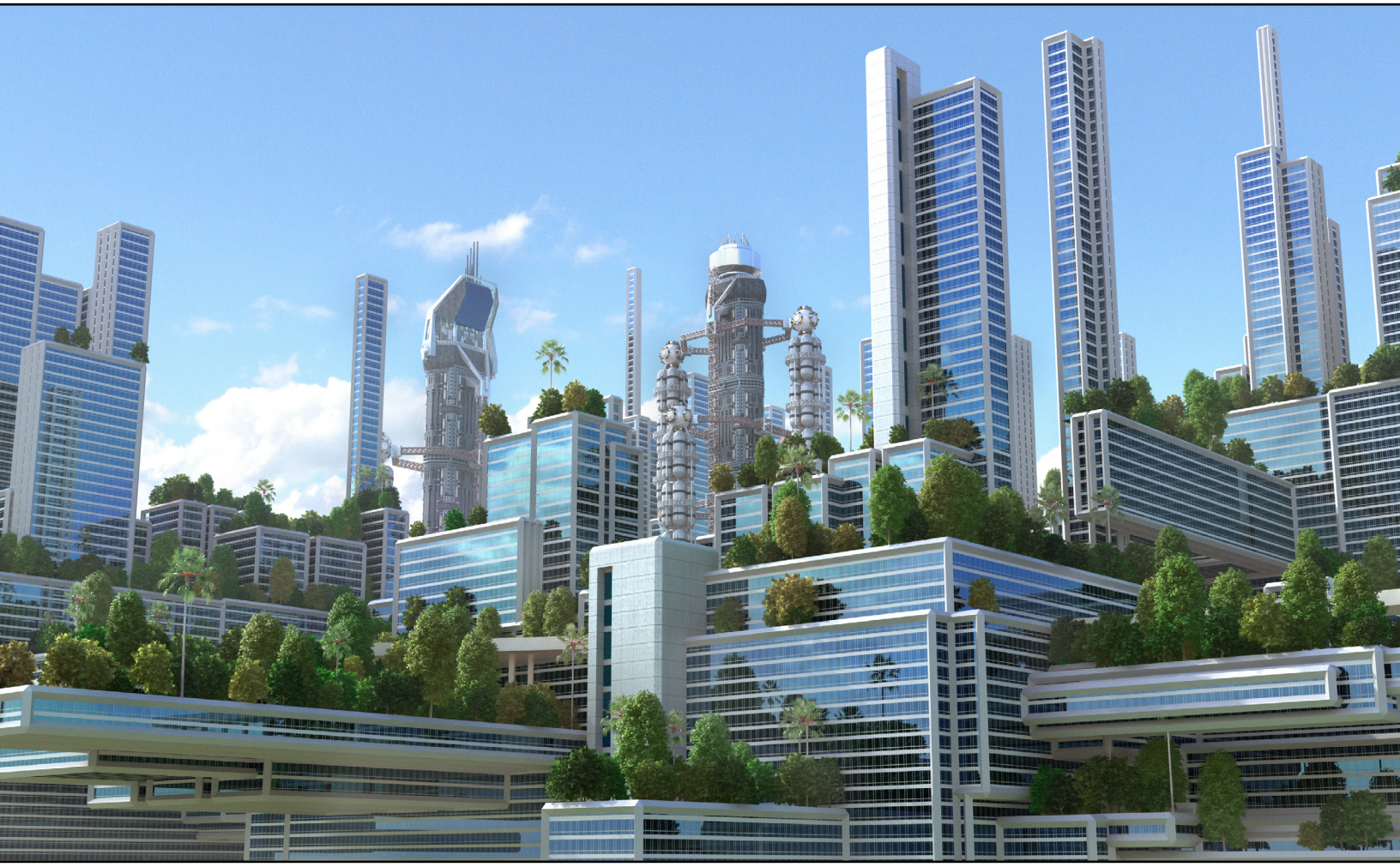
Smithsonian | SCIENCE *for Global Goals*

SUSTAINABLE COMMUNITIES!

How will we help our community thrive?



SUSTAINABLE DEVELOPMENT GOALS

developed by

Smithsonian *Science Education Center*

in collaboration with

iap SCIENCE HEALTH POLICY

the interacademy partnership

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Sustainable Communities!
How Will We Help Our Community Thrive?
Community Research Guide

Smithsonian Science for Global Goals Development Team

Lead Guide Developer/Writer
Heidi Gibson

Executive Director
Dr. Carol O'Donnell

Division Director
Laurie Rosatone

Curriculum Series Developers
Heidi Gibson
Andre Radloff
Logan Schmidt

Lead Product Specialist
Hannah Osborn

Digital Media Team
Ashley Deese, Assistant Division Director
Reuben Brenner-Adams
Sofia Elian
Ryan Seymour

Contributing Interns
Maggie New
Vivian Zohery

Smithsonian Science Education Center Staff

Executive Office
Kate Echevarria
Angela Pritchett

Advancement & Partnerships
Cole Johnson, Division Director
Kayla Powitz
Inola Walston

Professional Services
Dr. Amy D'Amico, Division Director
Katherine Blanchard
Katherine Fancher
Katie Gainsback
Dr. Hyunju Lee
Sherrell Lewis
Nejra Malanovic
Tami McDonald
Alexa Mogck
Eva Muszynski

Smithsonian Science for the Classroom Developers
Dr. Sarah J. Glassman
Melissa Rogers
Mary E. Short
Dr. Katya Vines

Finance & Administration
Lisa Rogers, Division Director
Anne-Marie Kom

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Senior Project Advisors

John Boright
Executive Director, International Affairs National Academy of Sciences
Washington, DC, USA

Peter McGrath, PhD
Coordinator
InterAcademy Partnership
Washington, DC, USA

Jacob Sherson
Founder and Director
Janet Rafner
Director of Learning
Arthur Hjorth
Postdoctoral Researcher
Ida Bang Hansen
Intern
ScienceAtHome
Aarhus University
Aarhus, Denmark

Research Mentors

Hooi Ling Khoo, PhD
Assistant Professor, Universiti Tunku Abdul Rahman
Perak, Malaysia

Liteboho Makhele
Programme Manager: Sustainable and Resilient Cities, South African Cities Network
Johannesburg, South Africa

Angela Mashford-Pringle, PhD
Associate Director/Algonquin Waakebiness-Bryce Institute for Indigenous Health, Dalla Lana School of Public Health, University of Toronto
Toronto, Canada

Mariana Sepiurka
Co-Founder at XSTEM and Owner at Estudio Rodrigo Sepiurka arquitectos
Buenos Aires, Argentina

Steven O. Nelson, MA
Supervisory Facility Operations Specialist, National Zoological Park DC & VA, Smithsonian Institution
Washington DC, USA

Project Advisors

Professor Andrea Boyack
Washburn University School of Law
Lawrence, Kansas, USA

Susan Brownknight
CEO, Living Arrangements for the Developmentally Disabled (LADD)
Cincinnati, Ohio, USA

Kate Christen, PhD
Research Associate, SLA/Smithsonian Facilities
Washington, DC, USA

Jennifer Collins
Manager of Ocean Education and Outreach, Smithsonian National Museum of Natural History
Washington, DC, USA

Prof Vernon Collis
Consulting Structural Engineer and Architect
Collis and Associates
Cape Town, South Africa

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Brian Coyle, PhD
Program Manager, Smithsonian Institution, National Zoological Park & Conservation Biology Institute
Washington, DC, USA

Jessica L. Deichmann, PhD
Program Scientist, Smithsonian National Zoo and Conservation Biology Institute & Smithsonian Working Land and Seascapes Program
Washington, DC, USA

Professor Priyan Dias, PhD
Senior Professor in Civil Engineering, University of Moratuwa, Moratuwa 10400, Sri Lanka
President, National Academy of Sciences of Sri Lanka
Associate Editor, Civil Engineering & Environmental Systems
Bandaranayake Mawatha, Sri Lanka

Ángela María Díaz-Márquez, Arch. Ph.D
Community Outreach Coordinator in Universidad de Las Américas (UDLA), Ecuador
Head of a multidisciplinary research group: Lugar, Medio y Sociedad (LMS)
Quito, Ecuador

Barbara Doten
Regional Director, Californian Global Education Project at CSU Long Beach
Los Angeles, California, USA

Alison Holm
Project Leader, Urban and Regional Planning
Washington, DC, USA

Rahinah Ibrahim, Ph.D., FASc.,
Senior Professor of Architecture, Faculty of Design and Architecture, Universiti Putra Malaysia
Selangor D.E., Malaysia

Caroline Knowles, PhD
Director, Urban Infrastructures of Well-Being Programme, Professor of Sociology, Goldsmiths, University of London
London, Great Britain

Mario Matamoros
School of Architecture, Universidad Nacional Autónoma de Honduras
Tegucigalpa, Honduras

Karen S. McDonald
STEM Program Coordinator, Smithsonian Environmental Research Center
Edgewater, Maryland, USA

Jenia Mukherjee, PhD
Assistant Professor, Department of Humanities and Social Sciences, Indian Institute of Technology Kharagpur
Kharagpur, India

Lara Noren
Ocean and Climate Education Specialist, Smithsonian National Museum of Natural History
Washington, DC, USA

Liana Ricci, PhD
Lecturer/Assistant Professor, School of Architecture, Planning and Environmental Policy
Dublin, Ireland

Kathleen Rooney
Director, Transportation Policy & Programs
Honolulu, Hawaii, USA

Cynthia E. Smith
Curator of Socially Responsible Design, Cooper Hewitt Smithsonian Design Museum
New York, New York, USA

Will Sowers
Regional General Manager—East Coast at Wheels Labs, Inc.
Orlando, Florida, USA

William Tietje, RLA, ASLA
Senior Associate, SCAPE Landscape Architecture
New Orleans, Louisiana, USA

Noah Weeth Feinstein
Director, Robert F. and Jean E. Holtz Center for Science and Technology Studies
Associate Professor, Curriculum & Instruction, Associate Professor, Community & Environmental Sociology, University of Wisconsin-Madison
Madison, Wisconsin, USA

Suresh Kumar Yadav
Province Coordinator, Nepal Peacebuilding Initiative
Katmandu, Nepal

Technical Reviewers

Badin Borde, M.A. Urban Geography
Project Manager, Siemens Stiftung
Munich, Germany

Professor Vernon Collis
Consulting Structural Engineer and Architect, Collis and Associates
Cape Town, South Africa

Jessica Loding, M.S.
Director of Sustainability at Schupan
Detroit, Michigan, USA

Kathleen Rooney
Director, Transportation Policy & Programs
Honolulu, Hawaii, USA

Field Test Sites

Linda Aaron, Jonathan Gonzalez
Natural History Museum of Utah
Salt Lake City, Utah, USA

Michael Oteng Attakora
Kumasi Wesley Girls' High School
Kumasi, Ghana

Constanza Azzolina, Mariana Sepiurka, Valeria Viva
XSTEM
Buenos Aires, Argentina

Chuck Barlow Jr., MSc-Executive Director
Saving Our Sons & Sisters International (SOSSI)
Atlanta, Georgia, USA

Stacy DeVeau, MS Ed
University of Arizona
Prescott, Arizona, USA

Milene Amato Regis de Farias
Southcrest Christian School
Lubbock, Texas, USA

Rosina Garcia
San Diego Unified School District

Talat Seema, Atifa Raza, Noreen Noor, Mohammed Faheem Shahid, Shahnila Zia
Dawood Public School
Karachi, Pakistan

Melanie Shaver, EdD.
Foothills Community School
Marion, North Carolina, USA

San Diego, California, USA

Kevin Hengelbrok
St. Edmund's Academy
Pittsburgh, Pennsylvania, USA

Andrea Inserra
Indian River Central School District
NYS Master Teacher Program Emeritus
Philadelphia, New York, USA

Phillip K Kight
Colgan High School
Manassas, Virginia, USA

Julia Elizabeth Little
Westover Senior High School
Fayetteville, North Carolina, USA

Tristan Orbeta
University of the Philippines—Diliman
Quezon City, Philippines

Maree Pascall, Kasey Liehr
Girl Scouts of Northeast Texas
Dallas, Texas, USA

Lily Shia
Shia Elementary
Los Angeles, California, USA

Terry Snow
Rogers Ranch Elementary
Laveen, Arizona, USA

Jason Watts
Dorris Intermediate School
Collinsville, Illinois, USA

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Smithsonian Science Education Center

The Smithsonian Science Education Center (SSEC) is an education organization within the Smithsonian Institution. The SSEC's mission is to transform K–12 Education Through Science™ in collaboration with communities across the globe. The SSEC promotes authentic, interactive, inquiry-based K–12 STEM teaching and learning; ensures diversity, equity, accessibility, and inclusion in K–12 STEM education; and advances STEM education for sustainable development. The SSEC achieves its goals by developing exemplary curriculum materials and digital resources; supporting the professional growth of K–12 teachers and school leaders; and conducting outreach programs through LASER (Leadership and Assistance for Science Education Reform) to help schools, school districts, state education agencies, and ministries of education throughout the world implement inquiry-based science education programs.

Smithsonian Institution

The Smithsonian Institution was created by an Act of Congress in 1846 "for the increase and diffusion of knowledge . . ." This independent federal establishment is the world's largest museum, education, and research complex and is responsible for public and scholarly activities, exhibitions, and research projects nationwide and overseas. Among the objectives of the Smithsonian is the application of its unique resources to enhance elementary and secondary education.

Smithsonian Science for Global Goals (SSfGG) is a freely available curriculum developed by the Smithsonian Science Education Center (SSEC) in collaboration with the InterAcademy Partnership. It uses the United Nations Sustainable Development Goals (SDGs) as a framework to focus on sustainable actions that are student-defined and implemented.

Attempting to empower the next generation of decision-makers capable of making the right choices about the complex socio-scientific issues facing human society, SSfGG blends together previous practices in Inquiry-Based Science Education (IBSE), Social Studies Education (SSE), Global Citizenship Education (GCE), Social Emotional Learning (SEL), and Education for Sustainable Development (ESD).

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Thank You for Your Assistance

Thank You for Your Support

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How will we help our community thrive?

Part 1: What are sustainable communities and how do they relate to me?	• Task 1: What is the problem? • Task 2: How is the problem of sustainable communities related to me? • Task 3: What skills do we need to do our research? • Task 4: Where do we notice the problem? • Task 5: How will we achieve our goals?
Part 2: How can including people help our community thrive?	• Task 1: Who is in our community? • Task 2: How has our community changed over time? • Task 3: Who makes decisions in our community? • Task 4: How can including our community help us make better decisions? • Task 5: How do we include the community in our actions?
Part 3: How can we use our space to help our community thrive?	• Task 1: Why does my community need space? • Task 2: How does my community use our shared space? • Task 3: How do green spaces meet the needs of my community? • Task 4: How can we design our space for a sustainable future? • Task 5: How can we make our community better?

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Part 4: How can housing help our community thrive?	• Task 1: Why is housing important? • Task 2: What are housing issues in my community? • Task 3: How can the design of housing meet our environmental needs? • Task 4: How can we use our housing in a sustainable way? • Task 5: How can we make housing in our community more sustainable?
Part 5: How can the transportation system help our community thrive?	• Task 1: Why is transportation important? • Task 2: What is the transportation system like in my community? • Task 3: How do transportation systems affect the environment? • Task 4: How do transportation choices affect my community? • Task 5: How can we improve transportation in our community?
Part 6: How can we use resources wisely to help our community thrive?	• Task 1: What resources do I use and how renewable are they? • Task 2: What waste does my community produce? • Task 3: How can my community reuse instead of waste? • Task 4: How can my community recycle waste? • Task 5: How can we improve resource use in our community?
Part 7: How will we act to help our community thrive?	• Task 1. What is the problem we want to take action on in our community? • Task 2: How will we try to solve our problem? • Task 3: How will our team take action in our community? • Task 4: Putting our plan into action • Task 5: What did I learn?

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Smithsonian
Science Education Center

Dear Parents, Caregivers, and Educators,

As a global community we face many challenges—biodiversity loss, climate change, pandemics. At times, these worldwide problems can seem overwhelming. We may ask ourselves questions about how to understand these complex problems and whether there's anything we can do to make them better. This community research guide encourages young people to discover, understand, and act on the answers to these questions.

In the years leading up to 2015, people around the world worked together to share their ideas about how our world should be. These ideas became a list of goals, the United Nations Sustainable Development Goals. The goals represent a plan for a sustainable world: a world where peaceful societies collaborate; a world where we live in balance with the environment of our planet; a world in which our economies fulfill our needs; a world that is fair to all.

As youth around the globe engage with the activities in this guide, they will gain an understanding of the science that underlies the Sustainable Development Goals—in particular, Goal 11: Sustainable Cities and Communities. They will be able to share their knowledge with their community, create tangible ways to help their community make informed decisions, and understand the best places to find additional information on the topics.

Throughout the guide, young people may find themselves asking many questions about the role that people, community spaces, housing, infrastructure, transportation, and resources play in helping our communities thrive. You do not need to have the answers to any of these questions. The most important thing you can offer young people is the opportunity to question, investigate, think critically and systemically, synthesize, and act.

One of the best ways to ensure a sustainable planet is by arming yourself with knowledge and then using that knowledge to make a difference in the world. The same is true for young people. But young people may require support and guidance from you to put their new knowledge into context. Ask the young people around you how they are feeling and what they are thinking about as they learn this content. Validate the questions they ask you, even if they ask them repeatedly.

Throughout the world, everyone—even children—strive for clean air, clean energy, a safe and healthy place to live, a sense of community, economic security, and reliable infrastructure. Living in sustainable communities gives us these things.

I am immensely grateful to the experts who helped to develop this guide—the InterAcademy Partnership (IAP), a collaboration of 140 national academies of sciences, engineering, and medicine; our colleagues across the Smithsonian Institution; and the external subject matter experts who contributed to this guide—for their perspectives and technical support in ensuring the science in this guide is accurate. I also want to say a special thank you to the author and developer of this guide, Heidi Gibson, for her tremendous expertise and understanding of international education, for her careful research and ability to translate complex ideas into meaningful content for youth, and for her thoughtful contributions to the *Smithsonian Science for Global Goals* project.

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Working together—scientists, researchers, parents, caregivers, educators, youth—we can make a better world for all. This guide is a step toward that grand collaboration.

Thank you for partnering with us to inspire our youth to build a better world.

Best,



Dr. Carol O'Donnell, Director
Smithsonian Science Education Center

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About this Community Research Guide

The goal of this guide is to prepare young people to take considered action on pressing global issues. Considered action means young people learn about a problem, connect it to the larger system, consider all the complexities of the problem, decide for themselves the best way to address it, and then execute a solution. Through this process young people are prepared not only to take considered action on a specific issue, but to build the skills to take action on all issues that affect them and their communities.



Figure 1: Sustainability Mindsets

Learners use scientific and socio-scientific investigations to understand their local communities, scientific principles, and innovation possibilities. They then have a chance to immediately apply this information to make decisions that are informed by the results of their investigations. Along the way, young people are prompted to reflect, investigate, think critically, analyze, and build consensus. Engaging in these activities builds important skills of empowerment and agency, open-mindedness and reflection, equity and justice, and global-local interconnection. These sustainability mindsets prepare young people to take an active role in shaping the future of their communities and their world.

A Framework to Discover, Understand, and Act

Throughout the guide, young people are prompted to Discover, Understand, and Act. The three parts of their learning journey are described here.

Discover

Young people already have a lot of information and opinions about the world around them. In this guide, they are prompted to use that knowledge as an entry point. They will discover what they already know and what questions they might have. They are encouraged to consider different perspectives and priorities. This both empowers young people and provides an immediate relevance and context for their investigations.



Figure 2: Global Goals Action Progression

Understand

Gathering new information is a primary goal of science. Using a wide variety of methods to do so helps young people understand the problems related to sustainable communities. They need to understand the problems both abstractly and within the context of their local community. Designing and conducting real-world investigations and interpreting results encourages young people to think like scientists.

Act

Finally, young people apply both their existing knowledge and their newly gathered information. First, they consider personal changes they could make to help make their communities more

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sustainable. Then, as a team, young people find consensus on what they *could* do, what they *should* do, and what they *will* do. Teams then take action and reflect on the consequences, both intended and unintended.

Pedagogy Shift

This guide may feel like a big shift from the standard method of teaching. The guide is:

Led by Young People

To make progress toward a better world, we need the ideas, enthusiasm, and energy of every young person. We need them to help design and build the world in which they want to live. This means throughout the guide young people make authentic decisions about what and how they will learn. Their goal is to understand issues in their own community and take sustainable actions to make their community and their world better.

Driven by Data Collected by Young People

In this guide, the young people you teach will become action researchers. They will gather information about what sustainable communities mean in their own local spaces. This includes scientific investigations and experiments to understand the problems better, and also using social science methods to understand their community better. Using science and social science helps young people arrive at a sustainable solution.

Focused on Action

The goal of the guide is to help young people not just learn but also do. Throughout the guide young people will conduct investigations and then use that knowledge to make decisions about the actions that would be best for their community. They will then put those decisions into practice and see the results of their actions.

Customized for Local Communities

Each community is unique. While the world has global problems, the solutions must work locally. Young people already have tremendous knowledge about their local community. This guide prompts them to use that knowledge and find out new information to figure out solutions that are sustainable in *their* community.

Structure of this Community Research Guide

Parts

This guide is made up of seven parts. Each part works with the others to help learners understand how to help their community thrive and to put that knowledge to work by taking action.

However, we recognize that time is a limiting factor in many learning spaces. Therefore, the guide is designed flexibly so it can be shortened, if necessary. The learners are guided to do this shortening work themselves at the end of Part 1. The guide prompts learners to discuss with their teacher how much time is available and then make decisions about the best way to use that time.

Tasks

Within each part there are five tasks. Each task helps learners examine a different aspect of the topic they are exploring. Within each task, there are three activities, which correspond to the Discover, Understand, Act framework. Discover activities focus on existing learner knowledge. Understand

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activities focus on gathering new information. Act activities focus on analyzing and applying that new information to make decisions. Tasks also include perspectives and stories from experts around the globe, so students can connect with the work of real-world scientists.

Using this Guide

Roles

The Learner's Role

Learners are the decision-makers of the guide. They will decide what information they need and what the information they gather means. Then learners use that information to decide and implement actions.

The Teacher's Role

This guide may be challenging for learners, since they may be unfamiliar with their role. Learners may need assistance in deciding what to do. Support and help them, but do not decide for them. Be patient. There are no right answers to the big questions posed by the guide.

Adapting the Guide for Your Context

Different Ages

This guide is designed to be used with young people between the ages of 8 and 17. This large range is deliberate to give access to these ideas to as many young people as possible. If you teach learners who are on the younger end of the age range you may need to support them a little more. For example, you might need to:

- Explain more complex words or topics.
- Promote listening and tolerance in group discussions.
- Support group decision-making.
- Help them plan investigations in their community or accompany the teams on their investigations.
- Help learners think through the feasibility of the action they plan.
- Present alternate ways of capturing ideas. For example if the guide suggests that learners write, but that is too difficult or is inappropriate for your learners, they can always draw, act out, or just talk about their ideas.

If you teach learners who are on the older end of the age range the language of the guide might seem a little simple. However, older learners who can understand more complex ideas will be able to develop a more nuanced view of the problem and come up with more extensive solutions.

All young people should be able to engage with the guide in a way that is developmentally appropriate for them.

Different Resources

We have assumed that you have very basic classroom resources, such as a class board (blackboard or whiteboard), paper, and pens/pencils. If it is not possible to capture learner writing, you can always have learners act out or discuss their ideas. If you do not have the capacity to print out a Community Research Guide for each learner, you or learner leaders can read the guide out loud from a single print or digital copy.

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Accessibility

This guide is designed to be widely accessible. The language, tone, and format attempt to be as inclusive as possible to reach learners with a wide variety of learning styles. However, learners with specific needs may need teacher support. As mentioned earlier, the guide activities can always be adapted to fit learner abilities, either by you or by the students themselves.

Extensions

For each part and many tasks there are additional activities, videos, and resources available digitally. They can all be found at the *Sustainable Communities!* storymap at https://bit.ly/2YdHNqB.

Teams

Much of the research, decision-making, and acting is designed to be done in teams. However, these teams can range in size from a group of two or three learners to the whole class. As a teacher, this is something to consider before beginning the Community Research Guide.

If you have motivated and responsible learners who need minimal teacher support, you may want to break your class into small teams. Smaller teams will allow individual learners to share their opinions and have more of an impact on team decision-making. With smaller teams, the experience can be more customized to the interests of the individual learner because there are fewer interests represented.

If you have learners who need more support, you may need to keep the class together in one team or have one team for each adult in the class. If you have only one team per adult, an adult can help support learners directly while they are engaging in activities such as conducting investigations and making decisions. However, because the team is larger, individual learners will have less of a voice in decision-making and less impact on group actions.

Alternately, if you have a group of learners with mixed abilities, you can design groups that bring together learners with different strengths. These types of groups can help learners support one another rather than immediately turning to an adult for support.

If you are uncertain whether a small or large group is most appropriate for your learners, you may want to wait and observe them during Task 1. In Task 1 in the Understand activity, learners break into groups and conduct investigations. If learners are able to complete this task independently with fairly limited teacher support, they would probably be successful in a small group. If learners need a great deal of help to complete this activity, you may want to structure group size so they can have more focused adult support throughout the Community Research Guide.

Getting Started

We recommend you give the young people you work with the Student Letter to read. You also may find it useful to read through each part of the Community Research Guide in its entirety before beginning that part. We suggest you encourage your learners to be excited about this new learning adventure. Be prepared to be enthusiastic about their ideas.

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Student Letter

Dear Student,

This is the last time you will be called a student in this Community Research Guide. Instead, you will take on a new role as an action researcher. Action researchers are interested in figuring out what to do to make their communities better. They use scientific investigations to help understand the natural world around them. They use social science investigations to help understand the people, cultures, and history of their communities. Then they use the information they gather to help solve problems in their own communities. This guide will help you learn more about this process. The most important thing to know is that you will control your own research and make your own decisions.

Think back to a time when you solved a problem. You first needed to know what you wanted, your goal. Then you needed to figure out what you needed to do to achieve your goal. This guide is similar. You will think about goals you have for your local community, then figure out what you need to take action to help reach those goals.

You and your classmates will work as a team to think about information you already have about the place where you live. Then you will investigate your local community and how things work. Finally, your team will decide how to make things better. Together you will put your decision into action. Sometimes, making decisions about what to do is difficult. Don't worry, this guide will give you lots of support.

How to Use this Guide

This guide is designed to help you explore and think about problems in your community. The guide is here to help you. That means you can always change it.

Adapting the Guide

You will notice that in this guide there are often suggestions of different ways of sharing your ideas or doing investigations. This is because different people think and work best in different ways. For example, some people like to draw, some people like to talk out loud, and some people prefer to write to express their ideas. This guide has suggestions, but you can always change the method suggested. You can share your ideas using discussions, acting, signing, telling stories, recording your voice, writing by

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hand, typing on a computer, drawing, or another way you choose. Think about the way you and your team learn best together. Including everyone on the team is important.

Safety Tips

This guide asks you to do and think about things that may seem unfamiliar. You will notice physical and emotional safety tips in the guide. These will help you stay safe and supported during the activities. Make sure you follow your teacher's directions about staying safe.

Guide Structure

There are seven parts in this guide. Each part has five tasks. Each task has three activities. The activities are called ***Discover***, ***Understand***, and ***Act***. In the ***Discover*** activities you will focus on thinking about information that you and your team already know. In the ***Understand*** activities you will investigate to find out new information. In the ***Act*** activities you will put your existing and new knowledge into action by applying it and making decisions. Words that may be unfamiliar will be in **bold** the first time they are used. Then at the end of each part a glossary lists the definitions of these words.

Investigations

You are the one doing the research in this guide. This means often you will develop your own questions and determine the best way to answer them. Developing and answering questions is how scientists find out new information about the world around them. As an action researcher, you need to think like a scientist to discover what you need to know, investigate to find out more information, and think about the meaning of what you found out.

Keeping Organized

In this guide you will have some papers you will need to keep so you can look at them later. You may want to have a folder, notebook, or scientific journal to help you stay organized.

Teams

You will be working with other classmates as part of a research team. Your team will conduct investigations and make decisions together. When conducting research, there

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may be many things to figure out as a team. You will need to be creative. There will not always be a clear right and wrong answer. Sometimes the team might not agree. This is okay. Just make sure to respect your teammates. There is no one right answer to the problems faced by your community. There is just the right answer for you and your team.

Getting Started

You will be thinking about complex problems. Sometimes this can feel difficult. Be patient. You will be guided to consider different parts of the problem. By the time you are making big decisions, you should have lots of information. Always remember, your work is important. Decisions you make can change your community. You are an important part of making your local and global communities better.

Thank you for working to make your community better.

The Smithsonian Science for Global Goals team
Smithsonian Science Education Center
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Guide Planner

Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Task 1: What is the problem?					
Discover	Explore the concept of community using your class as an example.	• Paper • Pens or pencils		20 minutes	7
Understand	Investigate five different parts of the classroom community.	• Paper • Pens or pencils		55 minutes	9
Act	Connect parts of a classroom with your local community and imagine a perfect community.	• Class board or poster paper		25 minutes	12
Task 2: How is the problem of sustainable communities related to me?					
Discover	Develop a personal identity map showing the different parts of who you are. Compare with teammates.	• Paper • Pens or pencils • Objects that represent you (optional)		25 minutes	15
Understand	Create a team identity map.	• Paper • Pens or pencils		15 minutes	17
Act	Gather your team's knowledge about parts of your community.	• Class board or poster paper • Sticky notes (optional)		20 minutes	19
Task 3: What skills do we need to do our research?					
Discover	Interview teammates to find out about their ideas about a perfect community.	• Pens or pencils • Paper (optional)	*My Perfect Community* (Task 1) *My Identity Map* (Task 2)	20 minutes	21
Understand	Explore different perspectives on what makes a perfect community.			25 minutes	22

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Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Act	Come to consensus on the most important goals for your local community.	• Paper • Pens or pencils • Class board or poster paper	*My Perfect Community* (Task 1)	25 minutes	24
Task 4: Where do we notice the problem?					
Discover	Consider connections between problems and knowledge in different places.			20 minutes	28
Understand	Investigate how the UN Sustainable Development Goals connect to the Thriving Community Goals you developed.	• Class board or poster paper • Sticky notes (optional) • Bag of small items (Option B: Activity)	*Thriving Community Goals* (Task 3) * StoryMap extension available	30 minutes	30
Act	Decide where your research area will be.	• Paper • Pencils • Local map (optional)		20 minutes	34
Task 5: How will we achieve our goals?					
Discover	Consider what you already know about your community and what you need to find out.	• Paper • Pens or pencils • Class board or poster paper	*Thriving Community Goals* (Task 3)	20 minutes	38
Understand	Decide which Parts of the guide you will use.			15 minutes	40
Act	Reflect on your thoughts and concerns about being an action researcher.	• Paper • Pens or pencils		20 minutes	42

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Timing note: *The time used for investigations, observations, and actions can vary. When different options are listed within an activity, some options may take longer than others.*

Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Task 1: Who is in our community?					
Discover	Consider the different identities in your community and why inclusion is important.	• Paper • Pens or pencils	*My Identity Map* (Part 1, Task 2) *Team Identity Map* (Part 1, Task 2)	15 minutes	55
Understand	Use a survey or other investigation to find out more about the people in your community.	• Paper • Pens or pencils • Computer (optional)		35 minutes + investigation time	56
Act	Create a community identity map.	• Paper • Pens or pencils		20 minutes	60
Task 2: How has our community changed over time?					
Discover	Reflect on and record changes you and your team have noticed in your community.	• Class board or poster paper • Audio or video recording device		45 minutes	62
Understand	Record oral histories from community members.	• Audio or video recording device • Paper and Pen		25 minutes + investigation time	64
Act	Create a representation of your community's history.	Optional: • Computer, paper, pen		25 minutes	68
Task 3: Who makes decisions in our community?					
Discover	Explore decision-making in your community.	• Paper • Pens or pencils	*My Identity Map* (Part 1, Task 2)	15 minutes	70
Understand	Collect information about how decisions are made in your community.			25 minutes + investigation time	72

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Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Act	Record how decisions are made in your community and how that could be more inclusive.	• Paper • Pens or pencils	*My Perfect Community* (Part 1, Task 1)	20 minutes	73
Task 4: How can including our community help us make better decisions?					
Discover	Design a shared community space to fill your own needs.	• Paper • Colored pencils	*My Identity Map* (Part 1, Task 2)	15 minutes	76
Understand	Experiment to find out whether including different people changes decision-making.	• Class board or poster paper • Paper • Pens or pencils		45 minutes	77
Act	Analyze experiment results and decide how you want to make decisions	• Paper • Pencils		20 minutes	79
Task 5: How do we include the community in our actions?					
Discover	Consider what you now know, think, and wonder about your local community.	• Paper • Pens or pencils	*Community Identity Map* (Task 1)	10 minutes	82
Understand	Investigate the best way to share information with your community.	• Paper • Pens or pencils		20 minutes + investigation time	83
Act	Share and get feedback on your Thriving Community Goals.	• Paper • Pens or pencils	*Thriving Community Goals* (Part 1, Task 3)	30 minutes	85

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Timing note: *The time used for investigations, observations, and actions can vary. When different options are listed within an activity, some options may take longer than others.*

Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Task 1: Why does my community need space?					
Discover	Consider your needs and how places in your community help you meet those needs.	• Paper • Pens or pencils • Computer (optional)	*My Identity Map* (Part 1, Task 2)	20 minutes	99
Understand	Use a survey, interviews, focus group, or other investigation to find out about the needs of people in your community.	• Paper • Pens or pencils • Computer (optional)	*Survey Instructions* (Part 2, Task 1, optional) *Oral History Instructions* (Part 2, Task 2, optional)	20 minutes + investigation time	101
Act	Identify ways the needs of people in your community are not met.	• Paper • Pens or pencils		15 minutes	104
Task 2: How does my community use our shared space?					
Discover	Find and analyze shared spaces in your research area.	• Paper • Pens or pencils	*My Research Area* (Part 1, Task 4) * StoryMap extension available	40 minutes	106
Understand	Investigate housing density and building use in your community.	• Paper • Pens or pencils		45 minutes	110
Act	Analyze the use of space in your community and decide if changes are needed by using different perspectives.	• Paper • Pens or pencils	*My Research Area* (Part 1, Task 4) *Part 3 Organizer* (Task 1)	25 minutes	111

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Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Task 3: How do green spaces meet the needs of my community?					
Discover	Explore built spaces and green spaces in your community.	• Small pieces of paper	*My Research Area* (Part 1, Task 4)	20 minutes	115
Understand	Investigate the ecosystem services provided by green spaces.	• Paper • Pens or pencils • Water, bowl, leaf, stone (optional, Observation 1) • Plastic bag, tie, plant (optional, Observation 2) • Water container (optional, Observation 4) • Water cup or bottle (optional, observation 5)	* StoryMap extension available	30 minutes + observation time (instructions for five observations provided, time for each varies; all are optional)	117
Act	Redesign the location and distribution of green space in your research area.	• Paper • Pencils	*Part 3 Organizer* (Task 1) *My Research Area* (Part 1, Task 4)	25 minutes	124
Task 4: How can we design our space for a sustainable future?					
Discover	Identify the strengths and weaknesses of your community.	• Paper • Pens or pencils • Computer (optional)	*Community Identity Map* (Part 2, Task 1)	25 minutes	127
Understand	Explore future opportunities and threats for your community.	• Paper • Pens or pencils • Topographical map of research area (optional)	*My Research Area* (Part 1, Task 4) *SWOT Analysis* (Task 4)	35 minutes	131

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Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Act	Continue redesigning your research area, adding shared spaces and considering the SWOT analysis results.	• Paper • Pencils • Items to represent shared spaces (optional)	*Part 3 Organizer* (Task 1) *My Research Area* (redesigned, Task 3) *SWOT Analysis* (Task 4)	20 minutes	134
Task 5: How can we make our community better?					
Discover	Consider what you now know, think, and wonder about the way space is used in your local community.	• Paper • Pens or pencils	*Part 3 Organizer* (Task 1) *Thriving Community Goals* (Part 1, Task 3)	15 minutes	136
Understand	Decide on individual actions you will take to help your community.		*Part 3 Organizer* (Task 1)	15 minutes	137
Act	Put your idea for individual change into action and reflect on it.			10 minutes + action time	138

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Timing note: *The time used for investigations, observations, and actions can vary. When different options are listed within an activity, some options may take longer than others.*

Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Task 1: Why is housing important?					
Discover	Consider how housing helps you meet your needs.	• Paper • Pens or pencils		15 minutes	153
Understand	Observe how people use housing and analyze whether it is functional for everyone in your community.	• Paper • Pens or pencils	*Community Identity Map* (Part 2, Task 1)	40 minutes + investigation time	155
Act	Examine and evaluate information about housing in your community.	• Paper • Pens or pencils	*Thriving Community Goals* (Part 1, Task 3)	15 minutes	159
Task 2: What are housing issues in my community?					
Discover	Explore housing issues and your own experiences with housing.	• Paper • Pens or pencils		20 minutes	162
Understand	Investigate housing affordability in your community.	• Paper • Pens or pencils	*Survey Instructions* (Part 2, Task 1, optional)	20 minutes + investigation time	165
Act	Identify functional and affordable housing issues in your community.	• Paper • Pens or pencils	*Part 4 Organizer* (Task 1)	25 minutes	170
Task 3: How can the design of housing meet our environmental needs?					
Discover	Explore how climate and local materials affect housing design.	• Paper • Pens or pencils		20 minutes	172
Understand	Investigate housing design in your research area.	• Paper • Pens or pencils	* StoryMap extension available	55 minutes	176

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Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Act	Draw or build a model of how you think housing should be designed in your area.	• Paper • Pens or pencils • Model-building materials (optional)	*Part 4 Organizer* (Task 1)	30 minutes	180
Task 4: How can we use our housing in a sustainable way?					
Discover	Consider different perspectives on saving resources at home.	• Paper • Pens or pencils		25 minutes	183
Understand	Investigate the sustainability of your daily actions at home.	• Paper • Pens or pencils	*Resource Use Checklist* (found at end of Part 4)	50 minutes	185
Act	Create a list of changes you could make so your daily actions are more sustainable.	• Paper • Pens or pencils	*Part 4 Organizer* (Task 1) *My Research Area* (redesigned, Task 3)	20 minutes	187
Task 5: How can we make housing in our community more sustainable?					
Discover	Consider what you now know, think, and wonder about how housing could be better in your local community.	• Paper • Pens or pencils	*Part 4 Organizer* (Task 1) *Thriving Community Goals* (Part 1, Task 3)	15 minutes	191
Understand	Decide on individual actions you will take to help your community.		*Part 4 Organizer* (Task 1)	15 minutes	193
Act	Put your idea for individual change into action and reflect on it.			10 minutes + action time	193

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Timing note: *The time used for investigations, observations, and actions can vary. When different options are listed within an activity, some options may take longer than others.*

Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Task 1: Why is transportation important?					
Discover	Explore how you use transportation and how it helps you.	• Paper • Pens or pencils		15 minutes	210
Understand	Investigate how people in your community use the local transportation system.	• Paper • Pens or pencils	*Survey Instructions* (Part 2, Task 1, optional) *Oral History Instructions* (Part 2, Task 2, optional) *Focus Group Instructions* (Part 3, Task 1, optional)	20 minutes + investigation time	211
Act	Consider how a transportation system can help your community thrive.	• Paper • Pens or pencils	*Thriving Community Goals* (Part 1, Task 3)	10 minutes	213
Task 2: What is the transportation system like in my community?					
Discover	Examine the transportation system within your research area.	• Paper • Pens or pencils	*My Research Area* (Part 1, Task 4)	25 minutes	215
Understand	Investigate to find out how different locations encourage different types of transportation.	• Paper • Pens or pencils	* StoryMap extension available	20 minutes + investigation time	217
Act	Develop and record ideas about how to redesign the transportation system in your area.	• Paper • Pens or pencils	*Part 5 Organizer* (Task 1)	20 minutes	219

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Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Task 3: How do transportation systems affect the environment?					
Discover	Consider your transportation choices and calculate your travel-related carbon footprint.	• Paper • Pens or pencils	* StoryMap extension available	35 minutes	222
Understand	Investigate the origin of items you use and consider how they might have traveled to you.	• Paper • Pens or pencils • Items to investigate (for example, clothing, food)	* StoryMap extension available	25 minutes	225
Act	Share what you have learned about transportation and carbon footprint with others.	• Paper • Pens or pencils	*Part 5 Organizer* (Task 1)	20 minutes + action time	228
Task 4: How do transportation choices affect my community?					
Discover	Explore different perspectives on how the transportation system affects your community.	• Class board or poster paper • Pens or pencils		25 minutes	230
Understand	Conduct an impact assessment for a new part of your community's transportation infrastructure.	• Paper • Pens or pencils	* StoryMap extension available	20 minutes + investigation time	232
Act	Propose changes to the new transportation infrastructure to make it more sustainable.	• Paper • Pens or pencils	*Part 5 Organizer* (Task 1)	20 minutes	234

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Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Task 5: How can we improve transportation in our community?					
Discover	Consider what you now know, think, and wonder about how transportation can make your community more sustainable.	• Paper • Pens or pencils	*Part 5 Organizer* (Task 1) *Thriving Community Goals* (Part 1, Task 3)	15 minutes	236
Understand	Decide on individual actions you will take to help your community.		*Part 5 Organizer* (Task 1)	15 minutes	237
Act	Put your idea for individual change into action and reflect on it.			10 minutes + action time	238

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Timing note: *The time used for investigations, observations, and actions can vary. When different options are listed within an activity, some options may take longer than others.*

Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Task 1: What resources do I use and how renewable are they?					
Discover	Observe and analyze the resources you use.	• Paper • Pens or pencils		25 minutes + observation time	253
Understand	Investigate the source and sustainability of the electric energy used in your community.	• Paper • Pens or pencils		25 minutes + investigation time	256
Act	Consider ways to make resource use in your community more sustainable.	• Paper • Pens or pencils	*Thriving Community Goals* (Part 1, Task 3)	15 minutes	258
Task 2: What waste does my community produce?					
Discover	Explore the waste you produce and what happens to it.	• Paper • Pens or pencils	*List of Things Used* (Task 4)	35 minutes	262
Understand	Investigate the amount of plastic waste you produce.	• Paper • Pens or pencils	* StoryMap extension available	20 minutes + investigation time	264
Act	Decide how you will reduce the waste you produce and put these ideas into action.	• Paper • Pens or pencils	*Part 6 Organizer* (Task 1)	20 minutes + action time	266
Task 3: How can my community reuse instead of waste?					
Discover	Search for evidence of a circular economy system in your community.	• Paper • Pens or pencils	* StoryMap extension available	40 minutes	268
Understand	Repurpose an item to create a new use for it.	• Paper • Pens or pencils • Items to repurpose	* StoryMap extension available	25 minutes + creation time	270

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Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Act	Share what you have learned about the circular economy with others.	• Paper • Pens or pencils	*Part 6 Organizer* (Task 1)	15 minutes + action time	272
Task 4: How can my community recycle waste?					
Discover	Explore recycling options and rules in your community.	• Paper • Pens or pencils	* StoryMap extension available	45 minutes	274
Understand	Investigate composting opportunities in your community.	• Paper • Pens or pencils	* StoryMap extension available	40 minutes	275
Act	Plan ways you could help your community do more recycling or composting.	• Paper • Pens or pencils	*Part 6 Organizer* (Task 1)	30 minutes	280
Task 5: How can we improve transportation in our community?					
Discover	Consider the ecological footprint of your community and how it could be more sustainable.	• Paper • Pens or pencils • Computer (optional)	*Part 6 Organizer* (Task 1) *Thriving Community Goals* (Part 1, Task 3) * StoryMap extension available	25 minutes	283
Understand	Decide on individual actions you will take to make your resource use and waste more sustainable.		*Part 6 Organizer* (Task 1)	15 minutes	287
Act	Put your idea for individual change into action and reflect on it.			10 minutes + action time	287

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Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Task 1: What is the problem we want to take action on in our community?					
Discover	Explore ways in which your community is doing well and ways in which it could be doing better.	• Paper • Pens or pencils	*Part 2, 3, 4, 5, 6 Organizers* (from Task 1 in each Part)	30 minutes	298
Understand	Report on problems in your community and consider the connections between the root causes of these problems.	• Paper • Pens or pencils	*Connected Problems* (Task 1)	25 minutes	300
Act	Come to a team consensus about which community problem you want to take action on.	• Paper • Pens or pencils	*Thriving Community Goals* (Part 1, Task 3)	25 minutes	303
Task 2: How will we try to solve our problem?					
Discover	Imagine different actions you could take to help address your team problem.	• Paper • Pens or pencils		25 minutes	305
Understand	Explore ways your possible actions could be more sustainable.	• Paper • Pens or pencils	*Team Action Plan* (Task 2) *Community Identity Map* (Part 2, Task 1)	20 minutes + investigation time	306
Act	Come to a team consensus on which action you will take.	• Paper • Pens or pencils	*Thriving Community Goals* (Part 1, Task 3)	20 minutes	308
Task 3: How will our team take action in our community?					
Discover	List the steps needed for your action.	• Paper • Pens or pencils	*Community Communication* (Part 2, Task 5)	15 minutes	310
Understand	Organize the action steps.	• Paper • Pens or pencils		20 minutes	311

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Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Act	Create an inclusive team action plan.	• Paper • Pens or pencils	*Team Action Plan* (Task 2)	25 minutes	312
Task 4: Putting our plan into action					
Task 4	Put your plan into action!	• Varies, depends on action plan		Varies, depends on action plan	313
Task 5: What did I learn?					
Task 5	Reflect on your action and your feelings.	• Paper • Pens or pencils	*My Feelings* (Part 1, Task 5) *Team Identity Map* (Part 1, Task 2)	15 minutes	314

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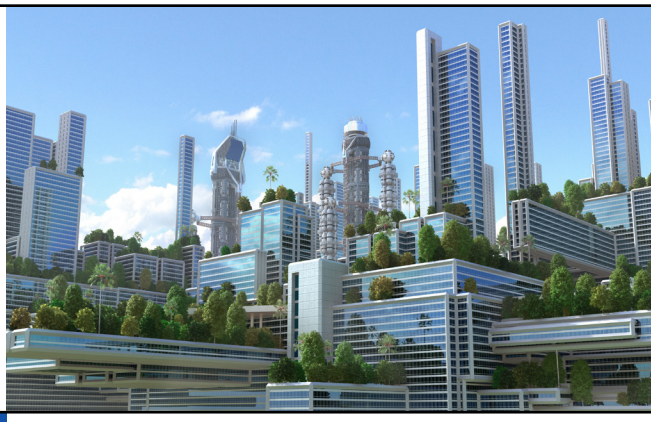



Part 1:

What are sustainable communities and how do they relate to me?

SUSTAINABLE DEVELOPMENT GOALS

developed by

Smithsonian
Science Education Center

in collaboration with

iap SCIENCE HEALTH POLICY
the interacademy partnership

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Smithsonian Science Education Center Module Development Staff

Executive Director - Dr. Carol O'Donnell

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Science Curriculum Developer - Heidi Gibson

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PART 1: WHAT ARE SUSTAINABLE COMMUNITIES AND HOW DO THEY RELATE TO ME?

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- **Act:** Where will we act? 34

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Find out More!

For additional resources and activities, please visit the *Sustainable Communities!* StoryMap at https://bit.ly/2YdHNqB.

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Planner

Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Task 1: What is the problem?					
Discover	Explore the concept of community using your class as an example.	• Paper • Pens or pencils		20 minutes	7
Understand	Investigate five different parts of the classroom community.	• Paper • Pens or pencils		55 minutes	9
Act	Connect parts of a classroom with your local community and imagine a perfect community.	• Class board or poster paper		25 minutes	12
Task 2: How is the problem of sustainable communities related to me?					
Discover	Develop a personal identity map showing the different parts of who you are. Compare with teammates.	• Paper • Pens or pencils • Objects that represent you (optional)		25 minutes	15
Understand	Create a team identity map.	• Paper • Pens or pencils		15 minutes	17
Act	Gather your team's knowledge about parts of your community.	• Class board or poster paper • Sticky notes (optional)		20 minutes	19
Task 3: What skills do we need to do our research?					
Discover	Interview teammates to find out about their ideas about a perfect community.	• Pens or pencils • Paper (optional)	*My Perfect Community* (Task 1) *My Identity Map* (Task 2)	20 minutes	21
Understand	Explore different perspectives on what makes a perfect community.			25 minutes	22
Act	Come to consensus on the most important goals for your local community.	• Paper • Pens or pencils • Class board or poster paper	*My Perfect Community* (Task 1)	25 minutes	24

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Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Task 4: Where do we notice the problem?					
Discover	Consider connections between problems and knowledge in different places.			20 minutes	28
Understand	Investigate how the UN Sustainable Development Goals connect to the Thriving Community Goals you developed.	• Class board or poster paper • Sticky notes (optional) • Bag of small items (Option B: Activity)	*Thriving Community Goals* (Task 3) * StoryMap extension available	30 minutes	30
Act	Decide where your research area will be.	• Paper • Pencils • Local map (optional)		20 minutes	34
Task 5: How will we achieve our goals?					
Discover	Consider what you already know about your community and what you need to find out.	• Paper • Pens or pencils • Class board or poster paper	*Thriving Community Goals* (Task 3)	20 minutes	38
Understand	Decide which Parts of the guide you will use.			15 minutes	40
Act	Reflect on your thoughts and concerns about being an action researcher.	• Paper • Pens or pencils		20 minutes	42

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1 Part 1: What are sustainable communities and how do they relate to me?

Remember: *In this guide you and your team are in charge. You can always change the instructions in the steps to make them work better for you and your team.*

Task 1: What is the problem?

In this guide you will become an **action researcher** to identify and help solve problems in your **community**. The knowledge you have as a member of your community is an important place to start. First you will ***discover*** what you already know in your community. Action researchers also use the tools of science and **social science** to understand the world around them. You will **investigate** to ***understand*** your community better. After thinking about all the information they know, action researchers ***act*** on what they have learned to improve their communities. In this guide you and your team are in charge. Your ideas and your investigations will help you decide the actions you will take in your community.

Ready? Let's get started.



Discover: *What are the parts of my classroom community?*

We all are part of different groups. These groups are sometimes called communities. This guide will help you create a better community. First you will start by noticing the community around you right now. You are in a classroom or other learning space. The people around you are a community. After learning about your classroom community, you can apply those lessons to your local community.

1. Action researchers start by remembering what they already know. Write down or share with a classmate what you already know about your classroom or other learning space and how people use it. For example, can you answer:
   a. Where is your classroom located?
   b. How many people learn together in your classroom?
   c. What types of activities do people do in your classroom?

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2. There are other things you know about your classroom community as well. For example, in your classroom you probably have shared and personal things and spaces. If you want, you can show this by playing a game. Here's how you play.
    a. When your teacher says "shared thing," move to, point to, or say out loud something in your classroom that everyone shares.
    b. When your teacher says "personal thing," move to, point to, or say out loud something in your classroom that is just yours.
    c. When your teacher says "shared space," move to, point to, or say out loud a space in the classroom that everyone uses.
    d. When your teacher says "personal space" move to, point to, or say out loud a space that is just for you.
3. If you would rather not play a game, that's fine too. Just talk to a partner about what types of spaces and things in your classroom are shared or personal.
4. Action researchers also make careful **observations**. To **observe** means to use your senses to get information about something. This is an important step in science. Practice making observations by looking closely at the things and people around your classroom.
5. In small groups or as a class, record your ideas by writing, drawing, or discussing your observations.
    a. What can you see or notice in your classroom or learning space?
    b. How are the things you notice used by people in the classroom?
    c. For the items you notice, what are some things that usually stay in the classroom (like a desk) and some things that get used up (like a piece of paper)?
6. As a class or small group, take a moment to discuss why you need a classroom community. Share your answers to these questions.
    a. How does the space in your classroom help you learn better?
    b. How do the things in your classroom help you learn better?
    c. How do the people in your classroom community help you learn better?
    d. How do you help others in the classroom community?
    e. Why do we need classroom communities?



⚠ Emotional Safety Tip

There are no wrong or right answers. Different people can have different opinions. Considering different opinions helps the group think better together. It may feel difficult to disagree with someone or have them disagree with you. Remember, disagree with ideas, not with people. For example, you could say, "I disagree with that idea because . . ."



Understand: *Why are the different parts of my classroom community important?*

You just thought about what you already know. Action researchers also need to find out new information. Now you will be investigating, or finding out more information about your classroom community. There are a lot of ways to investigate. In this activity you and your team are going to try some of them. Later you will apply what you learn to help you understand all communities better.

1. Read *More About Communities*. You may notice *More About Communities* is in a blue box. Blue boxes contain information or investigation instructions.

More About Communities

In the Discover activity you thought about the people in your classroom. You also thought about how the classroom space is used, shared and personal spaces and things, things that are always in the classroom, and things that get used up. These different parts all work together to create a place for you to learn with your classmates. These are all parts of your classroom community **system**. A system is something made up of parts that work together.

The parts of the classroom community system are like parts of your local community system. Right now, you will investigate these parts in your classroom to learn more about how they work. Later you will apply this information to your local community.

Remember, any community is **complex**—a system made up of many parts. Your research today is about understanding the different parts of your classroom community and how they work together to make your classroom a good place to learn.

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2. As a class, break into five groups. Each group will investigate one part of the classroom community. If you prefer, you can use only one group and cover all five parts within the group. Just make sure someone investigates each part. Your group is going to act as a research team to investigate your classroom community.
3. Gather with your group. Pick the part you will discuss from the list in *Parts of the Classroom Community*.
4. With your group, think about your questions so you can decide what you need to investigate. What questions do you have about the different parts of your classroom community? Think about what you need to know to understand whether each part is working well. How does the part you are investigating help make a community where everyone can learn?
5. Write down your questions about your part. You will use these questions to investigate your classroom community.

Parts of the Classroom Community

Part 1: People

People in a classroom talk, play, and learn with one another. Communicating and doing activities with others is called **interacting**. Interacting with others can help make a classroom a good place for learning. What can you ask about the ways people interact in your classroom community? For example, "How do people in my classroom share ideas with one another?"

Part 2: Shared Spaces

Classrooms have shared spaces that can help make them a good place for learning. What can you ask about the shared spaces in your classroom community? For example, "What space do people use the most in my classroom community?"

Part 3: Personal Spaces

Classrooms often have personal spaces that can help make them a good place for learning. What can you ask about the personal spaces in your classroom community? For example, "When do people use their personal spaces?"

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Part 4: Infrastructure—Things that Stay in Your Classroom

Classrooms have **infrastructure** that can help make them a good place for learning. Infrastructure in a classroom means things that stay in the classroom, like the walls, boards, desks, and shelves. Infrastructure can be used again and again. What can you ask about the infrastructure in your classroom community? For example, "How do people use the shelves in my classroom community? Is everyone in my classroom community able use the shelves?"

Part 5: Resources—Things that Are Used Up

Classrooms have **resources** that can help make them a good place for learning. These things sometimes are used only for a short time. Resources in your classroom are things that get used up, like a piece of paper or a pen. What can you ask about the resources in your classroom community? For example, "How do we use the things we have in our classroom?"

6. You have listed your questions as a group. Now you will do an investigation to find out the answers. With your group, pick the best way to investigate. You could:
    a. Talk to a leader. For example, you could talk to your teacher to learn more about why they set up the classroom the way it is.
    b. Do a community **survey**. For example, you could talk to people in your classroom community about how it feels to learn in the classroom and be a part of the community.
    c. Conduct an experiment. For example, if you want to understand why an object or item is important, you could take it away and see what happens.
    d. Conduct community observations. For example, you could take some time and watch carefully to notice how your classmates are using spaces or things in your classroom.
7. Plan your investigation with your group.
    a. What do you need to do?
    b. Who will do it?
    c. For example, if you want to talk to a leader, who will you talk to? What questions will you ask? Who will ask the questions? Who will record the answers?

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8. Conduct your investigation.
9. Write down or discuss what you find out.
10. Talk with your group about the results of your investigation.
    a. What new information did you find out?
    b. Why is the part you researched important to the whole classroom community system?
11. Share your ideas with the rest of the class.
    a. What do you now know about the part you researched?
    b. Why is it important to your classroom community?
12. As a class, talk about connections you see between the different parts of the classroom community. Remember, those parts are people, classroom space, personal space, infrastructure, and resources. Discuss:
    a. If one part was missing would it affect the other parts?
    b. How do all the parts work together to build a classroom community that helps everyone?



Act: *How does my classroom community relate to my local community?*

Action researchers apply what they learn to make their local communities better. People living, playing, and working together make up a local community. Your local community might be your city, town, village, or other local area. It includes you, your family, your neighbors, and friends who live nearby. This guide is about helping you make choices to make your community better. You can start by thinking about how your classroom community is similar to your local community.

1. As a class, think about how each part of your classroom community system might be like a part of your local community system. For example, you may have a desk as your personal space in your classroom. What would be the personal space you and the people you live with have in your local community?
2. Write this list someplace everyone can see. Draw two columns. Label one "Classroom Community." Label the other "Local Community." Under the *Classroom Community* column, list the parts you explored in the Understand activity. Figure 1.1 shows an example.

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Classroom Community	Local Community
People	
Shared spaces	
Personal spaces	
Infrastructure (things that stay in the community)	
Resources (things that get used up)	

Figure 1.1: Sample of a classroom and local community list

3. Next, list the matching parts under the *Local Community* column. Think:
   a. Who are the people in your local community?
   b. What are the spaces everyone shares in your local community?
   c. Where do you have personal space just for you and the people you live with in your local community?
   d. What infrastructure, like roads, are always there in your local community?
   e. What resources, like water or food, do people use up in your local community?
4. Take out a piece of paper and title it *My Perfect Community*. In this guide you will be investigating different parts of your local community system. This will help you find out information about what is going on in your local community right now. You will also need to think about what you believe *should* be happening in your local community. The difference between what *is* happening and what *should* be happening is where you can help when you take action.
5. Start to imagine how you think a community should be. Don't worry, we know life is not always perfect. Right now, it is time to dream.
6. Write or draw some ideas about your perfect community. If you would like to record this information a different way, you can do that. Just make sure you can save it and use it later. You can use some or all of these questions to help you think.
   a. What needs do you have that would be met in a perfect community?
   b. What wants do you have that would be met in a perfect community?
   c. What do you think you would see or notice in a perfect community?
   d. What would you not see or notice in a perfect community?
   e. How would you expect to feel in a perfect community?

7. Your classroom community helps people learn together. Local communities can help people live together. Living together includes time you spend playing, working, learning, and being with others. Think about all the things people are doing in a community. How would these things change in a perfect community? If you have any new ideas about your perfect community, add them to your paper.
8. Keep the *My Perfect Community* paper. You will be using it later.

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Task 2: How is the problem of sustainable communities related to me?

Action researchers need to ***discover*** their own **identity** and opinions. Then ***understand*** other people's identities and opinions. Finally, when you ***act*** you can use that information to make decisions that are good for everyone. In this task you will think about how identities relate to goals for your community.



Discover: *Who am I?*

You may have noticed during Task 1 that some of your classmates had different ideas than you. Our different experiences, backgrounds, and ideas give each of us a unique identity. Your identity is what makes you you. Our different identities often lead to different **perspectives**. Perspectives are the way we think about the world around us. Understanding your own identity and perspective can help you understand other perspectives. This activity will help you think about your own identity.

1. Take out a piece of paper and title it *My Identity Map*. If you prefer, you can make an identity map using objects or digital tools. There are more details on how to do that in step 6.
2. On the paper, write your name in the center of the page, or draw a small picture of yourself.
3. Draw a circle around your name or picture.
4. Answer the question "Who am I?" or "What describes me?" The list below can give you some ideas to consider. You can also include things that are not on the list. Record anything you can think of that is important to who you are.
   - Age
   - School or class
   - Race and/or ethnicity
   - Gender
   - Country or place where you live
   - Country or place that is important to you or your family
   - Topics or subjects that interest you
   - Hobbies or things you like to do for fun

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- Physical traits (such as tall, black hair, blue eyes, wears glasses)
- Personality traits (such as loud, funny, sad, kind)
- Roles you have in your household (such as big sister, helper, cousin)
- Groups you belong to

5. Write each answer on the page around your name. Draw a line between your name and each answer. Figure 1.2 is an example of a written identity map. You can put your answers at the end of each line.

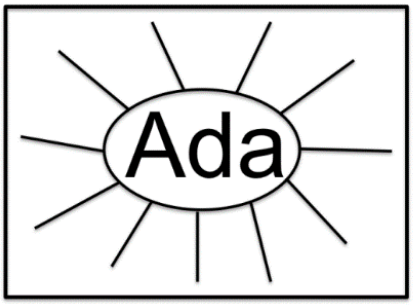

Figure 1.2: Example of a written identity map

6. If you prefer, you can use objects around your home to create your map. To keep your map, you can take a picture or just remember it. Figure 1.3 is an example of an identity map using objects. You could also make a digital map using recordings or photos.

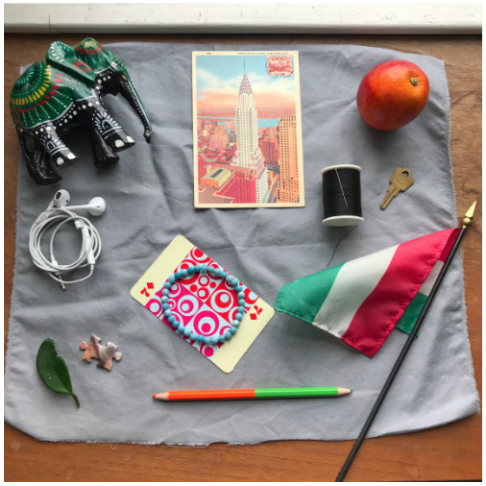

Figure 1.3: Example of an identity map using objects

7. Now form a team. You will be working with your team for the rest of this guide. You already know you are an action researcher while you are using this guide. You will also be part of a research team made up of your classmates. Using scientific tools, you will work together to understand your community and make it better. Your team may be your whole class, or it may be a smaller group. Either is fine.

8. Find out what you have in common with your team. Try to find matching identities with your teammates. For example, if you like to read for fun, see if you can find someone else who likes to read for fun. Find a few matching identities. Then move on to the next step.

> **⚠ Emotional Safety Tip**
>
> Sharing your identity with someone else can help build trust between you and that person. But it can be hard to share your personal identity with someone else. Only share parts of your identity map that you feel comfortable talking about.

9. Now try to find teammates who have different identities than you. It is good to have different identities. Everyone is unique. This means you have different information to share. For example, if you were born in the place where you live but your teammate was born somewhere else, you each may know different things. Find a few people who have different identities than you. Then return to your place.
10. As a team, discuss:
    a. How did you feel when you found teammates with matching identities?
    b. How did you feel when you found teammates with different identities?
    c. What could you find out from your teammates who had different identities?



Understand: *Who is on my team?*

You just made an identity map that shows who you are personally. Your team also has an identity that includes all the members of the team. In this activity, you will build a team identity map. Sometimes there are differences between your personal and team identities. These differences may affect the decisions you or the team make. For example, you may love listening to a certain type of music. However, your teammates

might love another kind of music. Imagine you were deciding what type of music to play. It would be important to have all the information when you make a decision. Your team may have many different perspectives. This is because you have many different identities. Different perspectives help you make better decisions.

1. Think about your identity map. What are some things that make you unique? Circle one item that may help you bring new information to your team.
2. You will have many discussions with your team as you work through this guide. Read through the following guidelines. Use these during your team discussions.

Guidelines for Team Discussion

- Remember, listening to many different perspectives and viewpoints is good.
- Open yourself to new ideas and perspectives.
- Actively listen by facing the person and show them you are paying attention.
- Collaborate with others to change things for the better.

3. Pick one person on the team to lead the discussion.
4. Have the team leader take a piece of paper and title it *Team Identity Map,* or write it on the board. Write the word "Team" at the top and circle it. You can look at Figure 1.1 for an example.
5. The team leader will start by sharing the one item they circled about their identity from the Discover activity. They will also share why they circled this item.
6. The team leader will write their item on the *Team Identity Map*, just as you did on your *My Identity Map* in the last activity.
7. Then the team leader will ask another team member to share. The next team member should share their name and the item they circled from the Discover activity. They should also share why they circled this item. Write this item on the *Team Identity Map*.
8. Repeat until all members of the team have shared and added one item to the *Team Identity Map*.

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9. Discuss the following questions in your team.
    a. How is your personal identity map like the team map? How are these two maps different?
    b. Does including everyone's identity on the *Team Identity Map* help everyone feel part of the team? What would it feel like if only some people were included?
    c. Why should we care about the identity of other people on the team?
10. Save the *Team Identity Map* by keeping the paper in a safe place or taking a picture of the board.



Act: *What does my team know about my community?*

In this guide you will think about how to help your local community become better. Your role is very important because you and your team are experts on your local community. Your team probably knows a lot about your local community. Now you will get ready to use the knowledge and experiences of your whole team.

1. Do you remember the parts of your classroom and local community systems? If you made a table matching the five parts of your classroom community system with the parts of your local community system, it might be a good idea to look at that table again (you can find it in Task 1, ***Act***, step 3). If you do not have that table, here is a list of the five parts to think about in your local community system.
    a. People in your community
    b. Shared spaces where people can interact, like parks, community centers, and markets
    c. Personal spaces, such as **housing**, which is the way most people have personal space in a local community
    d. Infrastructure, things that stay in your community and get used again and again, like roads, bridges, buildings, or buses
    e. Resources, things that get used up by people, houses, and businesses, like electricity, water, or food
2. As a team, write each part on a separate piece of paper or a different part of the class board. If you use paper, you might want to put it on the wall near your team.

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3. Now list the things you can think of that make up each part in your local community system. For example, under *Personal Spaces* you might list different types of places where people live in your community.
4. Think about each part by yourself. Think about experiences you have had with that part. Think about what you personally know about that part. For example, think about the transportation infrastructure you use to get to school or go other places. Or maybe you know about a shared space, like a park, where people go to play.
5. Have each team member write down their thoughts. You can write directly on the paper or a section of the board. Or you can write on and attach a separate piece of paper or a sticky note. Figure 1.4 shows an example. Then move on to the next piece of paper or section of the board.

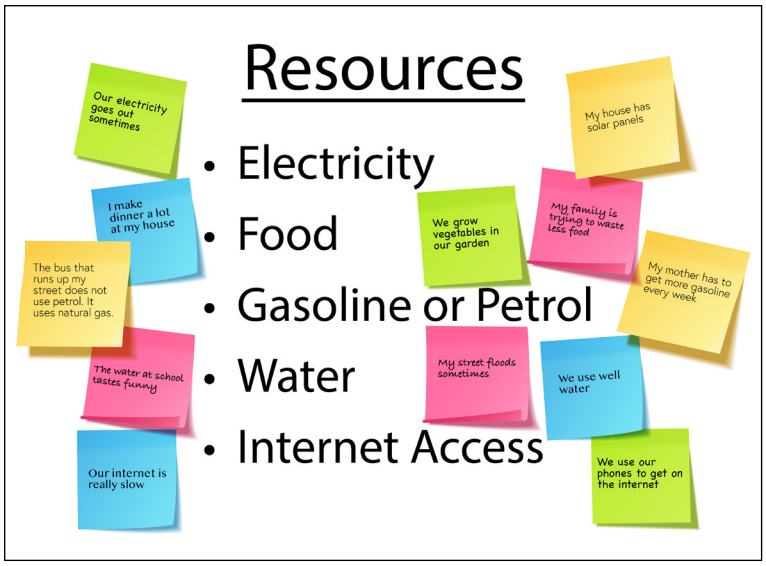

Figure 1.4: A sample community system list for the Resources part, including the things that are resources and team knowledge and thoughts about them

6. Notice the experiences and knowledge other team members listed. Consider:
    a. Do you notice anything that surprises you?
    b. Do other people have different knowledge and experiences than you?
7. As a team, discuss:
    a. Do you know things that you might not have known if you weren't working together?
    b. How do the different identities of group members help make the team stronger?
8. As action researchers, you will work together as a team to find the best way to help your community. The different identities and experiences of each member of your team will help you make better decisions.

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Task 3: What skills do we need to do our research?

Action researchers use information to make decisions. In this task you find out information about different opinions in your community. This will help you understand how to help your community. You will ***discover*** the opinions of your team. Then you will ***understand*** different types of perspectives. Finally, you will ***act*** on this information to decide what is important to your community.



Discover: *What do I want for my community?*

Discovering what your teammates and other community members are thinking is important. This activity will help you discover how your teammates are thinking about a perfect community.

1. Remember the end of Task 1 when you thought about your perfect community? Take out your *My Perfect Community* paper.
2. If you are using paper, turn it over and divide it into four sections.
3. You are now going to interview your teammates to discover their ideas about a perfect community.
4. Interview four of your teammates about the ideas they wrote, drew, or thought for their perfect community. Also allow yourself to be interviewed by four different teammates.
5. During your interviews you can write or draw notes in the four sections of your paper to remind yourself about what your teammates said.

Interviewer Tips

- Face the person sharing their ideas.
- Show the person you are paying attention.
- Remember your teammates might have very different ideas from you. This is good. Learning about different ideas helps you understand your community and make better decisions.
- As an interviewer, do not to share thoughts you might have. Your role is to pay attention to the other person's ideas.

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6. When you have finished interviewing and being interviewed, return to your place. Look at your results. Consider:
    a. Did anyone you interview have different ideas than you?
    b. What did your interviews tell you about different ways of thinking about a perfect community?
7. As a team, discuss your results.
    a. Did everyone have the same ideas?
    b. Take out your *My Identity Map* from Task 2. Now think about when you had a different idea than someone you interviewed. Is there something about who you are or what you have done that makes you think the way you do? For example, you may think that a perfect community would have lots of sports fields because you love to play sports. However, your teammate may love to play music and so they think sports fields are less important.
    c. Remember, communities are made up of lots of different people with lots of different ideas.
    d. Why is it important to get ideas from many different people when trying to imagine what your community should be like?



Understand: *How can we consider other perspectives when making decisions?*

Action researchers must understand different points of view, or perspectives. Thinking about different perspectives can help you understand why people might approach a problem differently. It can also help you understand what people value. In this activity you are going to explore different perspectives on what makes a perfect community. You will be talking more about how these perspectives work soon.

1. Break into four groups and move away from each other into four areas, such as the corners of a room. If your class would rather do this activity together, you can just go through all four perspectives one at a time.
2. Read *The Four Perspectives*. Each of the four groups is going to explore one perspective.

The Four Perspectives

The perspectives you will explore in this guide are social, environmental, economic, and ethical. People using different perspectives believe different parts of the community system are most important to consider.

- **Social** is about the interaction of people in a community. The health, education, and well-being of people are the most important thing.
- **Environmental** is about the natural world. Protecting the Earth and its natural systems is the most important thing.
- **Economic** is about money, income, and use of wealth. Economic growth, including making sure people have jobs and enough money, is the most important thing.
- **Ethical** means the fairness of something. Doing what is right and having a just community where everyone is treated fairly is the most important thing.

3. Decide or have your teacher assign you a perspective. Make sure one group is thinking about each perspective.
4. In your group, remember your ideas about a perfect community. This time you will think about what a perfect community would be like if everyone was only thinking about your assigned perspective. For example, if you are considering an economic perspective, think about what a perfect community would look and feel like if the economy was the most important thing to people in the community. If people valued making money and having jobs above everything else, how would your community look and feel?
5. After you have discussed your perspective in your group, take turns sharing your ideas with the rest of the class.
6. Now you will take a different approach to understanding your perspective. Sometimes the easiest way to understand the importance of something is to remove it and see what happens. Back in your group, think about and discuss what life in your community would be like if no one valued your assigned perspective. For example, if your assigned perspective is "ethical" and no one thought about fairness, what would your community look and feel like?

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7. As a group, come up with a creative way to share your thoughts. For example, you could act out life without your perspective, tell a story about life without your perspective, or find another way to show the rest of class.
8. Share your ideas with the rest of your class.
9. Then, as a class, think about and discuss:
    a. Were there any of the four perspectives that were not important?
    b. What happened if one perspective was not valued?
    c. Why is it important to balance all four perspectives?
10. When you can balance all four perspectives in a way that works for a long time, that is called **sustainable**. A **sustainable community** balances the needs of living things and the resources available in a way that does not hurt future generations. Your goal while using this research guide is to understand how to help make your community better in a sustainable way.



Act: *How can we come to consensus to help our community?*

Balancing different perspectives is the key to sustainable communities. Your research team will make decisions about the best actions to take in your community. Making good decisions as a group can be hard. Not everyone in the group can always get everything they want. Good teams try to come to **consensus**. Consensus is not competing to win or lose. Coming to consensus means working together to find a balanced decision that works for everyone. In this activity your team will come to consensus on the most important goals for your local community.

1. Get out your *My Perfect Community* paper. On one side you will see your ideas about a perfect community. On the other side you will see some of your teammates' ideas about a perfect community.
2. Read *Thriving Community Goals*.

Thriving Community Goals

Completely perfect communities do not exist. However, there are communities around the world that are **thriving**. When things are generally working well for people in a community, that is a thriving community.

As action researchers you need to figure out what you can do to help your community thrive.

Right now, you will set goals to help your community thrive. If you were taking a journey this would be like knowing where you want to end up. Your goals are your destination.

Later you will find out what is happening in your community right now. This is like understanding where you are right now on your journey.

Then you can make decisions about the actions you need to take to reach your goals. This is like figuring out how to get from where you are in your journey now to where you want to end up.

3. As a team, start building a list of team goals. Use a class board or a piece of paper and together make a list of possible goals. Team members can write their goal ideas on the board or paper.
4. Look again at the information you have on the *My Perfect Community* paper. Are there ideas on that paper that would be important goals? For example, maybe you thought that in a perfect community everyone would have a place to live. That is an important idea. Housing for all might be a goal of a thriving community.
5. Next, remember the social, environmental, economic, and ethical perspectives. Are there goals that need to be added related to those perspectives? For example, maybe you remember the group with the environmental perspective sharing what life would be like if no one cared about the natural world. Do you want to include any goals about caring for or protecting the natural world?
6. Team members can add any new goal ideas on the board or paper.
7. Now, with your team, use those ideas to come to consensus on a team list of the main goals for your community.
8. Take a few minutes to look at the board or think about what you have heard. Are there goals listed that are very similar? Part of coming to consensus is noticing when different people share the same values but are talking about it in a different way.

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9. If you see two or more goals that are similar, you can group them together. This will help you narrow down your list. For example, maybe one team member wrote a goal of having people use cars less. Maybe another wrote a goal of having trains to connect your community. Both may value public transportation. Your team might be able to come up with one goal that includes both more trains and fewer cars.
10. Now that you have a list of the possible important goals for your community, look at the goals and decide which are the four you think are most important.
11. Turn to a partner and discuss your ideas. Listen closely to your partner's opinions and share your own thoughts about why the goals you chose are most important.
12. Together with your partner, pick the four goals that you two together think are most important. This is not about picking *your* ideas. It is about picking *the best* ideas. You can use these phrases to help you have a useful conversation:
    - I agree/disagree because . . .
    - I'd like to go back to what you said about . . .
    - I noticed that . . .
    - Couldn't it also be that . . .?
    - Can you explain why you think that?
13. As a pair, you should now have four goals. Write them down or remember them.
14. Next, you will have a chance to eliminate less-important goals.
    a. If you are using a board or paper, put a mark next to the four goals you and your partner think are most important.
    b. If you are talking as a team, have a teacher or team leader say the goals out loud. Raise your hand when someone says one of the goals you and your partner think are most important.
15. Either look at the board or think about who raised their hand. Are there any goals listed that no one thought were the most important? If so, cross those goals off the list. They may still be important, but not the most important.
16. For each goal, a team member who thinks the goal is very important should explain why to the team.
17. When you have finished all the goals, discuss:
    a. Have you changed your mind about whether specific goals should be included?
    b. Are there goals that you think the team is ready to take off the list?

18. As a team, see if you can narrow the number of goals down to between three and six. These are your thriving community goals.
19. Title a piece of paper *Thriving Community Goals*. Then list these goals underneath. You will have a chance to talk about them again. Don't worry if they are not yet perfect. You will have a chance to keep thinking about these goals later. Keep this piece of paper, you will need it later.

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Task 4: Where do we notice the problem?

We are all a part of different communities. The people at your school are part of your school community. The people living near you are part of your local community. The people living in your country are part of your national community. All the people living around the world are part of the global community. Sometimes people in one community have problems that occur just in that place. However, you will ***discover*** that often problems that occur in one place are related to problems of the larger communities. During this task you will ***understand*** more about the relationship between problems of your local and global communities. Then you will ***act*** by deciding where you will do your research in your community.



Discover: *What connects problems in different communities?*

Communities may look different in different places, but many times they have problems that are similar. In this activity you will think about the connections between problems in different places.

1. Start off by thinking about a time when you had a problem and talked to a friend about it. Consider:
   a. Was it helpful to talk to a friend?
   b. If so, why?
   c. If your friend had faced a similar problem, would that make talking to them more helpful?
   d. If so, why?
2. As a class, come up with some reasons why it might be useful to talk to a friend, especially a friend who had a similar problem. Just like people, communities have problems too. When they do, it can be useful to connect with other communities that have similar problems.
3. Communities around the world sometimes work together to solve their problems. They also work with scientists and other researchers to help understand their problems better. As action researchers, you can get ideas and advice from other researchers, just as you would from a friend.

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4. In this research guide you will find out information from researchers in other places. These researchers are also trying to understand problems in their local communities and help them thrive. The information from researchers can give you ideas about your research and actions.
5. One researcher, who you will meet a little later in the guide, took the photograph in her local community shown in Figure 1.5. Examine it carefully.

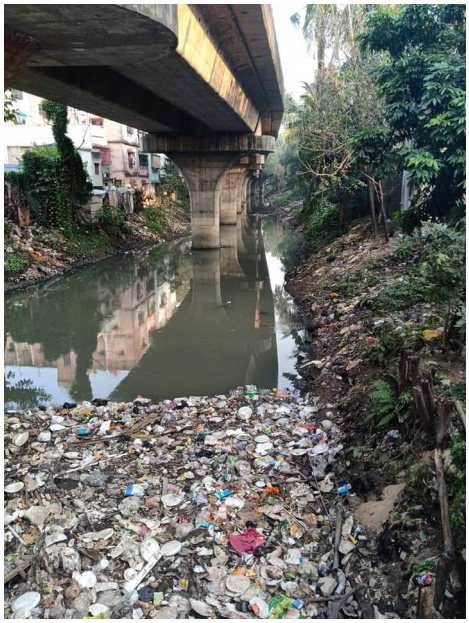

Figure 1.5: Local community photograph

6. Turn to a partner and discuss:
    a. What do you notice in the photo that makes you happy? Try to pay close attention and be specific.
    b. What do you notice about the photo that makes you worried?
    c. A researcher took this photo in the community where she works. What kind of things do you think she might know about her community?
    d. What do you wonder about the community where the photo was taken or the researcher who took this photo?
7. Now come together as a team and share the ideas you just discussed.
8. Problems in different places often have similar causes and solutions. Think about any connections between this photo and things you have noticed in your community. As a team, discuss:
    a. Are there things you notice in this photo that you have also seen in your local community?

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b. Are there problems you notice in this photo that are the same as problems in your community?

c. If you could talk to the researcher who took this photo, what advice or ideas do you think she could give you about your community research?

9. Asking advice or ideas from other researchers can be an important part of building a knowledge **network**. A network is a set of connections between people, communities, and ideas. Networks extend all over the world to help scientists and other researchers work together to create new knowledge and solutions.
10. As action researchers, you will use scientific and other tools to find out new information about your own community. This information can help you and your community. It can also help other communities by giving them new ideas, just as information from other communities can help you.



Understand: *How are global community goals related to my local community goals?*

Sometimes problems are so big that they really need the entire world to work together to make progress. As action researchers, you probably have thought of some of these problems already during your previous tasks.

1. By yourself or with your team, think about some problems that are so big that you think solving them requires people all around the world.
2. What do you know about organizations that help people around the world collaborate to solve problems? Read *The United Nations and the Sustainable Development Goals* to find out more.

The United Nations and the Sustainable Development Goals

Solving global community problems like the ones you just thought about is complex. It takes many people working together in many places to make these problems better. When many people are working together it helps to have someone organizing. The United Nations, also called the UN, is a global organization designed to help governments and people around the world collaborate.

A few years ago, the UN asked countries and people around the world to imagine a better world. They worked together to determine a list of goals. Then the countries of the UN came to consensus on the most important goals needed to get to a better world. These goals for the global community are called the UN Sustainable Development Goals, or SDGs.

The process used by the UN is like the process you used to determine your *Thriving Community Goals*. You imagined a better community and thought about which goals were most important. Then you came to consensus on your *Thriving Community Goals*.

3. Now break into teams.
4. Examine the SDGs in Figure 1.6.
   a. Do you see any of the big global problems you just talked about in step 1?
   b. Are there any goals you would add to the SDGs?
   c. Share your ideas with the rest of your team.



Figure 1.6: UN Sustainable Development Goals

5. Next, list your thriving community goals on a board or other place where everyone can have access to them.

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6. Think quietly to yourself:
    a. How do any of the SDGs connect to your *Thriving Community Goals*?
    b. Hint: Yes, Goal 11, Sustainable Cities and Communities, probably connects, but also look at some of the other SDGs to see if they connect.
7. Each team member should go to the list of *Thriving Community Goals*. Then put the number of the SDGs that connect to each thriving community goal. You can write a number, add a sticky note, or use another way to record your ideas. Add as many SDG numbers as you think connect to your goals.
8. As a team, examine the list of *Thriving Community Goals* and then discuss:
    a. Are there many connections between your thriving community goals and the SDGs?
    b. What do you think those connections mean about the connection between goals in your local community and goals in the global community?
    c. Why is it important to remember those connections when thinking about how to solve problems in your community?
9. Next you can either have a discussion or do an activity. Choose either Option A: Discussion or Option B: Activity.

Option A: Discussion

If you want to have a discussion, talk about the following questions with your team.

a. As action researchers you try to understand problems in your community and find the best way to solve them. How can your work in your local community help the global community make progress on the SDGs?
b. Why is it important for everyone around the world to participate in achieving the global goals of the SDGs?

Option B: Activity

In this activity, your class will collaborate to solve a problem. Here are the steps.

1. A teacher or class leader should take a bag of dried rice, lentils, corn, stones, or other small items and spread them around on the floor. There should be enough items that it would take one person a long time to pick them up.

2. As a class or a large team, divide up the floor area so each person is in charge of one area.
3. Pick up the items in your area. If necessary, cooperate with the team members next to you to make sure all the items between you are picked up.
4. When you have finished picking up all the items in your area, look around to see if anyone else needs help.
5. Return the items to a container provided.
6. Now come back together and discuss with a partner:
    a. Why was it important to have many people working together to pick up the items?
    b. What would it have been like if only some people in your team participated?
    c. How did you work together with the people near you to clean up the items together?
    d. Did everyone pick up the items using the same technique? Why were there differences?
    e. Did anything change while you were picking up the items? Did you learn new ideas from anyone else?
7. As a pair, share your thoughts with the team or class.
8. Now think about the items as problems that need to be solved. As a team, discuss:
    a. Could one person working alone solve all the problems (pick up all the items) easily?
    b. How is this activity like people around the world working together in their local spaces to help solve a global problem?
    c. In this activity, you worked with team members around you to make sure all the items were picked up. If you were trying to solve global problems, who do you think might be the most important people to work with?
    d. Maybe some of your team members used different techniques to pick up their items. How is this like different people or communities solving global problems in different ways?

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10. Read *Local-Global Connection* and consider how you feel about the ideas.

Local-Global Connection

One of the most important parts of achieving global progress is people around the world taking action in local communities. You will act to help your local community work toward your *Thriving Community Goals*. Your local actions will also help the world make progress on the SDGs. If all local communities around the world acted to make their communities better, then the whole world would improve quickly.



Act: *Where will we act?*

As action researchers, you will be conducting investigations into your local community. Before you can do this, you need to decide as a team what local community area you will be using as your research area. In this activity, you will decide and map the boundaries of your research area.

1. Your research area will be the place where you will conduct investigations. Think about the following ideas when you consider which area to choose to be your research area.
   a. Try to choose a space that is not too big, so you can get to know the area and its problems well.
   b. Choose an area that has a variety of places in it. For example, it probably would be a good idea to choose an area with some housing, some shops, and some public areas.
   c. Think about a place in your community you would like to know more about.
   d. Consider access. Make sure all your team members will be able to reach your research area. Be sure that they can all work there comfortably and safely. It may be best to have your research area near your school or near the places where team members live.
   e. You can choose to have more than one research area if that works best for your team.
   f. These decisions are all up to your team. It is also okay to change the size and number of research areas later as you collect more information.

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2. By yourself, think about the area or areas that are best to do your community action research. Write or draw your ideas on a piece of paper. Or you can just think about the area you consider to be best.
3. With a partner or with your whole team, share your ideas about where it might be best to do your research.
4. Then decide with your team where you will do your research.
5. Now you and your team need to mark the edges or boundaries of your research area. You can do this using a map. Some boundaries you might want to consider include:
    a. Team housing boundaries: set a boundary that includes all the homes of the team members, the meeting place of the team, and the surrounding area
    b. Natural boundaries: mountains, rivers, different land features
    c. Political or administrative boundaries: city or county lines, school district lines, neighborhood lines
    d. Physical infrastructure boundaries: roads, transportation networks
    e. Other boundaries: determine your own reasons for a boundary
6. As a team, you can either use an existing map or create your own to show your boundaries. You will continue to add details to this map throughout the guide, so make sure the map is big enough that you can add to it. Read *Using an Existing Map* and *Creating a New Map* to learn more.

Using an Existing Map

1. Obtain any maps of the community around where your team meets that may be useful to get you started.
    a. Online: Use free online mapping programs, such as Google Maps, to download and/or print a map of the community.
    b. Print: Good maps of the community are often published and available in local libraries, government planning offices, travel offices, road atlases, or tourist centers.
    c. Local: Local community leaders or other local sources, such as elders, may have maps available to share.

d. Accessible maps: People who are blind or have low vision sometimes use tactile or Braille maps. These maps used raised surfaces to describe where things are.

2. Next, mark the edges of your research area on the map. Figure 1.7 shows an example.



Figure 1.7: Example of using an existing map to define the research area

Creating a New Map

You can use a map that already exists to help you save time. But you and your team can also create your own map. If you are going to create your own map, here are some instructions that can help.

1. Use a blank piece of paper or grid paper. If you can look at a print or online map to help you draw, that might be useful.
2. If you don't want to use paper, you can make your map on a computer. Or you can draw your map outside in dirt, sand, or other material. You can also describe your map out loud with your team.
3. Start by marking on your map the location where your team meets. You will work outward from this location to determine your research site boundaries.

4. Your map should include:
    a. Roads and other infrastructure
    b. Businesses and other important buildings
    c. Natural features such as rivers or forests
    d. Parks or other shared spaces
5. Next, draw the edges of your research area on the map.
6. Your map does not need to be perfect; it just needs to make sense to you and your team. You can always add to it or fix it later.

7. When you have finished making and marking the boundaries on your *My Research Area* map, keep it in a safe place. You will use this map to help you decide where to do your research and to mark down important information.

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Task 5: How will we achieve our goals?

As action researchers, you and your team will make choices about how to use this guide. You will ***discover*** which community system parts you want to ***understand*** through further investigations. Then you can ***act*** and reflect on your role as an action researcher.



Discover: *What do we need to know more about?*

The problem of creating thriving communities is complex. As a team you have picked your starting goals for a thriving community. Now you need think about how to achieve those goals. This activity will help you discover what you already know about your goals and consider what you still need to explore.

1. As a team, get out your *Thriving Community Goals*.
2. Write each goal across the top of a piece of paper or on the board. Then make three columns for each goal and label them "Notice," "Think," and "Wonder." If you don't have paper, you can just discuss these ideas.
3. If you want, you can move around your community to notice things related to your goals. If that is not possible, just try to remember what you have seen in the past.
4. Under the *Notice* column, write down everything you have noticed in your community related to your goal. For example, perhaps one of your thriving community goals is to have lots of parks or other spaces where people can interact with one another and with nature. Under *Notice* you might write down the natural shared spaces you have noticed in your community. Or if you noticed that there are no natural shared spaces, you could write that down.
5. Next, under *Think* write down what you think is happening in your community. For example, thinking about a goal related to parks, if you think there are enough green spaces for people to use, write that down. If you think people want more parks, write that down. If you think there are a lot of parks in one part of your research area but none in another part, write that down.
6. Finally, under *Wonder*, consider what you don't know.
    a. What questions do you still have?

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b. At the end of this guide you will need to decide what to do to make your community better. What information about this goal do you need to help you make that decision?

c. For example, thinking about a goal to have lots of parks and green spaces, perhaps you wonder how people use parks. Or perhaps you wonder why there are parks in some places and not others. Or perhaps you wonder who makes decisions about parks.

7. The things you listed under *Notice* are things you already know. You probably need to find out more information about the things you listed under *Think* and *Wonder*. For example, you may think people want more parks, but you will need to find out if that is true. Or you may wonder who makes decisions about parks. Now you will think about how to get that information.
8. Remember the parts of your local community system? Just as a reminder, those parts are:
    a. People in your community
    b. Shared spaces where people can interact in the community, like parks, fields, and markets
    c. Personal spaces, such as housing, which is how most people have personal space in a local community
    d. Infrastructure, things that stay in your community and get used again and again, like roads, bridges, building or buses
    e. Resources, things that get used up by people, houses, and businesses, like electricity, water, or food
9. As a team, look at things you listed under *Think* and *Wonder*. Write or say how those questions or ideas connect to the parts your local community system. For example, under *Wonder* maybe you listed, "How do people use parks?" Think about which parts of the local community system you need to investigate to answer that question. In this case, you might need information related to people and shared spaces.
10. Record these ideas by keeping your paper, taking a picture of the board, or recording your voices. You will have a chance to return to these ideas in the next activity, when you will decide which parts you want to learn about.

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Understand: *What research will we do?*

You will be leading the research for the rest of this Community Research Guide. You have already determined your starting goals. Then you thought about what you still need to know about those goals. In this activity you will decide how to spend the rest of your time as action researchers.

1. You need know how much time you have. Check with your teacher or leader. Are you able to do all seven parts of the Community Research Guide? If not, figure out how many parts you can do.
2. Read *Part Overview* to find out more about each part, to help you understand which parts are the most important for your team.

Part Overview

We suggest that you definitely plan to do Part 1, Part 2, and Part 7.

- Part 1 introduced the problem and helped you understand how it relates to your community. You have almost finished Part 1.
- Part 2 will help you understand how to listen to different people in your community and make good decisions. Part 2 is a very important part.
- Part 7 is when your team will decide which problem you want to help solve. Then you will act to solve it. Part 7 is also a very important part.

The rest of the Parts of this guide are matched to the parts of the local community system you have been thinking about already. Here is the list:

- Part 3: Community Space
- Part 4: Housing
- Part 5: Transportation and Infrastructure
- Part 6: Resource Use and Waste

3. Look back at the parts of your local community system you listed that were related to your *Think* and *Wonder* columns. Which parts of the system did you think you needed to investigate to get more information?

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4. As a team, you will find out information and take action. Think about which Parts of this Community Research Guide your team would like to investigate.
5. It would be easiest for your class to all do the same parts. Now you need to decide as a class which parts to do.
6. As a class, discuss the Parts you think are most important for your class.
7. If you will be able to do all of the Parts of the guide, you can stop this activity now.
8. If you can only do some of the Parts, discuss which Parts are the most important for the largest number of goals. For example, maybe when you looked at the *Think* and *Wonder* columns there were questions for each goal that needed more information about resources. As a class you probably want to make sure you do Part 6, which is about resources.
9. Give everyone a chance to share their opinion, then spend some time coming to consensus. Think about:
    a. Is there one Part that everyone thinks needs to be explored?
    b. Is there one Part that no one thinks needs to be explored?
    c. If you are having difficulty deciding, have team members talk about why they think one Part might be more important to explore.
10. After you have discussed all the ideas, you can try to come to consensus. Sometimes after a discussion it is clear to everyone what the decision should be. If the decision is still not clear, go on to step 12. If you think everyone agreed, then have a teacher or class leader list the Parts they think everyone has agreed on. You and other class members then have the option to:
    d. Agree
    e. Agree with reservations, like maybe you are a little uncertain or worried about the decision
    f. Stand aside, meaning you don't agree but you are willing to go along with the group
    g. Block, meaning you feel strongly the decision being made is the wrong one
11. If everyone agrees, then you can stop this activity now.
12. If there are a lot of class members who do not agree, especially if they are blocking the decision, it is best to go on and work more on finding consensus.

13. If people in your class are having trouble agreeing, you can try the following ideas:
    a. List the good things and bad things about doing each Part. Discuss as a class.
    b. Build a sense of group opinion. Each person can vote for as many parts as your class has time to do. For example, maybe you can only do two parts out of Parts 3, 4, 5, and 6. In that case, each person can vote for two parts. Look at the Parts that have the most votes, and perhaps you can see if everyone can agree to do those Parts.
    c. Find a slow consensus. Find a partner and as a pair find consensus on which part or parts are most important. Then in a group of two pairs (four class members) you can find consensus. Then in a group of four pairs (eight class members) you find consensus. Keep adding together groups until you have found a class consensus.
14. When you have decided on the parts you will do, you are ready to complete Part 1 by finishing the Act activity. Then you can move on to Part 2.



Act: *What are my feelings about taking action?*

As action researchers you will work as a team. Using scientific and other methods, you will try to understand your local community and its problems. Then you will compare the way your community is to the way you want it to be. This difference is where you will act to help make your community better. By the end of this guide, your team will have come to consensus on what problem in your community you would like to address. Then you will put your plan into action.

1. The action researcher role may feel unfamiliar. Stop and think about how you are feeling before you go on to the rest of the guide.
2. Take a piece of paper and write "My Feelings" across the top. Then write down your answers to the questions in step 3 so you can look at them later.
3. Think about:
    a. What worries me about being an action researcher?
    b. What excites me about being an action researcher?
    c. What do I hope I will learn about my community?
    d. What do I hope I will learn about the topic of sustainable communities?

e. How do I think my team will work together?

f. Do I feel ready to take action to make my community better?

g. How do I hope I will feel at the end?

4. Save these answers. At the end of the guide you can think about them again.

Congratulations!

You have finished Part 1.

Find out More!

For additional resources and activities, please visit the *Sustainable Communities!* StoryMap at https://bit.ly/2YdHNqB.

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Glossary

This glossary can help you understand words you may not know. Feel free to add drawings, your own definitions, or anything else that will help. Add other words to the glossary if you would like.

Action researchers: People who use their own knowledge and information they find out from their community to make decisions and take action on important issues

Community: A group of people that have a place or other thing in common

Complex: Made up of many parts

Consensus: A balanced decision that works for everyone in the group

Economic: About money, income, and use of wealth

Environmental: About the natural world

Ethical: The fairness of something

Housing: A building or other structure where people make their home

Identity: Characteristics that make up each person or thing

Infrastructure: Built things that stay in your community (for example, bridges, buildings, train tracks)

Interacting: Communicating or doing activities with others

Investigate: Find out more information

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Network: A set of connections between people, communities, and ideas

Observation: Recording what you notice without adding your own opinion

Observe: Use your senses to get information about something

Perspective: A specific way of thinking about the world around us

Reflect: Think carefully about something

Resources: Materials we use to meet our needs

Social: About the interaction of people in a community

Social science: Study of human communities and interactions

Survey: A list of questions that you can give to a group of people

Sustainable: A balanced, long-term approach to social, environmental, economic, and ethical concerns

Sustainable community: A group that balances the needs of living things and the resources available in a way that does not hurt future generations

System: Something made up of parts that work together

Thriving: Something that is working or growing well

Other words:

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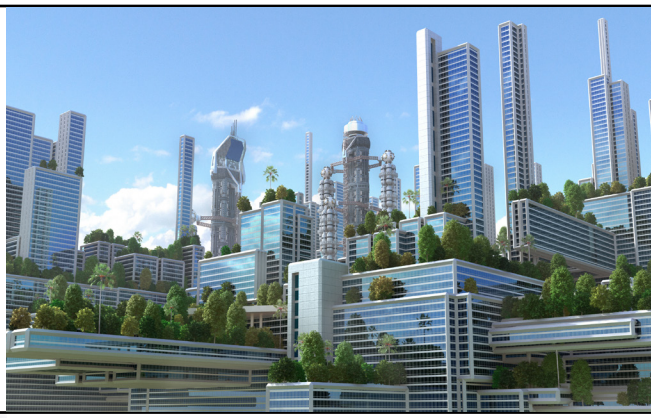
SUSTAINABLE COMMUNITIES!





Part 2:

How can including people help our community thrive?

SUSTAINABLE DEVELOPMENT GOALS

developed by

Smithsonian
Science Education Center

in collaboration with

iap SCIENCE HEALTH POLICY
the interacademy partnership

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Smithsonian Science Education Center Module Development Staff

Executive Director - Dr. Carol O'Donnell

Division Director for Curriculum, Digital Media, and Communications - Laurie Rosatone

Science Curriculum Developer - Heidi Gibson

Research Mentor
Angela Mashford-Pringle, PhD

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Find out More!

For additional resources and activities, please visit the *Sustainable Communities!* StoryMap at https://bit.ly/2YdHNqB.

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Planner

Timing note: *The time used for investigations, observations, and actions can vary. When different options are listed within an activity, some options may take longer than others.*

Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Task 1: Who is in our community?					
Discover	Consider the different identities in your community and why inclusion is important.	• Paper • Pens or pencils	*My Identity Map* (Part 1, Task 2) *Team Identity Map* (Part 1, Task 2)	15 minutes	55
Understand	Use a survey or other investigation to find out more about the people in your community.	• Paper • Pens or pencils • Computer (optional)		35 minutes + investigation time	56
Act	Create a community identity map.	• Paper • Pens or pencils		20 minutes	60
Task 2: How has our community changed over time?					
Discover	Reflect on and record changes you and your team have noticed in your community.	• Class board or poster paper • Audio or video recording device		45 minutes	62
Understand	Record oral histories from community members.	• Audio or video recording device • Paper and Pen		25 minutes + investigation time	64
Act	Create a representation of your community's history.	Optional: • Computer, paper, pen		25 minutes	68
Task 3: Who makes decisions in our community?					
Discover	Explore decision-making in your community.	• Paper • Pens or pencils	*My Identity Map* (Part 1, Task 2)	15 minutes	70

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Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Understand	Collect information about how decisions are made in your community.			25 minutes + investigation time	72
Act	Record how decisions are made in your community and how that could be more inclusive.	• Paper • Pens or pencils	*My Perfect Community* (Part 1, Task 1)	20 minutes	73
Task 4: How can including our community help us make better decisions?					
Discover	Design a shared community space to fill your own needs.	• Paper • Colored pencils	*My Identity Map* (Part 1, Task 2)	15 minutes	76
Understand	Experiment to find out whether including different people changes decision-making.	• Class board or poster paper • Paper • Pens or pencils		45 minutes	77
Act	Analyze experiment results and decide how you want to make decisions	• Paper • Pencils		20 minutes	79
Task 5: How do we include the community in our actions?					
Discover	Consider what you now know, think, and wonder about your local community.	• Paper • Pens or pencils	*Community Identity Map* (Task 1)	10 minutes	82
Understand	Investigate the best way to share information with your community.	• Paper • Pens or pencils		20 minutes + investigation time	83
Act	Share and get feedback on your Thriving Community Goals.	• Paper • Pens or pencils	*Thriving Community Goals* (Part 1, Task 3)	30 minutes	85

*StoryMap extension found at https://bit.ly/2YdHNqB

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2 Part 2: How can including people help our community thrive?

Remember that as **action researchers** you investigate and act on problems in your **community**. You use science and other tools to find out more about your community. In Part 2 of this Community Research Guide you will work with your team to get to know the people in your community better. You will explore who lives in your community, how it has changed over time, and who makes decisions. Understanding these things about your community will help you plan **sustainable** actions that are meaningful and long-lasting. Remember that a sustainable action is one that includes the **social, environmental, economic**, and **ethical perspectives**. When you can balance all four perspectives in a way that works for a long time, that is called sustainable. This can help your community now and in the future.

Remember: *In this guide you and your team are in charge. You can always change the instructions in the steps to make them work better for you and your team.*

Your Research Mentor

Sharing your experiences with others and learning from others' experiences is part of being a good action researcher. In Part 2, you will have a research **mentor** to help you understand some issues about making decisions in your community. A mentor is someone who has experience and can help guide you.

Meet Angela Mashford-Pringle, Your Part 2 Research Mentor



Meet Angela Mashford-Pringle. Angela (pronounced *An-juh-la*) is one of the many researchers around the world trying to help make the communities around them more sustainable. As action researchers you are also trying to make your community more sustainable. Angela will be your research mentor to help you consider how making decisions in your community might be more **inclusive** and sustainable.

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Since Angela is now working with you, it is important to understand who she is. To help you, Angela wanted to introduce herself.



"I'm going to situate myself. For my people that means introducing ourselves in our traditional way. My name is Angela Mashford-Pringle. I'm from Timiskaming First Nation in northern Quebec, but I was born and raised in Toronto so I'm an urban **Indigenous** person.

"I'm from Bear Clan. I'm a mother of two. My mother grew up in our traditional territories, as did my grandmother. And if you and I were in the same community and you knew the names, I would say my mother is a Robinson, and my grandmother is a Hunter, and these would mean something.

"And our traditional territories were stolen from us. We didn't have reserves in Quebec as my mom was growing up. The federal government in Canada sits on our traditional territory on **unceded** land. Ottawa is on unceded Algonquin land that they have not returned to us or given us any kind of treaty for in more than 200 years. So it also changes how we can live in our traditional way.

"I'm a **cis-gender** woman. I'm married; I've been married for almost 30 years, and I have two adult daughters.

"So that's how we would traditionally introduce ourselves. It's about where we came from, who we come from, and where we are today. And as for the 'where I am today,' I'm an assistant professor and associate director of the Waakebiness-Bryce Institute for Indigenous Health at Dalla Lana School of Public Health at the University of Toronto. So all of those things make up me.

"When you're talking about **identity**, it's a lot about what are the different labels and pieces that you consider part of you."

Before you begin the rest of Part 2, think quietly to yourself about Angela's introduction.

- What way do people in your community usually introduce themselves? What information about themselves do they include?
- How does Angela's introduction show her connection to her community?

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- Are there parts of your identity map that show your connection to your community?
- Would you need to add anything to your identity map to show where you came from, who you come from, and where you are today?
- Can you see anything about Angela's identity that would help her understand different perspectives on how to help a community thrive?

Throughout Part 2 you will notice Angela sharing ideas and experiences with you. She may help you understand better ways to conduct **investigations**, add an additional perspective, or share some of the work she has done.

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Task 1: Who is in our community?

In this task you will ***discover*** what you already know about people living in your community. Then you will do investigations to ***understand*** the people in your community better. Finally, you will ***act*** to make an identity map of your community.



Discover: *Why is it important to understand the identity of people in my community?*

Imagine that two of your classmates made a new rule for your classroom. They didn't ask anyone else in the class before making the rule, but your entire class has to follow it. Your two classmates explain, "We think we know what's best for the class, so we made the decision alone."

1. As a class, share your answers to the following questions.
    a. How do you feel about the way your classmates made this new rule?
    b. What would you do differently?
2. Examine your *My Identity Map* from Part 1, Task 2. Consider:
    a. What part of your identity is most important to you?
    b. Would you want someone who shared that part of your identity to help make the new class rule? For example, you might say, "I am a girl, so I want to make sure there is at least one girl helping to make the new rule."
3. Now gather with your team. Examine your *Team Identity Map*. Discuss:
    a. What were some of the parts of your team's identity?
    b. Would you want someone who shared parts of your team's identity to help make the new class rule?
    c. Think about the beginning of this activity. How did it feel to be left out of a decision that affected you?
    d. How would it feel different to have someone who shared your identity making the new rule?

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4. Read Angela's ideas about identity. As you think about what action to take in your research area, it's important to know who is in your community. Why? Remember that you and your team will plan and carry out an action to help balance the needs of humans and other living things in your community. You need to know who is in your community so you can include their identities in the plan you make.

Angela Says . . .



We all carry labels or identities. Our identities inform our own values, beliefs, and worldview. And these things inform how we work. How we relate to and understand ourselves. How we relate to the world around us. If we don't consider identity, we cannot understand how others move through the world. We have to think about the unique knowledge and ways of being that each person and group carries.

5. Work with your team to answer the following questions. You will need these answers later. Remember that your team can decide the best way to record information. Writing is one way, but you can also draw, record your voices, make a video, or choose another way.
   a. Who do we think are the people living in our community?
   b. What do we think the people in our community would put on their identity maps? (If you need an example of what might be on an identity map, go back to Part 1, Task 2.)



Understand: *Who is living in my community?*

You and your team have talked about who you think is living in your community. Do you think your ideas were right? You can find out by doing investigations in the community. Remember that you used investigations to find out more about your classroom community in Part 1. You can use the same kinds of investigations to understand your local community better. You and your team will need to decide what type of investigation will best help you understand who is living in your community. There are many different ways to do research.

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1. Read Angela's ideas about research and then start to consider some of the different ways researchers gather information about others and the natural world.

Angela Says . . .



Often the way we think about scientific research is a Western **paradigm**. In Indigenous communities we did research, but we didn't do all the academic pieces. There are different ways of knowing things about the world around us. We have to think about knowledge in many different ways. If you are researching a plant, a Western scientific researcher might understand it by pulling it apart and dissecting it. An Indigenous researcher might spend months watching it grow and trying to examine the surroundings. It's about different viewpoints. It is not that one researcher is better than the other, but rather we're doing research in different and unique ways.

2. Since you are trying to understand the identity of many different people in your community, a **survey** might be the best tool. You may have used a survey to understand your classmates better during your investigations in Part 1. A survey is a list of simple questions that you can give to a group of people. For example, you can ask, "What is your age?" Read the *Survey Instructions* for more information about how to give a survey.

Survey Instructions

Choosing People to Survey

a. It is normal to want to survey only the people you know well and feel comfortable with. But try to include people you may not know as well or people who live in other parts of your community. This will help you get a more accurate picture of your community.
b. Think about the categories on your identity map. Use those categories to try to pick a diverse group of people to survey. For example, ask people of all different ages or of more than one gender.

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Ways to Give a Survey

a. Talk to people in person.
b. Talk to people over the phone or the Internet.
c. Write down your questions on paper and give it to people.
d. **Design** a survey on the Internet and send it to people.

Tips for Giving a Survey

a. Make sure your questions are easy to understand.
b. Ask questions that have definite answers, such as, "What things do you like to do for fun?" instead of, "What do you like?"
c. Think back to Part 1, Task 2 when you made individual and team identity maps. Use these identity maps to help you think of what questions to ask.
d. Some people may feel more comfortable answering surveys if their answers are **anonymous**. Anonymous means people do not list their name.
e. Think about where you should give the survey. Is there a place in your community, either in person or online, where people gather and might be willing to answer your questions? Could you go from home to home? Would that be safe at this time?
f. Remember that you and your team members are part of your community. Think about what you already know about your community to help you choose the best way to get information. For example:
   - Will people in your community feel comfortable talking to a student?
   - Does everyone have **access** to the Internet if you want to do an online survey?

Safety Tips for Giving a Survey

Talk to your teacher for guidelines. They will know what is safest in your community.

⚠ **Physical Safety Tip**

Never go alone and always be aware of your surroundings. Pay attention to local guidance on whether it is safe to interact with people outside of your home.

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⚠ Emotional Safety Tip

It can be hard to talk to other people in the community. You may feel shy or nervous. Someone may tell you they don't want to talk. That's okay! It doesn't have anything to do with you. It just means they don't want to share. You can show them respect by thanking them and moving on to another community member.

3. If a survey doesn't sound like the right investigation for your team, that's okay! You can pick another way to collect information about your community.
   a. You can investigate using books, lists, videos, maps, artwork, audio recordings, or other records of who lives in your community.
   b. If your community has a **census**, it might include a lot of information about the community. Censuses often have information such as age, gender, family, religion, income (how much money a person or family makes per year), or race.
   c. You can think of your own way to collect information. You could combine more than one way (for example, you could collect information from books and videos and give a survey) or create a new way to collect information.
4. Decide as a team how you will investigate.
5. Remember, including everyone is important. This is true when you take action in your community. It is also true when you investigate as a team. Try to pick a way to investigate that allows everyone on your team to participate. This is called making something inclusive. Here are some things to think about.
   a. Time: If the investigation happens after school, does everyone in the team have time to do it?
   b. Comfort: If you decide to walk around the community to do your investigation, make sure everyone on your team feels safe and able to do this. If not, what is another way that team members could help with the investigation?
   c. Location: If the investigation is going to happen in a specific place, how easy is it for team members to get to that place?

d. Format: How are you collecting information? If you are reading books or other written records, can everyone on the team easily read? Can they understand the language the records are in? If the records are on video or are audio recordings, can everyone on the team see and hear easily?

6. Now that you have decided how you are going to get information from the community, your team needs to decide what information you would like to get.
7. Talk to your team about what you might want to find out about your community. Some examples are listed here.
   a. How old are people in the community?
   b. What genders are people in the community?
   c. What roles do people have in their families?
   d. What do people do for work and for fun?
   e. What do people say are the most important parts of their identity?
   f. What groups do people in the community belong to?
8. Are there ways in which each person feels the same as others in the community? Are there ways in which they feel different? Next, work with your team to plan how you will collect information. For example, if you decide to pass out a paper survey, decide who will type or write the survey, who will make copies, who will pass the survey out, who will collect the finished surveys, and who will keep track of the answers.
9. Finally, conduct your investigation with your team.



Act: *How will I remember all the identities in my community?*

You and your team have found out information about the people who live in your community. You will need this information as you work through the rest of this guide. Use the steps in this task to help you make a record of what you found out.

1. Consider what you found out about your community.
   a. Did you find identities different than the ones of people on your team?
   b. Did any of the identities you found surprise you?

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2. Use your results to make an identity map of your community with your team. This will help you remember all the different people living in your community. You can also include anything you already know about your community. Remember that you can make an identity map by writing, drawing, using objects, taking photos, or another way.
3. If you need help deciding what to put on your community identity map, you can use the individual and team identity maps from Part 1, Task 2 as examples. You can also include the answers to these questions.
    a. Who is living in your community?
    b. What did people in the community say about their identity?
    c. Are there other important characteristics that might give someone a specific point of view?
4. Title this map "Community Identity Map" and keep it separate from your individual and team identity maps.
5. Leave extra space in the *Community Identity Map* in case you want to add to it as you find out more information later.
6. Think about the people you thought were living in your community before you did your investigation. You recorded this information in step 5 of the Discover activity. Compare your original ideas with the results of your investigation. Discuss with your team:
    a. What did I learn about my community that I didn't know before?
    b. What surprised me?
7. You probably noticed that you didn't always guess correctly about your community. There may have been some information that was new to you. There may have been people in your community who you didn't know about before. Investigations about your community help your team learn more, make better decisions, and take sustainable action.

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Task 2: How has our community changed over time?

Just like you, communities are always changing. In this task you will ***discover*** what you already know about those changes. You will ***understand*** what other community members might know. Then you will save this information so you can use it when you are ready to plan how you will ***act***. You need to understand past actions before you develop or decide future actions.



Discover: *How have I noticed my community changing?*

Think back to the earliest time you can remember. Do you remember what you looked like when you were young? Do you remember what you liked to do? Think about how you are now. How have you changed? Communities can change too. The people who live there can change. The way land is used can change. What people think is important can change. Scientists such as geologists can investigate physical changes in a community over time. Other researchers such as historians can investigate human actions of the past. Action researchers find out how a community has changed over time because it can help them plan actions for the future. Remember, you and your team are also members of your community. Your thoughts, feelings, and information about changes in the community are important. You are going to start this activity by thinking about what you already know.

1. Have someone in your class place four large pieces of paper around the classroom. Write each of the following questions on its own piece of paper. Leave space for the whole class to write their answers below the questions. You can also do this activity by sharing ideas online, recording your answers on video, or another way.
    a. "What things in our community are new?" (For example, buildings, natural spaces, roads)
    b. "What things are no longer found in our community?"
    c. "How has who lives in our community changed?"
    d. "How do we feel about the changes in our community?"
2. Write your answers to each question on the papers.
3. Move around and read other people's answers.

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4. You might notice that another person in your class has different ideas about how the community has changed. They may have noticed something different than you.

> **⚠ Emotional Safety Tip**
>
> Different people can have different opinions. Considering different opinions may help the group think better together. It may feel difficult to disagree with someone's ideas or have them disagree with yours. If someone shares an idea that makes you feel uncomfortable or upset, it is okay to say so or to stop the conversation. Remember, everyone should disagree with ideas, not with people.

5. Now each team member will create an **oral history** of their experience in your community. An oral history lets people share the story of their past. Oral histories can have a lot of information. They can be used to see how communities change over time. You will learn more about investigating using oral histories with other people in the next activity. But first you will record your own oral history.
6. Use an audio or video device to record your history. Or, if you prefer, you can make a record by writing or drawing.
7. Imagine you were telling the story of your time in your community to someone who did not know you or your community. These questions can get help you started. Share and record your answers.
    a. What is your earliest memory of your community?
    b. What are some of the changes you have noticed?
    c. What changes have affected you the most?
    d. What are some things about your community that make you proud?
    e. What are some things about your community you hope will change in the future?
8. Share your oral history with your teammates, if you are comfortable doing so. Listen to your teammates' histories.
9. Think about why it might be important to know the history of a community before making decisions about that community. Discuss with your team:
    a. If we were making a decision about our community, what changes would it be important to know about?

10. Ask yourself quietly:
    a. Is everyone's history the same?
    b. Why is it important to hear the histories of other people?



Understand: *How has my community changed over time?*

In Task 1 you and your team collected information about the people living in your community. Now you will investigate how your community has changed over time.

1. Decide the best way to investigate how your community has changed over time. One good way might be to talk to people who have lived in your community for a long time. Read the *Oral History Instructions* for more information.

Oral History Instructions

When you talk to people and record information about their past, it is called an oral history. Oral histories create a record of what people or communities were like in the past.

Choosing People to Talk to

a. Think about who might know the most about how your community has changed. For example, it might be people who are part of Indigenous groups, older people who have lived in the community a long time, a local historian, people who build new things or tear things down, or leaders who make decisions. (Indigenous means a group of people or other living things that are native to a place and have not migrated from elsewhere.)
b. It is important that all the people of your community are included and represented in this work. As a team, try to talk to people with a variety of ages, genders, jobs, incomes, religions, ethnicities, or other identities.
c. Think about the many ways that people can share information and try not to leave people out. For example, someone in your community may be deaf or hard of hearing and use sign language to communicate. If you do not use sign language, ask your teacher if you can find an interpreter to help you collect an oral history from that person.

d. Talk to people who live in different parts of the community so you can learn how many parts have changed over time. As a team, try to talk to people who live in all parts of your research area.
e. Conducting oral histories can take a long time, so you may decide to talk to just one person. That is okay. If everyone on your team interviews at least one person, you will have enough information to complete the activity.

Ways to Record an Oral History

a. You can use audio or video to record an oral history.
b. You can also write or draw to make a record of the ideas that are shared with you.
c. You can talk to people in person, over the phone, or using the Internet.

Tips for Collecting an Oral History

a. Make sure you ask permission to record a person's answers.
b. Ask permission to share the oral history with the rest of your team, class, or other people in the community. People might be more willing to talk if their oral history is anonymous.
c. A person may have photographs, drawings, or other objects that help them tell their oral history. Ask the person to describe the object and make sure you record their description.
d. If it feels like someone didn't answer your question, don't be afraid to ask the question again in a different way.
e. Let the person you are talking to answer the questions in the way they want. Be patient. Listen carefully. Understand that they might give answers that you didn't ask for.

Safety Tips for Talking to People

Talk to your teacher for guidelines. They will know what is safest in your community.

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⚠ Physical Safety Tip

Never record an oral history alone and always be aware of your surroundings. You might want to suggest recording the oral history in a quiet public place.

⚠ Emotional Safety Tip

It can be hard to talk to other people in the community. You may feel shy or nervous. Someone may tell you they don't want to talk. That's okay! It doesn't have anything to do with you. It just means they don't want to share. You can show them respect by thanking them and moving on to another community member.

2. Read the additional ideas Angela has about collecting oral histories from others.

Angela Says . . .



Make sure that you're an active listener. While a person is talking to you just listen and wait until they're done, and **reflect** before you actually start talking. You need to make sure that the space is welcoming and inviting. And you need to be welcoming and inviting. Don't make faces when they say something you don't like. You need to actually pay attention and figure out what it is that they're telling you.

3. If an oral history doesn't sound like the right investigation for your team, you can pick another way to collect information about your community. For example, you can:
    a. Investigate using books, lists, videos, maps, artwork, audio recordings, or other records of the history of your community. If your community has maps or photos from different years, they could show you what changed from year to year.

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- If you use books, videos, or other pieces of information, remember to think about who made these records. What if people were living in your community before books were written or photos existed? It is important to try find out their history as well!

b. Investigate using census data. You can compare a recent census with one from the past to investigate how the community has changed.

c. Think of your own way to collect information. You could combine more than one way (for example, you could collect information from books and videos and collect oral histories) or create a new way to collect information.

4. Now decide what information you want to get from your investigations. Your team can use these questions as suggestions or write your own.
   a. How has the community changed over time?
   b. What buildings, natural spaces, roads, or other things are new?
   c. What things are no longer found in the community?
   d. Have you noticed any changes in who lives in the community?
   e. How do people feel about the changes in the community?

> ⚠ **Emotional Safety Tip**
>
> People may tell stories that are difficult for them to talk about. Some stories might be hard for you to hear. People you talk to may also have opinions that you disagree with or that make you uncomfortable. It is okay to pause or stop an interview if you are uncomfortable or upset.

5. Plan your investigation. Decide what needs to be done and who will do each part. For example, if you are recording an oral history you will need to decide who will find people to talk to, who will talk to each person, and who will help record the oral history.
6. Work with your team to conduct your investigation.

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Act: *How will I remember how my community has changed?*

You and your team have investigated how your community has changed over time. You will need this information as you work through the rest of this guide. Use the steps in this activity to help make a record of what you found out.

1. Share what you learned from your investigations. Discuss with your team:
    a. What surprised you?
    b. What was something that you didn't know before?
2. Take out the four pieces of paper that the whole class worked on before in the Discover activity of this task.
    a. How were your answers similar or different from the information you collected from others?
    b. What information would you like to add?
3. Work with your team to understand the information you collected by answering these questions.
    a. How has our community changed over time?
    b. How have changes in the community affected the people who live here?
    c. How do people in the community feel about these changes?
    d. What do we need to remember about how our community has changed when we are making decisions?
    e. What else do we want to learn about our community?

Angela Says . . .



One of our teachings is "seven generations back, seven generations forward." You have to think about seven generations behind you and the seven generations about to come. By looking back, we can see what previous generations did to be sustainable and in balance with Mother Earth. It

also gives us knowledge of how to move forward. What's old is new again! Many people in the world know three generations of their family. Think forward beyond that. What would you like to see in 2070? What do you want the world to be like at the end of your life cycle, looking at the next seven generations?

4. You and your team will need to keep a record of the information from this activity so you can plan actions that include and represent your community. Here are some suggestions.

    a. Put all the oral histories you collected, plus your own, together in a single recording, such as a podcast. Your team could add their own voices to the recording and add explanations or other facts. You can find more information about how to make a podcast at the Smithsonian Science Education Center's Don't Call Me Extinct Podcasting module, found at https://ssec.si.edu/dont-call-me-extinct-podcasting-module.
    b. Make a visual timeline of the community with drawings, symbols, words, photos, or objects.
    c. Look at your community records to see if any timelines already exist. What would you add to them? What would you take out or change?
    d. Add information to your *Research Area Map*. For example, you could add a note that a group of houses sit where there used to be a grass field.
    e. Add information from the oral histories to your *Community Identity Map*. For example, if a member of the community says that it used to be easier to find a job but now it is much harder, that is an important part of the community identity.

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Task 3: Who makes decisions in our community?

Remember in Task 1 you thought about how you would feel if someone made a decision about your class without talking to everyone. People make decisions about your community too. In this task you will ***discover*** how you are involved in making decisions. You will ***understand*** who makes decisions in your community. Then you will get ready to include your new information in making decisions about how to ***act***.



Discover: *Who makes the decisions that affect me?*

Knowing who makes decisions is important, especially when the decisions affect how you live your life, the place you live, or the people you care about. Remember the goal of this guide is to take action. You might have to ask for help or permission to complete your action. If you know who makes decisions in your community, you can ask them for permission if you need to. If you find out which people are usually left out of decision-making in your community you can include them in planning and taking action. In this activity, you will think about how you are included in the decisions in your life related to creating **thriving** communities.

1. Answer the questions in the *Who makes this decision?* chart about who makes decisions in your home and community. You can answer these questions by yourself or with the people who live in your home. For each question, record anyone who helps make the decision.
2. You can write this information as a list, record people's spoken answers, type answers into a computer or other device, or choose another way. Below is an example of a written version.

Who makes this decision?	**Me**	**Other children in my home**	**Adults in my home**	**My local government**
What place will I go when I want to be outside?				
What will be in the shared space in my community?				

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Who makes this decision?	Me	Other children in my home	Adults in my home	My local government
Will our home be close to our neighbors?				
How will we use the space in our home?				
What kinds of public buildings will we use (for example, libraries, schools, hospitals)?				
How will we get to places we want to go (for example, bike, drive, use public transportation)?				
What will happen to the things we throw away?				
When will we buy new things?				

3. Think quietly to yourself: Do you wish you were included in more of these decisions? Why or why not?
4. Look at the identity map that you made in Part 1, Task 2.
    a. Are there any parts of your identity that make it harder for you to be included? For example, if your community does not let people vote until they are 18 years old, your age may make it harder for you to affect local government decisions.
5. Think back to the Discover activity in Task 1 of this part. It described two of your classmates making a new rule in your classroom without asking you. Pause and remember how that made you feel. Could your classmates have made a good decision about you without including you?
6. Now think about your local community. Answer the following questions with your team.
    a. Who do you think makes the decisions in your community?
    b. Who do you think you should include when you plan to take action in your community?

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Understand: *Who makes decisions in my community?*

You and your team talked about who you think makes decisions in your community, but now you need to collect more information about how those decisions are made. You can do this with another investigation. In Tasks 1 and 2 you might have collected information using surveys, oral histories, or documents.

1. With your team, decide the best way to find out who makes decisions in your community. You could:
   a. Use documents to find out who is leading your community and how they were chosen. Are there people who are appointed and not chosen?
   b. Attend a meeting where the community makes decisions and record who gets to speak. Think back to what you learned in Task 1 in this part about who lives in your community. Notice who in the community is at the meeting and who is missing.
   c. Ask people in the community about who makes decisions.
   d. Come up with your own ideas. Use Angela's thoughts to get you started.

Angela Says . . .



We often take for granted who is a leader or in charge of a space. Our assumptions may not be true. In some communities it may not be just one person. Depending on the community, there may be a more consensus-building approach. To make decisions it may be that you need to talk to a number of people. For example, I've worked with communities where you make decisions by going to a town hall meeting and talking to everybody at once. There's not one person in charge. Knowing who makes the decisions is really important. You can find out by going to go to the community. Talk to organizations or talk to people in the community. Ask them who represents them.

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2. Now that you have decided how you will investigate, your team needs to decide what information you would like to get. You can use these questions as suggestions or write your own.
    a. Is everyone allowed to help with making decisions?
    b. Is there one person or many people in charge?
    c. Does our community vote on decisions?
    d. Who is allowed to vote?
    e. Are people able to talk about decisions before they are made?
3. Plan your investigation. Decide what needs to be done and who will do each part. For example, if you are attending a community meeting, you will need to find out the time of the meeting, decide who will attend the meeting, and who will record the information.
4. Work with your team to conduct your investigation.



Act: *How will I use what I know about decision-making in my community to help me take action?*

The information you collected about who makes decisions in your community will help you decide how to take action. In this activity you will create a record of how decisions are made in your community. You will need this information as you work through the rest of this guide. You will also discuss how you think decisions should be made in your community.

1. Work as a team to record the information you collected in the Understand activity. Here are some suggestions for how to record who makes decisions in your community.
    a. Write a list, table, or a chart.
    b. Make an audio recording of your team's description.
    c. Draw a visual. You can use words, symbols, lines, shapes, or other drawings that help you show this information.
        - You could make a **concept map**. A concept map is a visual that helps you show information.

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- Figure 2.1 is an example of a concept map. For this example, imagine your community has one person in charge. This one person talks to a group of five community members before making decisions. You could show this with a concept map like the one in the figure. It might include one large purple square to show the one person in charge. Five small blue triangles show the five community members. The purple square is on top because it is in charge. The blue triangles all share the same row because they have equal power.



Figure 2.1: A concept map showing how decisions were made

2. Work with your team to answer the following questions.
   a. Who makes the decisions in your community?
   b. Who does not get to make decisions?
   c. Do you like how decisions are made in your community or would you like it to be different in the future?
3. Remember that in Part 1 your team imagined your perfect community. Get out your *My Perfect Community* paper. Think about the goals you made for your community.
   a. If you want to reach your goals, who do you need to talk to in your community who helps makes decisions?
   b. Are there people who don't make decisions but could help you take action?
4. Think about how decisions are made in your community. Is there anything you wish were different? What would make it easier for you to take action in your own community? Just as you did in Part 1, dream a little bit.
   a. For example, maybe your community has only one person in charge. Your team may wish more people could make decisions.

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b. Or perhaps decisions in your community do not include the ideas of young people, people without much money, or people who were born outside of the community. Your team may wish those people could help make decisions.

5. Record any ideas about how you think decisions should be made on your *My Perfect Community* paper.

Angela Says . . .



Three Ps: power, privilege, positionality. Youth have to remember those three. They need to think about how they have a position. People can say the kids and teens don't get a voice, but they actually have more power than we give them credit for. Youth can make decisions that can put them at the table. Almost every organization I work with has some kind of youth component to it. I think young people don't understand how their voice will be heard. They need to say, "This is what I want you to hear for me, and this is why I want to sit at your table."

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Task 4: How can including our community help us make better decisions?

In this task you will ***discover*** how it feels to be in charge. Then you will ***understand*** the differences between including everyone or just a few people in making decisions. Finally, you will find out how important it is to include others when making decisions about how to ***act***.

Discover: *What are my ideas?*

You and your team talked about who makes decisions in your community. Now you will think about decisions you would make if you were in charge.

1. Take out the *My Identity Map* paper from Part 1. Remember things you like or hobbies you have. You can use these ideas to get you started in this activity.
2. First you need to do a little imagining by yourself. Imagine there is a shared community space, maybe like the one shown in 2.2. You are in charge, so you can decide how the space will be designed.



Figure 2.2: A shared community space waiting to be designed

3. Think about:
    a. What kinds of things would like to be able to do in this community space? For example, maybe you really like to ride your bike. Would you want the space to have a fun place to bike?

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b. How would your senses feel when you are in the space? For example, maybe you like the color purple or the smell of roses or the sound of running water. How could those things be part of the space?

c. How would you like to interact with other people in the space? For example, maybe you like playing games outdoors with a big group of people. Is there a way the space could help you do that? Or maybe you like spending time alone. Is there a way to design the space to help you do that?

4. Write or draw your ideas on a piece of paper. Be as specific as possible. If that is not possible, record your voice or a video explaining your ideas.
5. Do not share these ideas with anyone else. You need to keep them secret for the next activity.
6. Fold up your paper or give another record of your ideas to your teacher.



Understand: *How can working together help us make better decisions?*

A community is not just one person. It is many people. Working together with many people can take time and patience. But usually it helps a community make better decisions. In this activity you will investigate to see if this is true in your community. This investigation will help you understand why it is important to include people when making decisions.

1. You are going to do two experiments. You will need a large group. If you have a large team (12 people or more) you can work as a team. If you have a smaller team (2 to 11 people) you may want to work together with another team or even your whole class.
2. Start with Experiment 1. You can do this experiment two ways. Option A is a little easier. Option B is a little more difficult. You and your teacher can decide which option is best.

Option A: Easier

Remember in Task 1 when you thought about how you would feel if two of your classmates made a rule for the whole class without talking to you? Now you will experiment to notice what happens if only two classmates make decisions for your whole class. Will they be able to make decisions that work for everyone?

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a. Have a teacher pick two of your classmates.
b. The two classmates will design a shared community space that they think is best for everyone. The two classmates can use their ideas from the Discover activity.
c. No one else should talk or give ideas.
d. As the two classmates design the space, they should write, draw, or otherwise record their design so everyone can remember it later.

Option B: More Difficult

Remember at the end of Task 3 when you thought about how decisions were made in your community? Now you will experiment to understand how the process of making decisions can affect those decisions.

a. Think about how decisions are made in your community. There might be one or more than one leader making decisions. There might also be advisors or other people involved.
b. You and your classmates will take on decision-making roles that are similar to the ones in your community. For example, if your community has one person in charge with five advisors, then pick one classmate to be in charge. Pick five other classmates to be advisors.
c. Either your group or your teacher can pick the people who will play each role.
d. Now the decision-makers need to design a shared community space that they think is best for everyone. The decision-makers can use their ideas from the Discover activity.
e. No one else should talk or give ideas.
f. As the decision-makers design the space, they should write, draw, or otherwise record their design so everyone can see it later.

3. After you have finished either Option A or Option B, come back together as a class or team. This is the end of Experiment 1. You will discuss the results later.
4. Now start Experiment 2. In this experiment you will try to make decisions in a different way.

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5. In Experiment 2, your whole group will design a shared community space together. Everyone should share their ideas. Share your ideas with as many people as you want. Think about the ideas you wrote, drew, or recorded when you were in charge of the design in the Discover activity. These are the ideas you should share.
6. Design a shared community space together in a way that works best for your group. For example, you could:
    a. Use the board and have different group members draw on it.
    b. Have group members move around and talk to each other to share ideas.
    c. Use another way to record everyone's ideas.
7. As a group, write, draw, or record your design for a shared community space. You have now finished Experiment 2. You will discuss the results in the next activity.



Act: *Why is it important to include others when making decisions about my community?*

Now you will compare the results from your experiments. You will think about how the way you made decisions affected the decisions you made. This will help you decide how you want to make decisions about taking action in your community.

1. Pull out the designs from Experiments 1 and 2 and display them next to each other.
2. Silently notice any differences and similarities between the two designs.
3. Now have your teacher take out the folded pieces of paper or recordings that show each person's ideas for your imagined shared community space. Either:
    a. Unfold these pieces of pieces of paper and display them for everyone to see. Move around the room by yourself and notice all the things that the people in your class want.
    b. Or, if you recorded your voices, play those recordings for everyone to hear. Listen to the ideas of everyone in your group.
4. Compare the ideas from your classmates with the designs from Experiments 1 and 2. Discuss as a whole group:

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a. Did the design from Experiment 1 or the design from Experiment 2 match more of the things people in your class wanted in their shared community space?
b. When you have a shared community space, why is it important to think about what everyone wants?
c. Which design do you think would be better?

5. Now think about how decisions were made in Experiment 1. Only some of the people in your group were able to share their ideas.
6. Ask one of the decision-makers to share how it felt to make decisions for everyone.
7. Ask one of the classmates who was not a decision-maker to share how it felt to have someone else make decisions for them.
8. As a whole group, discuss:
   a. Were there ideas that were missed in Experiment 1 because everyone did not get a chance to talk?
   b. Would it have made a difference if the decision-makers had talked to the others before making a decision?
   c. What else would have helped the decision-makers make better decisions?
9. Now think about how decisions were made in Experiment 2. As a whole group, discuss:
   a. How did it feel to make decisions as a big group?
   b. What did you like about making decisions this way?
   c. What did you not like about making decisions this way?
   d. Did everyone's ideas make it into the final design or were there some ideas that got left out?
   e. If some people's ideas got left out, why was that?
   f. What else would have helped your group make better decisions?
10. Gather as a team. Remember what you learned in Task 3 about decision-making in your local community. Discuss:
    a. Are there people in your community who do not get to share their ideas?
    b. How do you think that makes them feel?

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c. How could your community decision-makers get ideas from more people?

d. How would decisions in your community change if more people were involved in the decision-making process?

11. Think about the way you make decisions as a team. As a team you can choose to make decisions in a way that includes everyone. Discuss with your teammates whether you think you need to change the way you are making decisions.

12. Take out your *Thriving Community Goals*. As a team, you have the chance to choose how you think decisions *should* be made in your community. Do you want or need to add a goal to your *Thriving Community Goals* related to the way decisions are made in your community? If so, add that goal now.

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Task 5: How do we include the community in our actions?

Learning from and working with your local community is a process that does not end. As action researchers you continue to ***discover*** what you know and what you still need to find out. To take action you need to partner with your community. So, you need to ***understand*** the best way to communicate with your community. Finally, you will use this information to ***act*** and get feedback on your community goals.



Discover: *How do we want to make community decisions?*

You have discovered information about your local community. Now you will think about what you already know and what you still need to find out. Your team has investigated your community in several ways. Get out your *Community Identity Map* from Task 1, your record of how your community changed from Task 2, and your record of your community decision-making from Task 3.

1. Work with your team. Title a sheet of paper or a digital document *Part 2 Organizer*. Make three columns. Write the words "Know," "Think," and "Wonder" at the top of the columns.
2. List or draw everything your team knows about your community in the *Know* column. Include anything you learned from your investigations. And include anything you already knew about your community because you experienced it yourself. Consider:
    a. Who is in our community?
    b. How has our community changed?
    c. Who makes decisions in our community?
    d. How can including the community help us make better decisions?
    e. For example, maybe you know that there are people living in your community who are thought to be different in some way. You can write that down.
3. List or draw everything your team thinks about your community in the *Think* column. Consider:
    a. Why are certain people picked as decision-makers in our community?
    b. Does decision-making our community exclude certain people?

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c. Do we think there are problems with the way decisions are made in our community?

d. For example, maybe you think it is a problem that decision-making in your community excludes the ideas of the people who are thought to be different.

4. List or draw everything your team still wonders about your community in the *Wonder* column. Consider:

   a. Are there questions you still have about people in your community?

   b. Are there actions you could take that would change your community for the better?

   c. For example, maybe you wonder if you could include the ideas of people who are thought to be different when you are making decisions.

5. Keep the *Part 2 Organizer*. You will need it again.

Understand: *How can we share what we have learned with others?*

You have gotten a lot of information from your community. Action researchers also give information back to the community. Partnering with your community means understanding the best ways to reach them. In this activity you will investigate the best ways to communicate with your local community.

1. First read Angela's ideas and think about why you believe it is important to share information you find out with your community.

Angela Says . . .



Sharing your research with the community is an important part of the relationship you are building. I think it's so important for researchers to do that. Don't be "helicopter researchers," where they come in, they ask their questions, they leave, and then they never come back. If we don't give back to communities and share what we have learned, how are they ever going to change, grow, or be better? When you share back with the community, they can use your results to implement changes or create policy. Figuring out who needs to do what in order to make a better place, that's what research should really be doing.

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2. Think about how you get information about what is going on in your local community. Do you:
    a. Hear it from others, like your friends and family?
    b. See or hear it on television or radio?
    c. Read it in print, like a newspaper or flyer?
    d. Use the Internet, like an online news site or social media?
    e. Read it on a cell or mobile phone, like through SMS/text alerts?
    f. Get it another way?
3. Talk with the rest of your team. Share with one another how you get information. Discuss whether you trust some information sources more than others.
4. Now you need to talk to other community members to see how they get their information.
5. There are several ways you can do this. You can choose one or two methods to get more information. You can:
    a. Interview: Have each team member talk to a few people in the community about how they get their information. It may be easiest to talk to people who you already know, like trusted adults or friends.
    b. Survey: Design and give a survey that asks questions about how people get information.
    c. Observation: Move around your local community and notice how information is communicated. Are there billboards, signs, announcements, radio programs, or other things you notice that are designed to communicate information?
6. Come back together and share the information you learned with the rest of your team.
7. In the future, you will need to communicate with your local community. Using what you learned, think with your team about:
    a. What is the best way to communicate with the people in your local community?
    b. Are there some people who get left out of community communications? For example, billboards and signs can exclude people who have low vision or are blind, or who can't read the language of the signs. Are there ways to communicate that include everyone in the community?

8. Record these ideas to help you remember how to communicate with your community. You can title a piece of paper *Community Communication* and write down your ideas. Or find another way to help you remember, like drawing a picture or recording your voices.



Act: *How will we change our goals after thinking about other perspectives?*

You have learned that including more people can help you make better decisions. As a team, you have made decisions about goals you think will help your community thrive. Now you will get opinions on those goals from other people in your community. Then consider if you want to change any of your goals.

1. Think about a person or some people in your local community who know your community well. Some ideas might be:
    a. Parents or other trusted family members who live in your local community
    b. School leaders, like a teacher or principal
    c. Elders or other trusted adults in your community
    d. Other children or teenagers
    e. Another idea you have
2. As a team or on your own, share your *Thriving Community Goals* with the person or people your team chose. Ask them:
    a. Do these goals make sense for our community?
    b. Are some of the goals more important than others?
    c. Are there goals that should be added?

⚠ Emotional Safety Tip

Sometimes people you talk to may have different opinions than you. That's okay. Listen respectfully but remember that just because someone else believes something does not mean you need to believe it. It is okay to pause or stop a conversation if you are uncomfortable or upset.

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3. Come back together as a team. Discuss:
    a. Did anyone you talked to have ideas that surprised you?
    b. Which ideas did you agree with?
    c. Which ideas did you disagree with?
4. Do you want to change your *Thriving Community Goals* after hearing some new ideas? If so, do that now. Remember, just because you talked to someone with different ideas does not mean you have to use those ideas. You and your team make the final decision about which goals you think are most important.

Angela Says . . .



Come at the research with your whole heart. Be mindful of people and try to be inclusive of everyone. If you've done the research and if you're passionate about the results, the community will see that. If you did it in a good way, the community's going to want to take up your recommendations and your results. Because I've seen communities decide to create programs and services and policies that will change things, based on what you say. Youth have a bigger voice than they give themselves credit for. They seem to think that adults aren't listening to them, but we really are. The problem is you're coming with new, fresh ideas. Sometimes older people are kind of set in our ways and not listening well enough. Don't give up hope that your actions and your research is not important, because it is.

Congratulations!

You have finished Part 2.

Find out More!

For additional resources and activities, please visit the *Sustainable Communities!* StoryMap at https://bit.ly/2YdHNqB.

Glossary

This glossary can help you understand words you may not know. Feel free to add drawings, your own definitions, or anything else that will help. Add other words to the glossary if you would like.

Access: Able to reach a place, thing, or idea

Action researchers: People who use their own knowledge and information they find out from their community to make decisions and take action on important issues

Anonymous: People do not list their name

Census: A list of information about people in the community which may include age, gender, family, religion, income (how much money a person or family makes per year), or race

Cis-gender: A person whose gender identity matches the sex they were assigned at birth. For example, a person who was assigned female at birth and thinks of themselves as a girl or woman

Community: A group of people that have a place or other thing in common

Concept map: A visual that helps you show information

Design: Decide on the look and function of a building, space, process, or object

Economic: About money, income, and use of wealth

Environmental: About the natural world

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Ethical: The fairness of something

Housing: A building or other structure where people make their home

Identity: Characteristics that make up each person or thing

Inclusive: Making sure no one is left out

Indigenous: A group of people or other living things that are native to a place and have not migrated from elsewhere

Investigation: Finding out more information

Mentor: Someone who has experience and can help guide you

Observation: Recording what you notice without adding your own opinion

Oral history: Recording information from people about their past

Paradigm: A way of thinking about the world

Perspective: A specific way of thinking about the world around us

Reflect: Think carefully about something

Social: About the interaction of people in a community

Sustainable: A balanced, long-term approach to social, environmental, economic, and ethical concerns

Survey: A list of questions that you can give to a group of people

Thriving: Something that is working or growing well

Unceded: Territory or items that have that have been taken without permission from the original owners

Other words:

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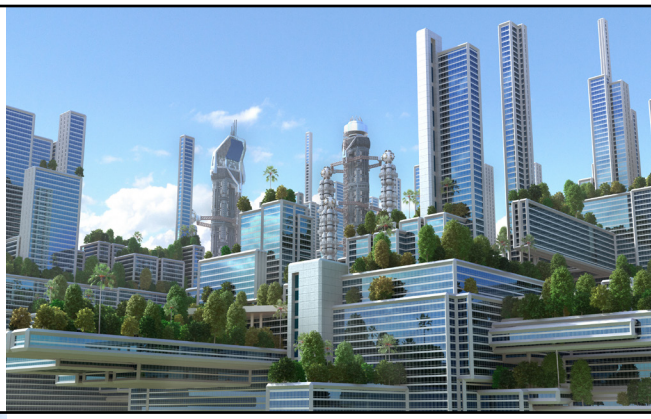
SUSTAINABLE COMMUNITIES!





Part 3:

How can we use our space to help our community thrive?

SUSTAINABLE DEVELOPMENT GOALS

developed by

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in collaboration with

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Smithsonian Science Education Center Module Development Staff

Executive Director - Dr. Carol O'Donnell

Division Director for Curriculum, Digital Media, and Communications - Laurie Rosatone

Science Curriculum Developer - Heidi Gibson

Research Mentor
Liteboho Makhele

Technical Reviewer
Badin Borde, M.A. Urban Geography

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Find out More!

For additional resources and activities, please visit the *Sustainable Communities!* StoryMap at https://bit.ly/2YdHNqB.

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Planner

Timing note: *The time used for investigations, observations, and actions can vary. When different options are listed within an activity, some options may take longer than others.*

Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Task 1: Why does my community need space?					
Discover	Consider your needs and how places in your community help you meet those needs.	• Paper • Pens or pencils • Computer (optional)	*My Identity Map* (Part 1, Task 2)	20 minutes	99
Understand	Use a survey, interviews, focus group, or other investigation to find out about the needs of people in your community.	• Paper • Pens or pencils • Computer (optional)	*Survey Instructions* (Part 2, Task 1, optional) *Oral History Instructions* (Part 2, Task 2, optional)	20 minutes + investigation time	101
Act	Identify ways the needs of people in your community are not met.	• Paper • Pens or pencils		15 minutes	104
Task 2: How does my community use our shared space?					
Discover	Find and analyze shared spaces in your research area.	• Paper • Pens or pencils	*My Research Area* (Part 1, Task 4) * StoryMap extension available	40 minutes	106
Understand	Investigate housing density and building use in your community.	• Paper • Pens or pencils		45 minutes	110
Act	Analyze the use of space in your community and decide if changes are needed by using different perspectives.	• Paper • Pens or pencils	*My Research Area* (Part 1, Task 4) *Part 3 Organizer* (Task 1)	25 minutes	111

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Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Task 3: How do green spaces meet the needs of my community?					
Discover	Explore built spaces and green spaces in your community.	• Small pieces of paper	*My Research Area* (Part 1, Task 4)	20 minutes	115
Understand	Investigate the ecosystem services provided by green spaces.	• Paper • Pens or pencils • Water, bowl, leaf, stone (optional, Observation 1) • Plastic bag, tie, plant (optional, Observation 2) • Water container (optional, Observation 4) • Water cup or bottle (optional, observation 5)	* StoryMap extension available	30 minutes + observation time (instructions for five observations provided, time for each varies; all are optional)	117
Act	Redesign the location and distribution of green space in your research area.	• Paper • Pencils	*Part 3 Organizer* (Task 1) *My Research Area* (Part 1, Task 4)	25 minutes	124
Task 4: How can we design our space for a sustainable future?					
Discover	Identify the strengths and weaknesses of your community.	• Paper • Pens or pencils • Computer (optional)	*Community Identity Map* (Part 2, Task 1)	25 minutes	127
Understand	Explore future opportunities and threats for your community.	• Paper • Pens or pencils • Topographical map of research area (optional)	*My Research Area* (Part 1, Task 4) *SWOT Analysis* (Task 4)	35 minutes	131
Act	Continue redesigning your research area, adding shared spaces and considering the SWOT analysis results.	• Paper • Pencils • Items to represent shared spaces (optional)	*Part 3 Organizer* (Task 1) *My Research Area* (redesigned, Task 3) *SWOT Analysis* (Task 4)	20 minutes	134

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Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Task 5: How can we make our community better?					
Discover	Consider what you now know, think, and wonder about the way space is used in your local community.	• Paper • Pens or pencils	*Part 3 Organizer* (Task 1) *Thriving Community Goals* (Part 1, Task 3)	15 minutes	136
Understand	Decide on individual actions you will take to help your community.		*Part 3 Organizer* (Task 1)	15 minutes	137
Act	Put your idea for individual change into action and reflect on it.			10 minutes + action time	138

*StoryMap extension found at https://bit.ly/2YdHNqB

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3 Part 3: How can we use our space to help our community thrive?

Every **community** takes up some space. Communities can choose to use this space in different ways. Some communities may have many buildings, others may have more natural spaces. In some communities there are many spaces everyone can use, others may have more private spaces. In Part 3 you will explore **sustainable** choices for using space to help your community **thrive**.

Remember: *In this guide you and your team are in charge. You can always change the instructions in the steps to make them work better for you and your team.*

Your Research Mentor

Sharing your experiences with others and learning from others' experiences is part of being a good **action researcher**. In Part 3 you will have a research **mentor** to help you understand some issues of space in your community and how to research those ideas. A mentor is someone who has experience and can help guide you.

Meet Liteboho Makhele, Your Part 3 Research Mentor



Meet Liteboho Makhele. She goes by Lite (pronounced *Dee-tay*) for short. Lite is the program manager of sustainable cities at the South African Cities Network. That means she works with cities around South Africa to help them become more sustainable. You, your team, and Lite are among the many researchers around the world trying to find ways to make local communities more sustainable. Lite will be your research mentor to help you understand space in your community.

Lite studied architectural technology and sustainable development planning and management at university. However, she also has knowledge and perspectives that came from other parts of her **identity**. Since Lite is now working with you, it is important to understand who she is.

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To help you, Lite filled out an identity map, just like you did in Part 1. Lite's identity map includes the following things.

- **Sustainability** manager
- Loves singing, dancing, theater, photography, graphic design, copy editing, and swimming
- Lives in Johannesburg, South Africa
- Catholic
- Believes in taking care of the planet and other humans
- Talkative
- Happy
- Short
- Perfectionist
- Black female
- University degrees in architecture and sustainable development planning and management
- Mosotho (from Lesotho)
- Speaks Sesotho and English
- Daughter, last born of two
- Wife, since 2009
- Mother to one daughter and one son
- Aunt to many nieces and nephews

Before you begin the rest of Part 3, think quietly to yourself about Lite's identity map.

- Are there things you have in common with Lite?
- Are there ways in which you are different from Lite?
- Can you see anything about her identity, in addition to her university degrees, that would help her understand different perspectives on how to help a community thrive?

Throughout Part 3 you will notice Lite sharing ideas and experiences with you. She may help you understand better ways to research or share some of the research she has done.

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Task 1: Why does my community need space?

As a community, you decide how your space is used. Space is often divided up for different purposes to help meet community needs. In this task, you will ***discover*** your own needs and how they relate to the places you go. You will investigate to ***understand*** the needs of your community. Then you will ***act*** by determining how your shared spaces meet the needs of your community.



Discover: *What are my needs?*

Every member of a community has their own needs. You need to consider these needs when you think about how to help your community thrive. You and your team members are an important part of your community. Any research into what people in your community need should start with you. The first step is thinking about your needs. Then you will think about how you use spaces in your community to meet those needs.

1. Take out a blank piece of paper or open a new digital document. Each person in your team is going to create a chart of their needs and wants.
2. Think of the needs of your body. What do you need to survive? For example, do you need air to breathe? Use words, drawings, or another method to record the needs of your body.
3. Think of your need for safety. Are there certain things you need to be protected against? For example, maybe you need protection against the weather. Record your needs for safety.
4. Think of your needs related to other people. Is your relationship with your family, friends, or another group very important to you? Record your needs related to other people.
5. Are there other needs or wants that are important to you personally? Maybe things that make you feel good about yourself? Things that make you happy? Things you want to learn more about? You can take out your *My Identity Map* from Part 1 and look at some of the things you said were important to you to get ideas. Record any additional needs.

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6. Share your list of needs and wants with your teammates. Discuss together:
    a. Are there some needs that everyone has?
    b. Are there some needs or wants that only some people have?
    c. If only some people have a need, does that make that need less important?

> **⚠ Emotional Safety Tip**
>
> Different people can have different needs. As an action researcher, it is important to understand many different needs of people on your team and in your community. When discussing which needs are the most important, remember there is no one right answer. You should respect the opinions of your teammates and expect that they will respect yours.

7. Now you will think of how places in your community help you meet your needs. As a team, create a list of all the places that team members have gone in the past week. Consider your homes, other homes, shops, parks, schools, museums, and any other places you can think of that you went. If it is not safe to go places right now, think of where you used to go when it was safe.
8. Compare where your team has gone to your list of needs and wants. What do you need and how do places in your community help you meet that need? Use Lite's ideas to help you with your discussion.

Lite Says . . .



I need some sort of ID or passport or something to identify myself, so I need a department that will help me get those documents. I need to eat, which means I need somewhere to buy my food. I need transport, somewhere to catch a bus to school or the movies or wherever I want to go. Then I need somewhere to go and play or sit around and enjoy the environment, so I need a park. I need a road that takes me from home to school and then school to basketball and then back home.

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Understand: *What are the needs of my community?*

Action researchers go beyond their own experiences and find out information from other members of the community. A thriving community meets the needs of its community members. You will investigate the needs in your community and where people go to meet those needs. This can help you understand how the spaces in your community are or are not meeting community needs. Asking people is the easiest way to find out more about the needs of people in your community and the places they go.

1. Decide how you will ask your community about their needs and the places they go. You have several options. You could:
   a. Give out a **survey**, either in person or online. You may have used a survey to understand the people in your community better during your investigations in Part 2. You can refer back to the *Survey Instructions* in Part 2, Task 1 if you need more information.
   b. Conduct interviews. Talk to individual people in your community to get more information. This is similar to the **oral histories** you may have used in Part 2, only it is getting information from people about the present, not the past. You can refer back to the *Oral History Instructions* in Part 2, Task 2 if you need more information.
   c. Conduct a focus group. A focus group brings a small group of people together to discuss a certain topic. This allows you to gather information from several people at one time. It also allows the people in your focus group to think together to come up with better ideas. Read the *Focus Group Instructions* for more information.

Focus Group Instructions

Choosing People to Be Part of Your Focus Group

a. It is normal to want to do a focus group with the people you know well and feel comfortable with. But try to include people you may not know as well or people who live in other parts of your community. This will help you get a more accurate idea of your community.

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b. Think about the identities you included in your *Community Identity Map*. Use those identities to try to pick a diverse group of people to be part of your focus group. For example, ask people of all different ages, located in different parts of the community, and more than one gender.

Ways to Hold a Focus Group

a. Talk to people in person at your school, a community center, in a park, or other public area.
b. Hold a meeting online or on the phone.

Tips for Holding a Focus Group

a. Think about where you should hold the focus group. Is there a place in your community, either in-person or online, where people gather and might be willing to answer your questions? How can you stay safe while holding a focus group?
b. Remember that you and your team members are part of your community. Think about what you already know about your community to help you choose the best way to get information. For example:
   - Will people in your community feel comfortable talking to a student?
   - Does everyone have **access** to the Internet if you want to hold a virtual meeting?
   - Do you need an interpreter to help you communicate with people in the focus group?
c. Make sure your questions are easy to understand.
d. Encourage people in the focus group to follow up on one another's answers. For example, maybe the first person says, "I need to exercise, so I go to a gym." Another person might say, "I also need to exercise, but I take walks outside."

Being Inclusive

a. Remember, including everyone is important. Try to pick a way to investigate that allows everyone on your team to participate.
b. Don't forget to think about timing, comfort, location, and format to make sure everyone can take part. You can look back at Part 2, Task 1 if you need more information about making your investigation **inclusive**.

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Safety Tips for Holding a Focus Group

Talk to your teacher for guidelines. They will know what is safest in your community.

⚠ Emotional Safety Tip

It can be hard to talk to other people in the community. You may feel shy or nervous. Someone may tell you they don't want to talk. That's okay! It doesn't have anything to do with you. It just means they don't want to share. You can show them respect by thanking them and moving on to another community member.

⚠ Physical Safety Tip

Never hold a focus group alone and always be aware of your surroundings. Pay attention to local guidance on whether it is safe to interact with people outside of your home.

2. Decide on your investigation questions. Your team needs to decide how you will ask for the information you would like to get. Think about the questions your team answered in the Discover activity. You need to find out the same information from your community to understand their needs and the places they go. As a reminder, you thought about:
   a. Needs:
      - Of your body
      - For protection
      - For relationships with others
      - Personal needs and wants
   b. Places: where you go in your community to meet your needs

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3. Work with your team to plan how you will collect information. For example, if you decide to hold a focus group, decide who will choose the people who will be part of the focus group, where you will hold the focus group, who ask the questions, and who will record the answers.
4. Conduct your investigation with your team. Record the information you find out.



Act: *Does my community's shared space meet the needs of all?*

Sometimes communities are well **designed** to meet the needs of all the people in the community. Sometimes they could be designed better. Now you will use the information you found out about the needs of people in your community to decide if the way your community space is used works well for everyone. This information can help you decide where you think there may be problems with the space in your community.

1. Work with your team. Title a sheet of paper or a digital document *Part 3 Organizer*. Make three columns, just like you did for your *Part 2 Organizer*. Write the words "Know," "Think," and "Wonder" at the top of the columns.
2. Use the *Know* column to list everything you found out about the needs in your community from your investigation in the Understand activity. Consider:
    a. How can you record the number of people with the same idea? For example, if you surveyed 10 people and 8 of them said they needed to have a job, you could record that by listing 8 out of 10, or as a percentage (80%), or as a fraction (8/10). Use the best way for your team to remember the information you gathered.
    b. How will you record important ideas that show that some people may have unique needs? For example, if you interviewed someone who uses a wheelchair and that person told you they need a way to get into buildings while using a wheelchair, you should find a way to record that need.
3. Now think about the places people told you they go. Record these places in the *Know* column. You will continue to use this organizer throughout this Part. The *Know* column will show all the information your team found out in your investigations.

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4. Next you will think about what that information means. Record these ideas in the *Think* column. As a team, discuss:
    a. How do places help meet the needs of the people in your community? For example, if you spoke to a person who told you they need to see their friends and one of the places they go together is to a public square, that place helps meet that need.
    b. Are there community needs that are not being met? Think about what people told you about what they need. Are there things they mentioned that do not seem to be available in your community?
    c. Whose needs are being met the best in your community? For example, maybe community members who are certain ages or genders or living in one part of the community are closest to having all their needs met. Why do you think that is?
    d. How important is it to meet everyone's needs in the community? Are some needs more important than others? Think about what you believe is fair.

> **⚠ Emotional Safety Tip**
>
> In most communities there are some people whose needs are not being met. This may be true for you or your teammates. This might make you feel angry, sad, or upset. These feelings are normal. It is okay to ask to pause or move away from a discussion if you are uncomfortable or upset. When discussing which needs are the most important, remember there is no one right answer. You should respect of the opinions of your teammates and expect that they will respect yours.

5. Use the *Wonder* column to list any other questions you have about the way space can be used to meet the needs of your community.
6. Keep the *Part 3 Organizer*. You will use it throughout Part 3 and in Part 7.

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Task 2: How does my community use our shared space?

Some spaces in a community are personal, like homes. Other spaces are shared with other members of the community. Sometimes shared spaces are **public,** or owned by the community. Public spaces may include streets, government buildings, and public parks. Sometimes shared spaces are **private**, or owned by individuals, groups, or companies. Private shared spaces may include shops, places of worship, or entertainment locations. Now you will ***discover*** some of the shared spaces in your own community. You will **observe** to ***understand*** the way space is used in your community. Finally, you will ***act*** on this information to identify problems about the way space is used in your community.



Discover: *What are the shared spaces of my community?*

Communities take up space. It is up to the community to decide how the space they have will be used. People who help build a community make choices. These choices include what to build and where to build it. These choices can either help a community to thrive or not.

In this activity you will start to think about why these choices are important. You already know that places can help meet or fail to meet community needs. Thriving communities need different types of spaces that people around the community can get to. If the places you go most frequently are nearby, it saves time. It saves other **resources** as well because people do not need to use transportation. Also, since people are staying in a smaller area, they get to know each other better. This can help build a sense of belonging and trust among people in the community. Now you will think about how this works in your own community.

1. Create a list with your team of possible shared community spaces. These are spaces that are not just for one individual or family but are for the whole community. Start by listing the shared places that people told you they go when you talked to them in Task 1.

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2. Consider whether there are any more possible shared spaces that no one mentioned during your Task 1 investigation. These do not have to be spaces you can find in your community. Record any shared spaces you can think of related to:
    a. Transportation, like roads or train stations
    b. Education, like schools, science centers, or libraries
    c. Buying things, like food or clothing
    d. Recreation, like sports fields or community centers
    e. Arts and culture, like historic sites, museums, or theaters
    f. Spirituality, like churches or sacred spaces
    g. Health, like clinics or hospitals
    h. Natural areas, like parks or rivers
    i. Services, like a fire station or a place to get an identification card
    j. Shared projects, like community gardens or group gathering spaces
    k. Other shared spaces
3. Take out your *My Research Area* map from Part 1. You may want to make a copy of it to use in this activity.
4. Circle, mark, or place an item on the shared spaces you know of in your research area. Figure 3.1 shows an example. If you are unsure whether a space is shared or personal, just leave it out.



Figure 3.1: Sample My Research Area map with shared spaces circled

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5. Examine these shared spaces. As a team, discuss:
    a. Is more of your community shared spaces or personal spaces?
    b. Are more of your shared spaces public or private?
    c. Are the shared spaces all in one place or are they spread out evenly through your research area?
    d. How does the way space is used in your community affect the people living there?
6. Compare the shared spaces on your map with the shared spaces from your list. As a team, discuss:
    a. Which of the possible shared spaces you listed in step 2 can you find in your research area?
    b. Are there some types of spaces that are missing from your research area?
    c. If so, does that create a problem?
7. Remember, having important shared spaces nearby can help people save time and money, and help build relationships with other community members. Some researchers think it would be best if all of your important needs could be met by going to places that you could get to by walking or biking 15 minutes, especially if you live in a city or town. In this activity, you will think about how similar your community is to a **15-minute community**. You can do this with a digital mapping tool, such as Google Maps, or you can use your *My Research Area* map. This activity can be done by yourself, in pairs, or with your team.
8. If your home is in the research area, mark it now. If not, you can either find another map that includes your home or pick the home of a teammate that is inside the research area.
9. Mark the places you and your family need to go often. For you, this may be school, a local park, or a food market. For adults, this might include their workplace and local government buildings. Remember the needs and places you thought about in Task 1. If you are using your *My Research Area* map you may have already marked some of these places when you marked shared spaces. If there are places outside your research area that you often go to, just draw an arrow in the direction of that place and label it with where you or your family goes.

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10. Now examine how close those places are to your home. How long does it take you to walk or bike to each of these places? If you need help answering this question, you can use the directions feature on a digital map or you can measure the distance on your *My Research Area* map. If you have places that are off the map, estimate how long it takes you to travel there and record that information next to the arrow. Figure 3.2 shows an example.



Figure 3.2: Sample My Research Area map with arrows pointing to places visited frequently and the number of minutes it takes to get there

11. Can you bike or walk to everywhere you need to go within 15 minutes?
    a. If so, congratulations, you are living in a 15-minute community. This may make it easier for you to get to know other people in your community and save time and resources.
    b. If not, don't worry. In **rural** areas it may not be possible to have a 15-minute community. If you live in a city or town that is not a 15-minute community, you will have a chance later to think about what changes you could make to your space to make it a 15-minute community.
12. Think quietly to yourself about different parts of your research area. Do people living in some parts of it have to travel much farther to get what they need? Consider whether or not you think that is a problem.

Understand: *How dense is the housing in my community?*

Space in a community can be used in many ways. Homes can be close together or far apart. This is called **housing density**. **Housing** can be all in one area or it can be mixed up with shops and other types of shared spaces. Different areas of the community can be used for different purposes. Sometimes, if space is used in one way, like to build a shop, it cannot be used in another way, like to build a clinic. Sometimes, spaces can be used in several ways, like as a school during the day and as a community center in the evening. In this activity, you will investigate housing density and the way different spaces in your research area are used.

1. Pick a part of your research area you can walk around or move around easily. You should pick an area along a road or path. It should be long enough that there are a number of buildings, but not so long that you cannot reach the end of it. Try to pick an area with several different types of buildings. You can go all together as a team or break into smaller groups and each cover a different area. If you cannot go in person, you may be able to use an online mapping program, such as Google Maps' street view, to move virtually along the street.

> ⚠ **Physical Safety Tip**
>
> Talk to your teacher or another trusted adult before you go. Never go alone and always be aware of your surroundings. Pay attention to local guidance on whether it is safe to interact with people outside of your home.

2. Measure: Find out how big the area you picked is. You can measure it in whatever way makes sense to you. For example, you could use city blocks, kilometers, meters, miles, or you could just count your steps.
3. Go to the beginning of the area you picked and be prepared to observe closely. You will be walking or moving through this area and conducting an **observation**. You will be observing the density and use of the buildings you pass. Read through the directions in steps 4 and 5. Then start your investigation.
    a. Bring something to write on or find another way to record your observations.

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b. You may want to assign different jobs to team members, since you will be observing two different things. Have some people observe density and some observe how spaces are used. Or you can also move through your area twice and have everyone make both observations.

4. Calculate: You will find out how many people are living in one area.
   a. Count the number of buildings that people live in as you pass by, to help estimate housing density.
   b. Estimate how many people live in each building. For example, if you pass a house and most people in your community have families of around five people, you could guess five. If you happen to know how many people live in a home, then use that number. If you pass a large apartment building, you might want to count the number of floors and use that to help you make your guess.
   c. Record this information during your investigation.
5. Use: You will find out how people are using the spaces you pass by.
   a. If you pass buildings that are not for housing, record what they are used for. If they are used for more than one thing, record that information.
   b. If you pass outdoor areas, make a record of how they are being used. For example, maybe you pass a bench where someone is sitting and having a snack.
   c. Record this information during your investigation.



Act: *What are the problems with the way space is used in my community?*

The way a community uses the space it has can help determine whether the community can thrive. Spaces can be used so that everyone can meet their needs. However, in many communities the spaces do not meet everyone's needs. Each community is unique. The values of a community are also unique. You will think about how the way your community uses its space can help it become a better place to live.

1. Take out your *Part 3 Organizer*. Use the *Know* column to record the information you found out during your Understand investigation. Record:
   a. How many people do you think are living in the area you investigated? Try to use a number, like 100 people in two city blocks.
   b. How were people using the spaces you observed?

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c. Were there many buildings used in the same way or were there different uses mixed together? For example, if there was only housing in one area, that would be the same use. If an area had housing and shops and outdoor spaces to play, that would be mixed use.

2. Analyze the housing density with your team. Record your answers under the *Think* column.
   a. Does it seem like there are a lot of people living in the space you investigated or just a few?
   b. If there were many more or many fewer people living in your research area, how do you think your community would change?
   c. What are the advantages of having many people living in one area?
   d. What are the advantages of having few people living in one area?
3. Analyze the use of the spaces you passed. Record your answers under the *Think* column.
   a. What would be the advantages to using the space in a mixed way? For example, maybe there is a square that has shops, a public park, and housing on it. Why would it be good to have all of those things together?
   b. What would be the advantages of using the space in the same way? For example, maybe there is a street that just has houses on it. Why might that be a good idea?
   c. If you were trying to create a 15-minute community, would it be easier to have space used in a mixed way or the same way?
4. Mark on your *My Research Area* map how you would change things to make your research area closer to a 15-minute community.
   a. Are there better places to put shared spaces?
   b. Are there changes you could make that would make things more equal for the people living in your community?

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Lite Says . . .



Look at what exists in your community and think about what would make your life easier. This is actually what a professional **urban** planner does when they put communities together. These are the sort of questions they think about and these are the sort of needs they try to address. Sometimes planners get it wrong and that is one reason why your community might have problems with the space. Look at the solutions to those problems. How do you make your communities better?

5. Share your ideas with another team or with your teacher about how your research area could be changed.
6. Think about the housing density and use of the space you observed during your investigation. You can consider whether the way space is used in your community is sustainable. **Sustainable communities** use space in ways that are good from all four **perspectives**: **social**, **environmental**, **economic**, and **ethical**. Does the way space is used in your community seem good from a:
    a. Social perspective: For example, does the space help people interact with other people and build relationships?
    b. Environmental perspective: For example, are there places for nature?
    c. Economic perspective: For example, are there spaces where people are buying, selling, and making things?
    d. Ethical perspective: For example, can everyone reach the shared spaces or are some people left out?
7. Record any problems you notice about the way space is used in your community in the *Think* column. Discuss with your team:
    a. Are there problems you noticed from a specific perspective? For example, maybe you noticed problems from a social perspective because there were not enough spaces for people to meet together.

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b. What would you change about the way space is used in your community, if you could? For example, maybe you think you would have different shared spaces or put them in different places.

8. Use the *Wonder* column to list any other questions you have about shared spaces in your community.

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Task 3: How do green spaces meet the needs of my community?

Space in a community can have buildings, roads, or other things built on it. Or space can be left open and natural. Both types of spaces are important in a community. In Task 2 you thought about some shared built spaces. In this task you will think about shared open spaces. You will ***discover*** the proportion of built space and open space in your research area. Then you will ***understand*** the importance of open, natural spaces. Finally, you will prepare to ***act*** by using that information to make decisions about open space in your own community.



Discover: *How does my community balance built space and green space?*

People take up a great deal of space. People need housing, transportation, and things like food and clothing. Buildings and roads are part of the way most people meet those needs. However, spaces that are not covered by buildings and roads, but are left as natural areas, also fill an important role. These natural areas are also called **green spaces**. Different communities leave different amounts of these green spaces. Now you will think about how your community divides space between built spaces and green spaces.

1. Take out your *My Research Area* map. Your team will be measuring the parts of your research area.
2. Cut or tear pieces of paper into small pieces that are all the same size and around the width of a road on your *My Research Area* map. If you are using a digital map of your research area, you may be able to measure using a digital tool instead.
3. Take the small pieces of paper and use them to cover all the streets in your research area. Figure 3.3 shows an example.

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Figure 3.3: Sample My Research Area map with pieces of paper over the streets

4. Remove the pieces of paper and count them. Record the count.
5. Next, take the same small pieces of paper and use them to cover all the buildings in your research area. It does not matter what the purpose of the buildings are—if a space includes a building, place a piece of paper on it.
6. Remove the pieces of paper and count them. Record the count.
7. Finally take the same small pieces of paper and use them to cover all the parks, rivers, or other green spaces in your research area. Remember, green spaces are any natural areas, even if they are not covered with green plants. Depending where you live, green spaces might be rocky, sandy, wooded, snowy, marshy, or something else. People may visit green spaces, like in a park. But green spaces usually do not have houses built on them.
8. Remove the pieces of paper and count them. Record the count.
9. Examine your three counts. You have a number for the area for streets, the area for buildings, and the area for green spaces. These three counts show you the proportion of your research area that is used for the different types of spaces. Discuss:
    a. What takes up the most space in your community: roads, buildings, or green spaces?
    b. Is your team happy with the way the space is divided?

c. Are the roads, buildings, and green spaces spread out evenly around your community? Or, for example, are there more green spaces in some areas than in others?

Lite Says . . .



People need proper housing. You need to have places where people go to work. People need practical things like health care. They need to go shopping. So you do need built-up spaces. At the same time, you need to balance that with the amount of natural and green spaces that you have. If you completely remove nature from a community, you have challenges related to **pollution**, **heat islands**, and **congestion**. It also is not a livable place for people. That affects people's mental and physical well-being.

10. Think back to your investigation in Part 2 about how your community has changed over time. Based on what you found out in that investigation, do you think the proportion of buildings, roads, and green spaces in your community has changed? If so, why do you think it changed?
11. Think quietly to yourself:
    a. What information did you find out about your community by looking at the three categories (roads, buildings, green space)? For example, maybe you found out that there was a lot of green space in your community or that roads take up a lot of space.
    b. Why is it important to have each type of space (roads, buildings, green space)?

Understand: *Why are green spaces important for my community?*

Now you will do an investigation to find out more about why green spaces in your community are important. Their importance is related to **ecosystem services**. Ecosystem services are any benefits that an ecosystem or natural area provides to people. Ecosystem services can help meet a variety of human needs. In this investigation you will find out more about the way green spaces in communities benefit people.

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1. Start by thinking quietly to yourself. You may want to close your eyes. Remember a time when you were in a natural space that was beautiful to you. Think about:
   a. What did you notice with your different senses?
   b. How did you feel?
   c. Why was the experience of being in that space valuable to you?



Figure 3.4: Beautiful natural space

2. Share your answers with your team, if you are comfortable doing so.
3. Discuss what ecosystem service the green space provided to you at that time. People sometimes feel a sense of awe, peace, or connection when they are in green spaces. This fills an important need for many people. It is one of the ecosystem services provided by green spaces.
4. Think about the role green spaces play in your culture. Different cultures may use green spaces in different ways. In some cultures there are ceremonies or specific events that happen in green spaces. In some cultures there are important education experiences that happen in green spaces. Discuss with your team:
   a. In your culture, are there certain social gatherings that happen in green spaces?
   b. In your culture, are there important events or traditions that happen in green spaces?
   c. In your culture, are there education experiences that happen in green spaces?
5. List the personal and cultural ecosystem services you just discussed. You can do this by writing or drawing on paper, using a digital document, recording your voice, or using another method to record your observations as a team.

6. Now pick a green space to investigate further. If you have a green space in your community, like a park, it may be easiest to do this investigation there. If not, you may be able to complete this investigation somewhere else outside your school or home.
7. Decide with whom you will investigate. You can choose to observe by yourself, in pairs, or with your whole team.

> **⚠ Physical Safety Tip**
>
> Talk to your teacher or another trusted adult before you go. Never go alone and always be aware of your surroundings. Pay attention to local guidance on whether it is safe to interact with people outside of your home.

8. Observe how people use the space. Take 5 to 10 minutes and quietly observe.
    a. What people do you notice? (Record their ages and other identifying features.)
    b. What are they doing?
    c. Are people doing activities alone or with others?
    d. If you came at a different time of day or a different time of year, do you think you would notice different people or different activities?
9. Discuss with your team how people are using the space to meet their needs. How is the green space providing ecosystem services to the people you observed? Add these ecosystem services to your list. You can use Lite's ideas about green spaces to help you get started.

Lite Says . . .



Green spaces make our cities and neighborhoods more attractive places to live and work. They provide us with places to exercise and improve physical and mental well-being. We can cycle, run, and play games. They are places where we can meet and celebrate with family and friends. They are inclusive, meaning they can be used by many different kinds of people. Small and medium businesses can be set up in these spaces and provide jobs.

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10. Now observe how other living things, like plants and animals, use the space. Green spaces provide space for living things to grow, raise young, and get food or water. Take 5 to 10 minutes and quietly observe.
    a. What types of living things do you notice?
    b. How are they using the green space?
11. Discuss with your team what ecosystem services you observed. Record your answers.
    a. How do other living things benefit from the green space?
    b. How do the living things you observed help people?
    c. What other ways do living things help people? Sometimes it can be difficult to observe how the living things in a green space help people. You will have a chance to think about these benefits next.
12. Air: Plants help clean **polluted** air and release oxygen and **water vapor**. You can observe this in action by doing the activities in *Observation 1: Plants and Oxygen* and *Observation 2: Plants and Water*, if you have time. Discuss the ecosystem services plants provide related to air with your team. Record your answers.
    a. Why would helping to clean polluted air benefit people?
    b. Why would it be good for people when plants release oxygen?
    c. Why would it be good for people when plants release water vapor?

Observation 1: Plants and Oxygen

You may know that people breathe in oxygen and release carbon dioxide. Plants do the opposite. They take in carbon dioxide and release oxygen. Plants can also help absorb some types of air pollution. In this observation, you can see the oxygen released by a plant.

a. Get out a clear bowl or cup and fill it with tap water.
b. Pull a green leaf off a plant. This can be a leaf from a tree or a smaller plant. Try to find a leaf that is a size you can observe easily.
c. Weigh the leaf down in the water with a small stone.
d. Observe the leaf carefully.

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e. Leave the bowl of water in sunlight for an hour or two.
f. Observe the leaf again. Do you notice any small bubbles?

When you leave the leaf in the sunlight, it uses a process called **photosynthesis** to release oxygen. The small bubbles you see are the oxygen the plant released.

Observation 2: Plants and Water

Plants take in water from the ground and use it as part of photosynthesis. Plants also release some of this water into the air as water vapor.

a. Take a plastic bag and tie it around a branch of a tree or plant that is in the sun. Make sure the plant has leaves.
b. Leave the bag tied for an hour or two.
c. Observe the inside of the plastic bag. Do you see water droplets? That is the condensed water vapor released by the plant.

The water vapor released by plants goes into the atmosphere. This water vapor is an important part of the water cycle. It helps to form clouds and create **precipitation**.

13. Temperature: Green spaces are cooler because they do not absorb and release the sun's energy the way built spaces do. Also, water evaporating from trees and plants cools the air surrounding them. You can observe these ecosystem services in action using *Observation 3: Green Space and Heat* and *Observation 4: Plants and Cooling*, if you have time. Discuss the ecosystem services green spaces provide related to temperature with your team. Record your answers.
    a. How do green spaces help keep communities cooler?
    b. Why would keeping a community cooler be good for people?

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Observation 3: Green Space and Heat

Have you ever stepped on concrete in bare feet on a sunny day? It can get very hot! Many parts of the human-built environment absorb heat from the sun all day. The heat gets trapped in cities, creating heat islands. Green spaces can help.

a. Go to a spot where plants are next to a road, sidewalk, or other similar built surface. This will work best on a sunny day.
b. Put one hand on the built surface. Put one hand on the plants.
c. Feel both surfaces. Which is hotter?
d. Find a spot where a tree is shading an area. Go into the shaded area. Then move into the sun. Which is hotter?

The air around a built-up space tends to be warmer than the air around a natural space. Built spaces absorb and then release more heat from the sun. Plants reflect more heat, helping to keep the air cooler. Plants also help make the air cooler by providing shade. This prevents some of the energy from the sun from reaching that area. If you want to see an example of how green spaces can help cool down cities, you can look at the maps on found in the StoryMap website.

Observation 4: Plants and Cooling

Remember, plants release water vapor. Just like you, plants get hot. You cool down when you sweat. When water vapor evaporates from a plant's leaves, it cools the plant down. When water vapor evaporates from plants it also cools off the air around the plant. You can understand this using another simple observation.

a. Put your hand about an arm's length away from you and blow on your palm.
b. Now fill up a bowl, bucket, or pan of water all the way to the top of the container. Put it between your mouth and your palm. Blow again, but this time blow across the water.
c. Which breath feels cooler on your palm?

When air flows over evaporating water vapor from the plants, it cools the air as it moves into the surrounding area. Plants basically act as nature's air conditioner!

14. Water: Green spaces absorb water more easily than built spaces. This helps communities with water management. You can observe these ecosystem services in action using the *Observation 5: Green Space and Water* activity, if you have time. Discuss the ecosystem services green spaces provide related to water with your team. Record your answers.
    a. How do green spaces help with water management?
    b. Why would managing water be good for people?

Observation 5: Green Space and Water

Water acts differently in green spaces and in the built environment. See if you can find out why.

a. Take a cup or bottle of water. Pour about half on a sidewalk, road, or other built area. Observe what happens.
b. Pour the other half on a green space. Observe what happens.

You may have seen water rolling off the built space. The water may have been absorbed into the ground in the green space. When water is absorbed, it adds to the water that is in the ground. Many communities use **groundwater** to meet their water needs using wells, bore holes, or other methods. The more water absorbed by the ground, the more groundwater there is to use.

Sometimes when there are built areas, the water flows out of the area so fast that it does not have a chance to be absorbed by the ground. This may mean the groundwater is not refilled and communities need to get water from somewhere else. When water flows out of a built area it can sometime cause floods or lead to a lot of pollution getting into rivers or lakes.

15. Keep your record of all the ecosystem services you noticed in your green space. Read Lite's ideas about green spaces to see if you missed anything.

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Lite Says . . .



Green spaces protect and conserve biodiversity, which means they create homes for different kinds of plants and animals, such as birds, squirrels, and butterflies. Trees play a vital role in managing pollution and keeping the air clean by producing oxygen and removing carbon dioxide and other harmful gases in the air. Green, open spaces also help manage floods by absorbing water and channeling it away from buildings.

Act: *How should we divide up space in my community?*

The ecosystem services provided by green spaces are important. So are the other possible uses of that space, such as housing or transportation infrastructure. Balancing the proportion of built spaces and green spaces can be difficult. Both can help meet human needs in your community and around the world. You will need to think about the best way to divide up space in your community.

1. Take out your *Part 3 Organizer*. With your team, use the *Know* column to record information about green spaces in your community. Record:
   a. What proportion of space in my research area is used for roads?
   b. What proportion of space in my research area is used for buildings?
   c. What proportion of space in my research area is used for natural or green areas?
   d. What are the important ecosystem services green spaces provide to our community?
2. Discuss how space is divided up and used in your community. Record your answers under the *Think* column. Consider:
   a. What do you think would change about your community if there were more green spaces? What would you need to give up?
   b. What would change about your community if there were more built spaces? What would you need to give up?

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c. If you could, would you change the proportion of built space and green space in your community?

3. Use the *Wonder* column to list any other questions you have about green space in your community.
4. Now you will have a chance to start to redesign your research area. You can do this individually or in teams. Take out your *My Research Area* map and use it to help you. Take out a blank piece of paper. Draw or trace natural features on it that cannot be changed about your research area. For example, include rivers or mountains. Figure 3.5 shows an example.

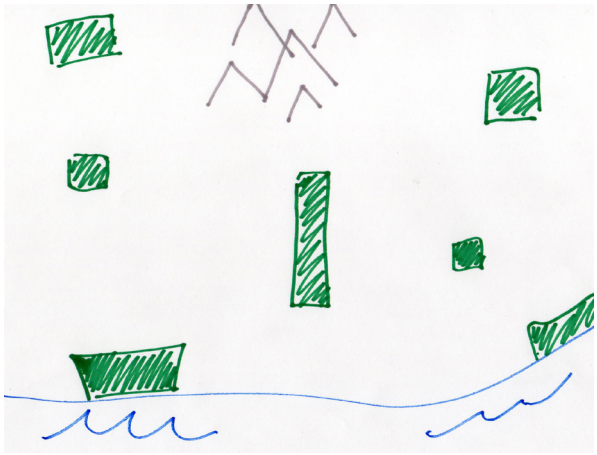

Figure 3.5: Sample redesigned area with river and green spaces

5. Next, mark the green spaces you want to have in your research area. You may want to use items to represent green spaces until you decide on your final design. Keeping the green spaces where they are is easiest. However, you may want to make changes. Consider:
   a. Do you think more or less of your community should be green space?
   b. Are there some parts of your research area that are far away from green spaces? Could you distribute the green spaces more evenly?
   c. Are there important green spaces that you would not want to change?
   d. Are there important built areas that you would not want to change?
6. Share your ideas about new green spaces with a friend or family member.
7. Keep your redesigned *My Research Area* map. You will add to it in Task 4.

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8. Consider the global connection. Ecosystem services don't just end with your community. They extend globally. The balance between built spaces and natural spaces is also a global issue. In the past 40 years, the amount of built-up space has more than doubled around the world. Consider:

   a. Why do you think built spaces have increased globally?

   b. How do you think this change is affecting communities around the world?

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Task 4: How can we design our space for a sustainable future?

Each community has unique needs and unique features. In this task you will ***discover*** more about what makes your community unique. Then you will investigate to ***understand*** how you can help plan for a sustainable future. Finally, you will ***act*** to design a better use of space in your community.



Discover: *What are the strengths and weaknesses of my community?*

Community identity, natural features, **climate**, and location all help make your community unique. As action researchers these are important things to consider when thinking about space in your community. Your community has specific strengths and weaknesses. Keeping your strengths is important. Helping to make your weaknesses stronger is also important.

1. Take out your *Community Identity Map* from Part 2 and remind yourself of what is on it.
2. Think quietly to yourself about what makes your community identity unique. Your *Community Identity Map* is a list of the identities of people in your community. But there is also a collective identity that is part of your community. Consider cultural elements, social connections, places, and events in your community.
3. Discuss with your team what else is an essential part of your community identity.
    a. Are there cultural elements that make your community unique? For example, maybe you have a food, a dance, or a language that is an essential part of your community.
    b. Are there social connections that make your community unique? For example, maybe many people in your community grew up there and families know one another well, or maybe many people in the community connect through a shared identity, like a favorite sport or a local team.
    c. Are there places that make your community unique? For example, maybe you have a historical site, a sacred site, a museum, or a local business that is an essential part of your community.

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d. Are there events that make your community unique? For example, maybe there is a festival or a market that is an essential part of your community.

4. Take a piece of paper or open a digital document and divide it into four boxes. Label the two boxes across the top "Strengths" and "Weaknesses." Label the two boxes across the bottom "Threats" and "Opportunities." This is called a SWOT Analysis. Figure 3.6 shows an example.

Strengths	*Weaknesses*
Opportunities	*Threats*

Figure 3.6: SWOT Analysis example

5. Consider your *Community Identity Map* and the other parts of your community identity you just discussed. Having a strong community identity can help a community thrive. Are there things about your community that help people feel a sense of pride and belonging? Write, draw, or find another way to record those things under *Strengths*.
6. Now think about weaknesses in your community. Write, draw, or find another way to record these things under *Weaknesses*. Discuss with your team:
   a. Are there ways some people in your community are left out or treated unfairly? You may want to remember what you learned about community decision-making in Part 2.
   b. Are there places or people in your community who used to be thriving but now are struggling?
   c. Are there past events that happened in your community that were unjust? For example, maybe in the past some people took over land unfairly, did not treat others with respect, or harmed others. Even though these events were in the past, they may still affect your community.

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⚠ Emotional Safety Tip

It can be difficult to talk about things that have gone wrong in your community in the past. It can also be difficult to talk about things that are not right about your community now. It is okay to feel sad, angry, embarrassed, or any other way. All communities make mistakes. However, it is important to discuss those mistakes and talk about how to make things better. Make sure you listen closely and treat your team members with respect. They may have opinions that you disagree with or experiences that make you uncomfortable. It is okay to ask to pause or move away from a discussion if you are uncomfortable or upset.

Lite Says . . .



Decisions that city planners have made in the past about placing certain groups of people in certain areas may have affected those people's access to economic, social, and educational opportunities. Townships in South Africa are **apartheid** residential areas that were excluded from everything. Traditionally townships only had one entrance so that security forces could control the people living there. A lot of time you find that townships were created as places you only go to sleep, instead of communities where people go to work, play, and have access to different opportunities. Townships were designed as rows and rows of matchbox houses with very small yards, with very little open space, very few schools, clinics, or any other social or economic **amenities**. Communities should not be exclusively for a certain group of people. Integrating a diversity of people from different walks of life and different income groups makes the community better from a social, economic, environmental, and ethical perspective.

7. Consider the natural features of your community. People are an important part of a community, but so is the space occupied by the community. Discuss with your team:
   a. What are the natural features of the place where your community is located? For example, is your community next to a river, mountains, a beach, good farmland, or near an earthquake fault line?

b. What are the strengths of your community because of those natural features? For example, if your community is near a river maybe it makes your community more beautiful and is a source of food, such as fish. Record those ideas under *Strengths*.

c. What are the weaknesses of your community because of those natural features? For example, maybe the river in your community floods often and damages people's homes or businesses. Record those ideas under *Weaknesses*.

8. Consider the climate of your community. Climate is what the weather is like in an area over a period of time. Discuss with your team:

   a. What is the climate like for your community? Does it change from season to season? Are you in danger from any extreme weather? For example, does it rain more at certain times of year, is it sometimes too cold to spend a lot of time outside, do you sometimes have tornadoes?

   b. What are the strengths of your community because of your climate? For example, if your community has a lot of rain, you may have plenty of water. Record those ideas under *Strengths*.

   c. What are the weaknesses of your community because of your climate? For example, if you have a lot of rain it may make it difficult to spend a lot of time outside or you may have flooding. Record those ideas under *Weaknesses*.

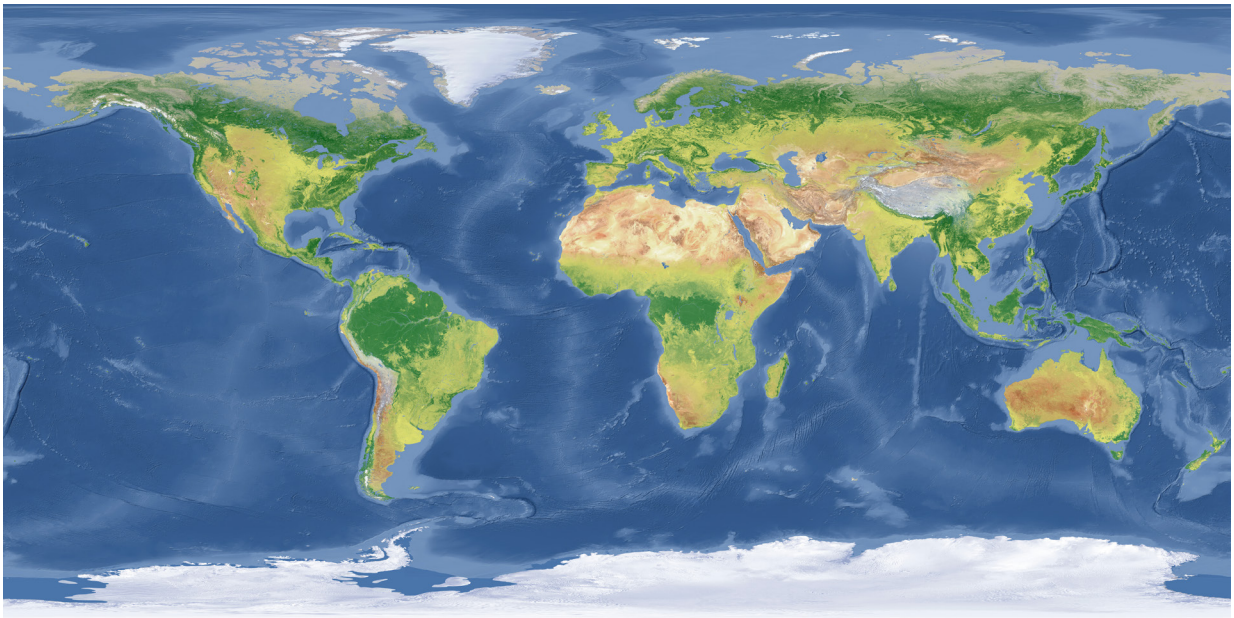

Figure 3.7: Map of the world

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9. Consider the location of your community. You can use the world map in Figure 3.7 to help you. Discuss with your team:
    a. Where in the world is your community located? What is it near? For example, is your community in a city or a small village? Is it near many other communities or far away? Is it near a border with another country?
    b. What are the strengths of your community because of its location? For example, if your community is near many other communities, it may be easier to trade. Record those ideas under *Strengths*.
    c. What are the weaknesses of your community because of its location? For example, maybe your community competes with many other communities for resources like land or water. Record those ideas under *Weaknesses*.
10. Keep your *SWOT Analysis* sheet. You will fill in the *Opportunities* and *Threats* boxes in the next activity.



Understand: *What are the future opportunities and threats for my community?*

The strengths and weaknesses in your community show what is going on in your community right now. Next you will think about what could happen in the future. Remember in Part 2 when you found out about how your community had changed? Although it can be difficult to realize it, your community continues to change.

Renewable energy, **climate change**, **artificial intelligence**, **migration**, **self-driving vehicles**, better **satellite Internet access**, **drones**, and **3-D printing** are just a few examples of changes that will affect communities around the world. You can find a more information about these changes in the glossary. Changes may be opportunities to make your community better. They also may be threats to your community. When you think about the best ways to use the space in your community, you need to consider the changes happening in your community. Many opportunities and threats may come from big changes that are taking place beyond your community in your country, your region, and around the world.

1. By yourself or with your team, start thinking about national, regional, and global changes you think might affect what happens in your community. Consider:
    a. Social changes: Is the way people interact changing? The Internet allows for virtual interactions. How does that change the way people connect in your

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community? Do people have different places or ways they connect with one another? Are family groups changing?

b. Environmental changes: Is pollution affecting your land, water, or air? Are there changes to populations of animals or plants that people depend on? Will rising sea levels, increases in extreme weather, drought, or wildfires because of the changing climate affect your community? If you want to think more about how climate change might affect your community, you can use the *Climate Change Investigation*.

c. Economic changes: How is your local economy changing? Are people doing different types of jobs because of new technologies? Are the places and ways in which people are buying and selling things changing?

d. Ethical changes: What is right and wrong may not change, but our ability to notice what is right and wrong may change. Are there people with certain needs who were previously ignored but now you are more aware of them? Are there changes that need to happen for your community to be fair to all the people in it?

Climate Change Investigation

The local and global environment is changing in many ways. These changes are sometimes opportunities but are often threats. Right now the global climate is warming quickly. This is called climate change. A changing climate presents many threats. Considering how a warming planet will change your community is important.

a. Take out your *My Research Area* map. You will be using this map to identify potential threats to spaces in your area. If you have a **topographical map** of your research area, that might be helpful.

b. First you will think about the threat of too much water. A warmer climate will make the level of the seas rise. In many places it may also lead to increased precipitation. This makes flooding and landslides more of a threat. Examine your map to think more about the threat of flooding. Mark areas you think may be at risk of flooding using a colored pencil or another way to mark them.

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- Are there spaces in your community that are close to the ocean? If so, is the ground in those areas close to the level of the ocean? Mark those areas on your map now.
- Are there spaces near rivers? Rising sea levels and more precipitation may mean that rivers have more water or change course in unpredictable ways. If there are spaces near a river that are close to the level of the river, they may be under threat. Areas where rivers have been rerouted into canals may also be under threat. Mark those areas on your map now.
- There may be other spaces in your community that are under threat of flooding. These may be low-lying areas or spaces where a lot of storm water drains. One way to identify these spaces is if you have noticed water there in the past. Mark any areas you think are under threat of flooding on your map now.
- Are there areas built near steep slopes, mountain edges, or near where water is draining or land is **eroding**? If the ground becomes wet in these types of areas there may be a landslide. Mark any areas you think are under threat of landslide on your map now.
- The areas you marked on your map may be under threat from a changing climate. Record those ideas under *Threats* on your *SWOT Analysis*.

c. Next you will think about what happens when there is not enough water. A changing climate may lead to drought or dried-up lakes or riverbeds in some places. Sometimes drought leads to wildfires. Think about what you know about your community. Is there a high risk of wildfires in the surrounding area? Record any threats you identify under *Threats*.

Another climate-related threat is extreme weather events like hurricanes, cyclones, tornadoes, windstorms, and heat waves. You may have experienced these weather events yourself. If you know of any extreme weather that sometimes happens in your community, record those threats under *Threats*.

2. As a team, come up with a creative way to share your thoughts about the future changes you think will happen in your community. For example, you could act, tell a story, draw a picture, make a collage, record a podcast, or use another way to show the rest of class what you are thinking.

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3. Share your ideas with the rest of your class. If other teams have good ideas about changes that may happen, you can add these ideas to your own thoughts.
4. Now think about the things that might be good about the changes. Write, draw, or find another way to record those ideas under *Opportunities* on your *SWOT Analysis*. For example, maybe there are new jobs being created in your community because people can sell things to people outside your local area using the Internet. That might be an opportunity.
5. The world is changing quickly in many ways. These changes from outside your local community will bring changes to your local community. If you can think of any other opportunities or threats to your community, record those now on your *SWOT Analysis*.



Act: *How should my community prepare for the future?*

Each community has unique strengths and weaknesses. Global changes offer both threats and opportunities. As an action researcher and a member of your community, you can influence the way your community responds to these opportunities and challenges.

1. Take out your *Part 3 Organizer*. If you want, you can use the *Know* column to record the information from your *SWOT Analysis*. Or you can just keep that information together with your *Part 3 Organizer*.
2. Take out a copy of your redesigned *My Research Area* map from Task 3. You can now continue to improve this design.
3. Start by adding shared spaces around the community. You may want to use movable items to represent buildings until you decide on your final design. Keeping the shared spaces where they are is the easiest. However, you may want to make changes. Consider:
    a. What did you learn about the needs of your community? Are there new types of spaces that need to be added?
    b. How are shared spaces distributed? Can you arrange them so everyone can reach them easily?

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c. How close was your community to being a 15-minute community? Are there changes you can make that would make it closer?

d. Are the buildings in your community mostly for one type of use or mixed use? Would you change that in your design?

Lite Says . . .



It is important to think about what a perfect community would look like. What should it have? What does a person **holistically** need? What is missing in this community that you could add or change? People may need better opportunities, better living spaces. In turn, that impacts their health and well-being and their social cohesion as a community. What kind of spaces do people need to thrive as human beings?

4. Check your design against the *Strengths*, *Weaknesses*, *Opportunities*, and *Threats* you identified on your *SWOT Analysis* for your community.
   a. Does the design allow your community to continue with the same strengths?
   b. Does the design allow your community to make its weaknesses stronger?
   c. Does the design allow you to make use of the opportunities you listed?
   d. Does the design help you minimize the threats you listed?
5. Keep moving pieces of your design until you are satisfied. There is no one right way to design a community. Different people may have different ideas. Record the design you decide on.
6. If you completed a design individually, share your design with your team members. Examine their designs. Why do you think different team members came up with different designs?

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Task 5: How can we make our community better?

Change happens on different levels. It is important to think about how you personally can make problems in your community better. It is also important to think about the way the *system* of your community needs to change to make problems better. In this task you will ***discover*** what you know about systemic changes needed for your community. You also will ***understand*** some ways you can personally change your behavior to help your community. Then you will ***act*** on those ideas. You and your team will also use this information to decide on your community action plan in Part 7.



Discover: *What are the problems with space in my community?*

The way space is divided and used can help the community thrive—or not. You have found out a lot of information about space in your community. Now you will identify problems with the way space is used and think about ways in which it could be better.

1. Take out your *Part 3 Organizer*.
2. Your team has already listed in the *Know* column information you found out from your investigations. Add any additional information you want to remember.
3. You have also recorded some of your thoughts in the *Think* column. Now that you have investigated space in different ways, you can think a little more. Consider:
    a. Why do we think space is used the way it is in our community?
    b. Do we think there are problems with the way space is used in our community?
    c. Is the way space is used fair to everyone in the community?
4. Take out your *Thriving Community Goals*. Compare them to the things you *Know* and *Think*. Your *Thriving Community Goals* show you how your team wants your community to be. What you *Know* and *Think* shows you how your community is. When your community is not the way you want it to be, that is a problem.
5. As a team, discuss:
    a. Did you find any information about your community that shows you are not meeting your *Thriving Community Goals*?
    b. If so, did you already list that as a problem?
    c. If you spot new problems, record those now in your *Think* column.

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6. List or draw what your team still wonders about space in your community under the *Wonder* column. Consider:
    a. Are there questions listed in the *Wonder* column that you have already answered?
    b. Are there questions you still have about the way space is used in your community?
    c. Are there actions you could take that you think may change the way your community uses space for the better? For example, maybe you wonder if shared space could help to encourage more social interactions within your community.
7. Take out your redesigned *My Research Area* map. Are there ideas there that you would like to record under the *Wonder* column? Consider:
    a. Are there any possible changes you thought of when you redesigned your research area?
    b. Are there other ideas you would like to remember?
8. Keep the *Part 3 Organizer* safe. You will need it again.



Understand: *What can I do individually to help?*

In this Part you found out information about why space is important in your community. Space can be used in different ways. You just thought about ways your whole community might use space better. You will have a chance to put some of these ideas into action in Part 7. However, there are always ways that you could make things in your community better through your own individual actions.

1. Examine your *Part 3 Organizer*. Are there any problems you saw that you could help to change all on your own?
2. Discuss your ideas with your team. For example, maybe you could:
    a. Share the different community needs you found out about with your family or friends.
    b. Try to make your own 15-minute city. Can you change where you go to get what you need so you can limit the amount of time and resources you use?

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c. Think about ways you can improve some of the ecosystem services of green spaces. For example, can you connect with your community in a local green space? Can you plant a tree or a smaller plant in your own space to help provide benefits to people or other living things?

d. Can you help your family or school get ready for the threats or opportunities you thought about for your community?

e. Come up with your own ideas.

3. Think quietly to yourself about a change you want to make.
   a. Why do you think this change is important?
   b. How is it connected to problems you noticed in your community?



Act: *How will I put my ideas into action?*

Changing your own behavior is often the first step. Now that you have decided what you will do to improve your community, you can put that idea into action.

1. Make a plan for how you will put your idea into action. If you need to share information, where, when, and with whom will you share it? If you need to do something, what do you need so you can do it?
2. Put your plan into action.
3. Think quietly to yourself to **reflect** on your action.
   a. What seemed to go well?
   b. What was hard?
   c. Were you able to make the changes you thought you would be able to make?
   d. Will you keep going with your changes or are there things you would do differently in the future?

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Lite Says . . .



It's about local action; it's about what you are able to do within your power. If you see a problem, what are you doing about it? Voice your concerns, voice what is not working, and also notice what is working. Can that be replicated in areas that are having problems? One action can set off a whole series of things, and some people are just waiting for something to support. You know how there are those people who are just waiting to see what other people will do before they do anything? You can ignite that participation from people by starting a movement in a small way. It just requires you to be bold, have a voice, speak out, and see who you can bring on board. You can start with your own family and your friends and go from there.

Congratulations!

You have finished Part 3.

Find out More!

For additional resources and activities, please visit the *Sustainable Communities!* StoryMap at https://bit.ly/2YdHNqB.

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Glossary

This glossary can help you understand words you may not know. Feel free to add drawings, your own definitions, or anything else that will help. Add other words to the glossary if you would like.

Access: Able to reach a place, thing, or idea

Action researchers: People who use their own knowledge and information they find out from their community to make decisions and take action on important issues

Apartheid: A South African policy that segregated and discriminated against people based on race

Amenities: Places or features that make a place nicer

Artificial intelligence: Computer systems that are able to act with human-like intelligence

Climate: Weather conditions in a place over a long period

Climate change: Rapid warming of the global climate

Community: A group of people that have a place or other thing in common

Congestion: Crowding in an area

Design: The look and function of a building, space, process, or object

Drones: Flying device without a pilot

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Economic: About money, income, and use of wealth

Ecosystem services: Benefits that an ecosystem or natural area provide to people

Environmental: About the natural world

Eroding: Soil, rock, or land wearing away because of wind, water, or other natural processes

Ethical: The fairness of something

15-minute community: A community where people can walk or bike to everything they frequently need within 15 minutes

Green space: Natural areas without buildings or roads

Groundwater: Water that stays underground in the soil or spaces between rocks

Heat island: Places in cities where heat gets trapped

Holistically: Considering all the parts together of a person, thing, or item

Housing: A building or other structure where people make their home

Housing density: How many homes are found within an area

Identity: Characteristics that make up each person or thing

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Inclusive: Making sure no one is left out

Investigate: Find out more information

Mentor: Someone who has experience and can help guide you

Migration: Moving from one place or region to another

Observation: Recording what you notice without adding your own opinion

Observe: Use your senses to get information about something

Oral history: Recording information from people talking about their past

Perspective: A specific way of thinking about the world around us

Photosynthesis: The process plants use to make food, taking in carbon dioxide and releasing oxygen

Polluted: Water, soil, or other natural systems that have been contaminated with things that do not belong in them

Pollution: Things that do not belong in and can harm an environment

Precipitation: Water falling to the ground as rain, snow, sleet, or hail

Private: Owned by one person, group, or company

Public: Owned by the community

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Reflect: Think carefully about something

Renewable energy: Electricity produced from materials that are easily replenished or ongoing natural systems

Resources: Materials we use to meet our needs

Rural: A place with low housing density, like the countryside

Satellite Internet access: Wireless internet connections through orbiting satellites

Self-driving vehicles: A car or other vehicle that is driven by a computer system

Social: About the interaction of people in a community

Survey: A list of questions that you can give to a group of people

Sustainable: A balanced, long-term approach to social, environmental, economic, and ethical concerns

Sustainable community: A group that balances the needs of living things and the resources available in a way that does not hurt future generations

Sustainability: An idea that requires that people do not use more resources or create more waste than the biocapacity of the Earth can meet

System: Something made up of parts that work together

3-D printing: A printing technique that produces three-dimensional objects

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Thrive: Something that is working or growing well

Topographical Map: A map that shows the shape of the land

Urban: A city or place with high housing density

Water vapor: Water in a gas form

Other words:

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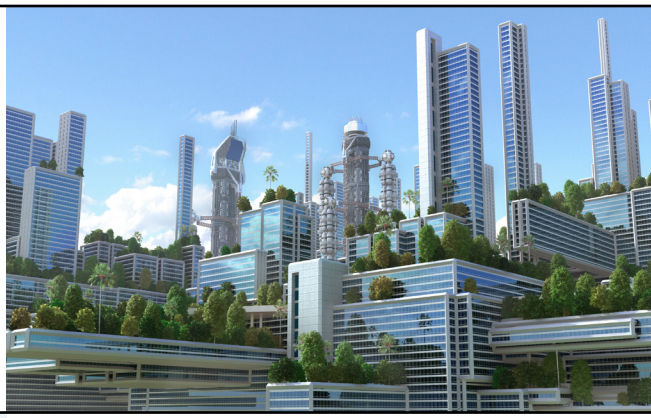
SUSTAINABLE COMMUNITIES!





Part 4:

How can housing help our community thrive?

SUSTAINABLE DEVELOPMENT GOALS

developed by

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in collaboration with

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Smithsonian Science Education Center Module Development Staff

Executive Director - Dr. Carol O'Donnell

Division Director for Curriculum, Digital Media, and Communications - Laurie Rosatone

Science Curriculum Developer - Heidi Gibson

Research Mentor
Mariana Sepiurka

Technical Reviewer
Prof Vernon Collis

The contributions of the Smithsonian Science Education Center: Module Support Staff and Technical Reviewers are found in the acknowledgments section.

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Find out More!

For additional resources and activities, please visit the *Sustainable Communities!* StoryMap at https://bit.ly/2YdHNqB.

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Planner

Timing note: *The time used for investigations, observations, and actions can vary. When different options are listed within an activity, some options may take longer than others.*

Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Task 1: Why is housing important?					
Discover	Consider how housing helps you meet your needs.	• Paper • Pens or pencils		15 minutes	153
Understand	Observe how people use housing and analyze whether it is functional for everyone in your community.	• Paper • Pens or pencils	*Community Identity Map* (Part 2, Task 1)	40 minutes + investigation time	155
Act	Examine and evaluate information about housing in your community.	• Paper • Pens or pencils	*Thriving Community Goals* (Part 1, Task 3)	15 minutes	159
Task 2: What are housing issues in my community?					
Discover	Explore housing issues and your own experiences with housing.	• Paper • Pens or pencils		20 minutes	162
Understand	Investigate housing affordability in your community.	• Paper • Pens or pencils	*Survey Instructions* (Part 2, Task 1, optional)	20 minutes + investigation time	165
Act	Identify functional and affordable housing issues in your community.	• Paper • Pens or pencils	*Part 4 Organizer* (Task 1)	25 minutes	170
Task 3: How can the design of housing meet our environmental needs?					
Discover	Explore how climate and local materials affect housing design.	• Paper • Pens or pencils		20 minutes	172
Understand	Investigate housing design in your research area.	• Paper • Pens or pencils	* StoryMap extension available	55 minutes	176

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Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Act	Draw or build a model of how you think housing should be designed in your area.	• Paper • Pens or pencils • Model-building materials (optional)	*Part 4 Organizer* (Task 1)	30 minutes	180
Task 4: How can we use our housing in a sustainable way?					
Discover	Consider different perspectives on saving resources at home.	• Paper • Pens or pencils		25 minutes	183
Understand	Investigate the sustainability of your daily actions at home.	• Paper • Pens or pencils	*Resource Use Checklist* (found at end of Part 4)	50 minutes	185
Act	Create a list of changes you could make so your daily actions are more sustainable.	• Paper • Pens or pencils	*Part 4 Organizer* (Task 1) *My Research Area* (redesigned, Task 3)	20 minutes	187
Task 5: How can we make housing in our community more sustainable?					
Discover	Consider what you now know, think, and wonder about how housing could be better in your local community.	• Paper • Pens or pencils	*Part 4 Organizer* (Task 1) *Thriving Community Goals* (Part 1, Task 3)	15 minutes	191
Understand	Decide on individual actions you will take to help your community.		*Part 4 Organizer* (Task 1)	15 minutes	193
Act	Put your idea for individual change into action and reflect on it.			10 minutes + Action time	193

*StoryMap extension found at https://bit.ly/2YdHNqB

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4 Part 4: How can housing help our community thrive?

When people live in a place, that place becomes a home. **Housing** is a building or other structure where people make their home. You can meet important needs through housing. But some people may not have the housing they need. Housing can be **designed** to help meet the needs of your **community** and your place. This most often happens when housing is built. In this Part you will be thinking more about how housing is part of a **sustainable community** and how you personally can choose **sustainable** actions when using your housing. Housing contributes to a sustainable community and helps your community **thrive** by meeting the needs of all people in an **affordable** and environmentally friendly way.

Remember: *In this guide you and your team are in charge. You can always change the instructions in the steps to make them work better for you and your team.*

Your Research Mentor

Sharing your experiences with others and learning from others' experiences is part of being a good **action researcher**. In Part 4 you will have a research **mentor** to help you understand some issues about housing in your community and how to research those issues. A mentor is someone who has experience and can help guide you.

Meet Mariana Sepiurka, Your Part 4 Research Mentor



Meet Mariana Sepiurka. Mariana (pronounced *Mah-ree-ah-nah*) is an **architect**. She designs and builds different kinds of buildings, such as schools, universities, and different types of housing. You, your team, and Mariana are all part of the many researchers around the world trying to find ways to make local communities more sustainable. Mariana will be your research mentor to help you understand housing in your community. Mariana has a degree in architecture and a technical degree in industrial design. However, she also has

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knowledge and **perspectives** that came from other parts of her **identity**. Since Mariana is now working with you, it is important to understand who she is. To help you, Mariana filled out an identity map, just like you did in Part 1. Mariana's identity map includes the following things.

- Architect for 25 years
- Recently co-founded an organization to encourage STEM education
- Loves animals and nature, history, and art
- Enjoys running, dancing, singing, reading, cooking, watching movies
- Lives in Buenos Aires, Argentina
- Jewish: "As a granddaughter of Holocaust survivors, I embrace all religions and strongly believe in a diverse world."
- 44 years old
- Female
- Brown long hair, light brown eyes, average height
- Funny, enthusiastic, curious, perfectionist, kind
- University degree in architecture
- Speaks Spanish, English, Italian, and Hebrew
- Interested in **sustainability**, innovation, and the power of design and technology to improve lives
- Mother of two daughters, Ana and Martina, and Horacio's partner
- Daughter of a lawyer and a veterinarian

Before you begin the rest of Part 4, think quietly to yourself about Mariana's identity map.

- Are there things you have in common with Mariana?
- Are there ways in which you are different from Mariana?
- Can you see anything about Mariana's identity that would help her understand different perspectives on how to help a community thrive?

Throughout Part 4 you will notice Mariana sharing ideas and experiences with you. She may help you understand better ways to research or she may share some of the work she has done.

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Task 1: Why is housing important?

People need shelter. Housing provides this shelter. It can also help people in other ways. Housing includes many different types of homes and living situations. In this task you will ***discover*** what you already know about how housing meets your needs. You will **investigate** to ***understand*** how people use housing. Then you will ***act*** by sharing how housing can help your community thrive.



Discover: *Why is housing important to me?*

People use housing in many ways. Housing can help fill different needs for you and your community. Every person's experience with housing is unique. You may not have housing right now. You may have lived in many different places or just one. You may live with many people or just a few. You may live with your family or with other people. You may live in a permanent or a temporary structure. Your housing may be a building where many families live or just one. You may have had a home where you felt very protected or one that felt less safe.

Your experience is valuable because it gives you certain information and perspectives on housing. The experience of others is also valuable because it can bring different information and perspectives. In this activity you will **reflect** on the experiences you have had with housing and how you use your housing to meet your needs.

1. Think quietly to yourself, how do you use your housing? If you do not have housing right now, think about a time when you did. If you want, you can record these ideas by drawing, writing, or using another method. Consider:
    a. What types of things do you do when you are in your housing?
    b. Are there some things you do in your housing at different times of the day?
    c. Are there some things you do with other people in your housing?
    d. Are there things you do only in certain parts of your housing?
    e. Are there some things you do only sometimes? For example, during the COVID-19 pandemic you may have done things at home that you usually do other in places.

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⚠ Emotional Safety Tip

In many communities there are some people who do not have housing. This may be true for you or your teammates. This might make you feel angry, sad, or upset. These feelings are normal. As a young person, problems with your housing are not your fault. It is important to think about difficult situations in your community because that means you can consider ways to help make them better. However, it is okay to ask to pause if you are uncomfortable or upset.

2. Remember what you already learned about your needs if you completed Part 3. If you haven't completed Part 3, start this activity by thinking about what you need and recording your ideas. You can consider the questions at the beginning of Part 3, Task 1 to get you started. Then move on to the steps below.
3. Turn to a partner and share your ideas.
   a. How do you use housing?
   b. How does housing help you meet your needs? Remember the different needs you have.
      - The needs of your body: for example, housing might be a place where you sleep.
      - Your need for safety: for example, housing might help keep you safe by protecting you from the weather.
      - Your needs related to other people: for example, you might spend time with your family or friends in your housing.
      - Your personal needs and wants: for example, maybe you use a space in your housing to read books you like.
4. In many communities there are some people who do not have housing. It is possible you may not have housing right now or you may not have had housing in the past. If you have always had housing, imagine for a few moments that you do not have housing. Think quietly to yourself:
   a. If you don't have housing, how does that make it harder for you to meet your needs?

b. If you don't have housing, how might that make you feel?

c. How do you think it affects your whole community when some people do not have housing?

5. Why is housing important to you personally? Use your ideas from the questions in this activity to draw, write, or find another way to record your thoughts.



Understand: *What makes housing functional?*

You have thought about the way you and your family use your home to meet your needs. When housing meets your needs, it can be called **functional**. Now you will investigate to understand more about what makes housing functional for you and others. There are two parts to this investigation. First you will investigate how housing is used by you and your teammates. Then you will investigate whether housing is functional for others.

1. Decide where you will conduct your investigation. You will be doing an **observation**. When you do an observation you try to just record what you notice without adding your opinion. If you can **observe** your own housing, that is easiest. If not, you may be able to work in pairs to observe the housing of another teammate or the housing of a friend or family member. For this observation you will be thinking about the inside of a home.
2. Observe how the people in the home use their housing. You can observe yourself, you can observe others, or you can observe both. Record what you notice. Consider these questions.
   a. What are the different rooms or spaces within the home?
   b. How do people use the different spaces within the home?
   c. Are some spaces used more than others?
   d. What extra items, like furniture, are needed for the housing to be functional? For example, if someone uses their housing to cook food, they may need a stove or other **appliance** to give off heat to cook the food.
   e. What are the spots in the housing that many people touch or use? For example, a doorknob.

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3. Read Mariana's ideas about designing a house. Why is the information you found during your observation useful?

Mariana Says . . .



When we are designing a house the first thing we do is talk to the people who will use it. We ask them questions about how it is going to be used. This is the basis of design. Maybe a family will use their house in a way that you are not using yours. When you are designing, everything depends on the needs of the people and the use of the house.

4. As a team, gather together and share with one another information about the people you just observed.
   a. Did you observe people of different ages and abilities?
   b. Did the people you observed represent all the characteristics you listed on the *Community Identity Map*? If not, you may be missing some important information about different needs and housing designs.
5. Take a moment to reflect. Most housing is designed for a tall adult without any disability. But all sorts of people use housing. For example, children, the elderly, and people with disabilities all use housing. Is housing designed to be functional for everyone? Remember, when something is functional, it meets your needs. Think back to when you were a small child.
   a. Were there things you wanted to do in your home that were difficult because you were small? For example, were there things you couldn't reach?
   b. How do you remember feeling when you had difficulties?
   c. As a small child, did you ever go to a place where furniture or other items were designed to fit you? How did that feel?
6. As a team, discuss how your different needs and abilities as a small child affected whether the housing design was functional for you. Housing designed for adults is less functional when you are a child. There are many other differences that also might make housing designed for a tall adult without any disability less functional.

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7. Take out a piece of paper or open a digital document. Remember your identity map from Part 1. Are there some things about you that are different from your teammates? People can be different in many ways. This variation is called **diversity**. Some diversity can affect whether housing is functional. With your team, make a list of some of the diversity that you have noticed in your community. For example:
    a. Diversity in size, like being taller or shorter
    b. Diversity in senses, like hearing or vision
    c. Diversity in how people move around, like using a wheelchair or walking with a shuffle
    d. Diversity in strength or flexibility, like how a person grips something such as a doorknob or shower handle
    e. Diversity of the mind, like how people respond to loud noises or bright lights
8. Next to each type of diversity, list how it might affect housing design. For example, if you are thinking about someone who uses a wheelchair, you may want to write that a wheelchair probably cannot go up or down stairs, a wheelchair is wider than a standing or walking person, and the person using the wheelchair is at the height of a seated person. Each type of diversity brings its own perspective. What do you think is important to consider about each type of diversity and housing design?

> **⚠ Emotional Safety Tip**
>
> You or your teammates may have important information about how housing design might need to be different for some people. You might know this because of your own experience or the experience of your family or friends. Sometimes it can feel good to share what you know. Sometimes you may prefer to keep your experience private. If someone wants to share their experience, all team members should listen respectfully. If someone chooses not to share their experience, all team members need to respect their privacy.

9. With your team, consider how you could find out what makes housing functional for different types of diversity. What can you do to better understand how housing

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designs might need to be different to meet diverse needs? Choose whether you would like to:

a. Interview some people with diverse experiences, like the ones you listed. One of the best ways to understand an experience is to talk to someone who has had that experience. As a team, you may want to talk to several people with diverse experiences to understand what makes housing functional for them. This is like the **oral histories** you may have used in Part 2, only this time you are getting information from people about the present, not the past. You can refer to the *Oral History Instructions* in Part 2, Task 2 if you need more information.

b. Conduct an empathetic housing investigation in the space you have already observed. Read the *Empathetic Housing Investigation Instructions* to find out more.

c. Think of another way to find out this information.

10. Plan and conduct your investigation.

Empathetic Housing Investigation Instructions

An empathetic housing investigation can help you to imagine how you would use housing if you were a person with the diverse experiences you listed. Each team member might want to investigate one type of diversity. Then you can share what you found out with your other team members.

Becoming Empathetic

Empathy means trying to understand the perspective of another person. It is impossible to understand someone else's experience entirely. But when you become empathetic, you do your best to think about what another person would think and feel.

Using a New Perspective

Consider what it would mean to have a different type of diversity and how it might change your perspective. Use your ideas from Step 8. What could you do to better understand the different perspective? For example, if you were

investigating what it would be like to be in the housing in a wheelchair, you might want to sit on a chair and notice if you can reach the things you need.

How to Investigate

Return to where you conducted your last observation. Remember the ways you observed people using the housing before. Starting from outside the housing, move through the housing and experiment to find out whether it would be functional for you if you had different needs. Consider:

a. Would you be able to enter the housing? If not, what would need to change?
b. Is there anything that would make it difficult for you to move around the housing? Notice things like the width of doorways, steps inside the house, or things that might make you trip.
c. Would you be able to cook in the housing? Think about different appliances, counters, cabinets, or anything else used to prepare food. Would you be able to use the toilet or bathe? Think about everything people do in bathrooms—would it all be possible with the way the housing is designed?
d. Think about all the different things you found people use housing to do. Would you be able to do these things?
e. Remember what you learned about spots people touch or use a lot? Think about those spots—would you be able to reach or grasp them?



Act: *How can housing help people in our community?*

Housing is used to fill many different needs and wants for people. Housing design may be functional for some people but not for others. You have found out information about how you use your housing. Now you will think about what that information means for you and your community.

1. Work with your team. Title a sheet of paper or a digital document *Part 4 Organizer*. Make three columns. Write the words "Know," "Think," and "Wonder" at the top of the columns.

2. Use the *Know* column to list everything you found out about how people use housing, from your investigation in the Understand activity. Your team members investigated different homes. When you put those investigations together as a team, you can notice how homes and the way people use them might be different. Record:
    a. The ways you observed people using their housing.
    b. Important items or things touched frequently in the housing.
    c. The ways in which housing may or may not be functional for people with diverse needs.
3. Next you will think about what that information means. Record these ideas in the *Think* column. As a team, discuss:
    a. How does housing help you meet your needs and the needs of people you live with?
    b. Does everyone have the same needs from their housing?
    c. Why is having functional housing important?
    d. Why is having some type of housing important for everyone?
    e. Would you know if not everyone in your community had the housing they need? How could you find out?
4. Use the *Wonder* column to list any other questions you have about how housing can help people meet their different needs.
5. Take out your *Thriving Community Goals*. These goals list how your team wants your community to be. Consider:
    a. Are there goals listed that relate to housing?
    b. Are there goals that may not be about housing, but that you would have trouble reaching if housing was a problem?
6. Record any ideas or problems you notice related to your *Thriving Community Goals* in the *Think* column of your *Part 4 Organizer*.
7. Communities around the world struggle to make sure all the people living there have housing that meets their needs. Some communities have many people who do not have their housing needs met. Some have only a few people in this situation. Think quietly to yourself, then turn to a partner and discuss:

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a. How do I feel about the fact that there are people around the world and in my community without housing?
b. Is designing all housing for a tall adult without any disability the right thing to do?
c. If a community is trying to thrive, how can housing make that easier or harder?
d. Do I think housing might be used differently in a different place?
e. Why is housing important in my community?

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Task 2: What are housing issues in my community?

Having housing is important to you and important to a thriving community. In this task you will think about problems people have with housing. You will ***discover*** more about your own experiences with housing. You will investigate to ***understand*** the housing problems in your community. Finally, you will ***act*** on the information you find to think about the problems with housing access in your community and around the world.



Discover: *What housing issues do I know about?*

People need housing that meets their needs. In Task 1 you learned more about these needs. Housing should be both functional and affordable. Affordable means you can pay for it. When housing is not functional and affordable, that is a problem. Now you will explore some of the potential problems people might have had with housing and think about how those problems might affect your community.

1. Think about your own experience with your housing. By yourself, go through the *Housing Experience* list. Each statement describes a way housing might be working well for you and your **household**. Your household is the people who live with you in the same home. Keep track of how many are true for you. You will not need to share this information with anyone. If you do not know the answer to a question, just skip it. If you prefer not to answer the questions for yourself, answer them for someone else you know.

Housing Experience	
I have a history with and feel I belong in the place I live.	
The design of my housing works well for me and I can reach light switches, counters, cabinets, and shelves.	
My housing is close to my school and other places I often need to go.	
My housing has Internet access.	
My housing has a toilet inside.	
Someone regularly takes the rubbish or trash away from my housing.	
My housing is in good repair and protects me from the weather.	

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Housing Experience	
I have an outdoor space near my housing where I can go.	
There is a quiet place in my housing where I can do my schoolwork.	
The inside of my housing is usually a comfortable temperature.	
If I needed it, I know the government would help me find housing.	
I know the people who live around me and they will help me if needed.	
The people who live in the housing around me have a variety of backgrounds and experiences.	

2. Think quietly to yourself about your answers. Many of the statements about housing may be true for you. Or few of the statements may be true for you. Each statement is true for some people and not true for others. The more statements that were true for you, the easier your housing experiences have been. Consider:
   a. Are there things that were true for you that you assumed were true for everyone?
   b. What would be different about your life if your housing experiences had been different?
   c. How does it make you feel that answers for other people on your team or in your community might be different?
3. Now you will classify the statements related to housing. Go back to the *Housing Experiences* list and consider whether each statement is about housing being affordable or functional. Classify each statement as:
   a. Functional, if the statement is about housing meeting needs and wants. Remember the different needs you have:
      - The needs of your body
      - Your need for safety
      - Your needs related to other people
      - Your personal needs and wants
   b. Affordable, if the statement is about having enough money to pay for housing and related expenses.
   c. Both, if the statement is about meeting needs and having enough money.

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4. Next to each statement, you can mark an F for Functional, an A for Affordable, or a B for Both. Or you can create a separate list for each.

> **⚠ Emotional Safety Tip**
>
> Difficulties with housing can create problems with a person's health, education, and relationships with others. This may be true for you or your teammates or others in your community. This might make you feel angry, sad, or upset. These feelings are normal. As a young person, situations with your housing are not your fault and they are just one part of your identity. There is no shame in having difficulties or not having difficulties with your housing. It is important to think about difficult situations in your community because that means you can consider ways to help make them better. However, it is okay to ask to pause if you are uncomfortable or upset.

5. Sometimes there are problems related to housing that you might find in your community. These problems can be related to functional or **affordable housing**. Classify the problems listed in *Housing Problems* as functional, affordable, or both. Next to each statement, mark an F for Functional, an A for Affordable, or a B for Both.

Housing Problems	
A person lost their housing because they did not have enough money to pay rent after they lost their job.	
The electricity in an apartment building goes off frequently.	
Utilities, like water or electricity, are very expensive in a community.	
A person built a house but did not own the land and now may have to leave.	
Mold growing in the walls is causing breathing problems for people living in a home.	
The neighborhood around a home has a lot of crime.	
A home does not have clean running water.	
A family had to move to a different community because the housing costs increased.	
A home was badly damaged in a tornado and repairs were too expensive.	

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6. Think quietly to yourself, why is having functional and affordable housing important?
7. With a partner, discuss what it would look and feel like if everyone in your community had functional and affordable housing. Draw, write, or find another way to record your thoughts. Include your thoughts about:
    a. Are there things that would need to change about your community?
    b. Who should be in charge of those changes: individual people, the government, or other organizations?



Understand: *How affordable is housing in my community?*

Housing that is affordable is a problem in many communities. Even if your household does not have a problem with affordable housing, this problem can affect your community. In this activity you will investigate to find out more about the affordability of housing in your community.

1. With your team, think about expenses related to housing. If you do not know the answers to these questions, think about who you could ask to find out. Consider:
    a. Do people in your community need to pay to live where they do?
    b. If people get housing by paying, is it a payment that is made regularly, like once a month, or just one time?
    c. Is the cost the same for everyone?
    d. What are the expenses related to living in the home? Are there monthly expenses that people pay for, like electricity?
    e. What are the **maintenance** expenses? Maintenance means the activities needed to keep the housing functional and in good repair.
    f. Are there other expenses related to housing, like taxes or other fees?
2. What do you know about how much people pay for housing in your community? Examine newspaper advertisements, online listings, or another place that lists housing rentals in your community. Try to find a few examples of the most expensive housing and a few examples of the least expensive housing. Discuss with your team:
    a. What makes some housing more expensive than other housing?
    b. Is housing in some locations more expensive? Why do you think that is?

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c. Are certain types of housing more expensive? For example, bigger buildings or with an attached outdoor space might be more expensive. Why do you think some housing is more expensive?

d. Are buildings made with certain materials more expensive?

Mariana Says . . .



Affordable housing is affected by design choices. For example, certain building materials or construction techniques may be more expensive. This may make the housing less affordable. The daily cost of living in the housing also must be affordable. For example, if the housing design means you need a huge amount of energy to maintain a comfortable temperature inside, the housing is not affordable. Maintenance also should be considered. Using materials that last a long time and that can be repaired by the people living there makes housing more affordable.

3. Now you will investigate more about whether housing in your community is affordable. Affordable housing means you can pay for housing and have enough money left to pay any other expenses needed for your household. These other expenses include food, clothing, transportation, education, health care costs, and other things. With your team, choose how you will find out whether the people in your community can afford the available housing. Below are a few ideas to get you started. You could:

   a. Interview an expert. Read the *Interview an Expert Instructions* to find out more. Often there are people who work for organizations or the government who may be able to give you information about affordability and housing in your community.

   b. Do your own calculations. Read the *Calculating Affordability Instructions* to find out more.

   c. Give out a **survey**, either in person or online. You may have used a survey to better understand the people in your community during your investigations

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in Part 2. You can refer to the *Survey Instructions* in Part 2, Task 1 if you need more information. You can use the ideas in the *Interview an Expert Instructions* to think of survey questions.

d. Use another research method, such as searching using online sources.

⚠ Emotional Safety Tip

It can be hard to talk to other people in the community, especially about money. You may feel shy or nervous. Someone may tell you they don't want to talk. That's okay! It doesn't have anything to do with you. It just means they don't want to share. You can show them respect by thanking them and moving on to another community member.

Interview an Expert Instructions

One way to find out more about the housing situation in your community is to talk to people who might know a lot about it.

Finding an Expert

Think about who might know about housing affordability in your community. Consider:

- Organizations that help people find housing
- Government housing departments
- Businesspeople involved in housing
- Accountants or other people who help manage money

Picking Your Questions

Consider the discussions you had with your team about housing costs and affordability. What questions could you ask about:

- The amount of money people in your community pay for housing and related costs
- The proportion of income spent on housing and related costs

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- The problems of housing in your community
- Things that are working well about housing in your community

Setting up the Conversation

Usually, you will need to arrange in advance to talk to an expert. Consider:

- Is there someone whom you or your teammates know who would be willing to talk to you?
- When and how will you be able to talk to the expert? Consider online, in person, over the phone, or using email.

Calculating Affordability Instructions

Affordable housing means you can pay for housing and related expenses and still have enough money left to pay for your other needs. Some experts think affordable housing costs should be no more than 30% of a person's income. For this calculation you will think about the costs of renting housing, not owning it.

To calculate whether housing is affordable in your community, you will first need to know an average or median monthly income for people in your area. You may be able to find this information by searching on the Internet or contacting a government office. You may need to ask an adult to help you.

Next you need to investigate housing prices in your area. You can use the information you found in Step 2. Make sure you have a few examples of housing rental prices.

Now divide the monthly housing price by the average monthly income.

> Monthly housing price ÷ Average monthly income = Proportion of income used for housing
>
> For example, if your monthly housing price is 500 and you have an income of 1,500, your calculation would be:
>
> 500 ÷ 1,500 = 0.33 (33%)

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If the result is more than 0.3 (30%), that means more than 30% of average monthly income would be used for housing costs. This means the housing may be unaffordable for someone in your area with an average monthly income. So in the example above, the housing might be unaffordable.

This calculation is a good way to get a quick idea of whether rental housing in your area is affordable. However, not everyone agrees that it is the best measure. Discuss these questions with your team.

a. Even if housing is affordable for people with an average income, what if someone has a lower-than-average income?
b. If a family was very large, that might affect their other expenses, like money spent on food. Would they still be able to spend 30% of their income on housing?
c. Is the more affordable housing still functional? Does it have enough space, is it close enough to work and school, does it meet the needs of people living there?
d. How could you calculate the affordability of buying instead of renting housing?
e. Even if you own a home, is it possible that other expenses, like taxes, could make it unaffordable?

Different calculations have different advantages and disadvantages. Can you think of other ways to calculate affordability? Perform any other calculations you can think of and record what you find out.

4. Remember, including everyone in your investigation is important. Using different ways to investigate has some advantages. Try to pick a way to investigate that allows everyone on your team to participate. Don't forget to think about timing, comfort, location, and format to make sure everyone can take part. You can look back at Part 2, Task 1 if you need more information about making your investigation **inclusive**.
5. Work with your team to plan how you will collect information. For example, if you decide to interview an expert, decide how you will set up the interview, what questions you will ask, who will ask the questions, and who will record the answers.
6. Conduct your investigation with your team. Record the information you find out.

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Act: *What are the functional and affordable housing issues in my community?*

You have thought about functional and affordable housing. You have investigated affordability in your community. Now you can think about what that information shows about problems of housing in your community.

1. Take out your *Part 4 Organizer*. Use the *Know* column to record the information you found out about functional and affordable housing. Record:
    a. What does housing need to do to be functional? Look back at your lists from the Discover activity to remind you. Add any additional ideas you have.
    b. What are some of the costs of housing?
    c. How affordable is housing in your community? Record information from your expert interviews, your calculations, your survey, or any other investigation methods you used.
2. Next you will think about what that information means. Record these ideas in the *Think* column. As a team, discuss:
    a. What problems did you find that may make it hard for some people in your community to have housing?
    b. Are there problems with functional housing in your community? Is it different for different people?
    c. What other problems might be caused if people need to spend a lot of their income on housing?
3. Use the *Wonder* column to list any other questions you have about housing issues in your community.
4. Think about whether other places around the world are facing similar housing issues. By yourself or with your team, consider these two global trends.
    a. In 1950, less than one-third of the world's population lived in urban areas. **Urban** means a city or someplace with high **housing density**. Now more than half of the world's population lives in urban areas. By 2050, more than two-thirds of the world's population will live in urban areas.
        - How do you think the population change affected housing in urban areas between 1950 and today?

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- Remember when you found out about changes in your community in Part 2. How might those community changes you learned about relate to the global change in where people live?
- How do you think the population change will affect housing between today and 2050?

b. Around the world, about one-third of people living in urban spaces live in housing that has more than three people per room, has no access to sanitation (like a toilet) or running water, or does not protect against extreme weather.

- How does this situation relate to the ideas you thought about functional housing?
- Why do you think people live in housing with these problems?
- Have you noticed housing like this in your community? If you haven't, might it be around without you noticing?

5. Pick one of the two global trends described in step 4 to discuss. Divide your team into four groups: **social**, **environmental**, **economic**, and **ethical**. With your group, discuss the trend and problems it might cause from the perspective of your group. For example, if you have an environmental perspective and you are thinking about the fact that more and more people are living in urban environments, what kind of environmental problems might that cause? Each group should share their ideas with the rest of the team by speaking, acting, drawing, or using another method.

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Task 3: How can the design of housing meet our environmental needs?

In Task 2 you found out about affordable and functional housing in your community. Remember, functional housing is housing that meets the needs of people living in it. These needs can be different in different places and for different people. In this task you will ***discover*** how local materials and **climate** can lead to different housing designs in different places. Then you will investigate to ***understand*** how the housing in your community is functional in your climate. Then you will ***act*** by using this information to design housing.



Discover: *How can local conditions affect housing design?*

Each place is unique. A place has **local building materials** and a local climate. Local building materials are natural **resources** found in a place, such as stones, trees, grasses, and earth. Climate is the weather conditions in a place over a long period. Housing design should consider both things. Now you will explore more about how local conditions can affect housing design.

1. With your class or team, divide into four groups. Each group should consider one of the following situations.
    a. You live in a desert environment. It is hot during the day for much of the year. It is cold at night.
    b. You live in a tropical environment near an ocean. It is warm most of the time and you often have storms with strong winds.
    c. You live in a mountainous environment. It gets cold in the winter and warmer in the summer. You often have snow.
    d. You live in a grassland environment. It is very cold in the winter. Strong winds often come from all directions.
2. Draw or write how you might design a home in each area. What local materials might you expect to find in each environment? What weather conditions do you need to think about?
3. Share your ideas with the rest of your team or class.

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4. Match the pictures of housing below with the environments where they are located. People have been living in different climates with different local materials for thousands of years. Groups of people who have been living in an area for the longest time often have developed good ideas about the best way to live in a place comfortably. In many cases, homes built in traditional styles show how to use local materials to create a comfortable home in that climate. Each of the pictures in Figures 4.1 to 4.4 is designed for one of the environments you considered in Step 1. As a team, think about which type of housing might be best for each environment.



Figure 4.1: A bure with strong wood corner posts, walls of woven mats, and a grass thatch roof



Figure 4.2: A timber house with a sod grass roof

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Figure 4.3: A woolen felt ger (yurt) with wooden framing



Figure 4.4: An adobe dwelling made from earth bricks and a small amount of wood

5. Read *Matching Housing to Climate* to find out which housing design in Figures 4.1 to 4.4 was developed for which local environment. Consider what makes a housing design good for an environment. For example, does the shape or materials used in the housing make a difference?

Matching Housing to Climate

In Step 4 you tried to match the climates you read about with pictures of traditional housing in those places. You can find the correct matches below.

Figure 4.1: This is a bure with strong wood corner posts, walls of woven mats, and a grass thatch roof in Fiji. It is designed for a tropical environment near an ocean. The climate is warm most of the time and there are often storms with strong winds. The high roof allows warm air to rise and the woven walls provide ventilation, helping to cool the inside. The construction and roof shape make it resistant to cyclone winds.

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Figure 4.2: This is a timber house with a sod grass roof in Norway. It is designed for a mountainous environment. The climate is cold in the winter and warmer in the summer, and it often snows. The grass on the roof helps insulate the house to keep it warmer during the winter and helps with water absorption when the snow melts. Layers of birch bark underneath keep it waterproof. The sod grass also puts weight on the timber walls, pushing the wood together and keeping out cold air.

Figure 4.3: This is a woolen felt ger (yurt) with wooden framing in Mongolia. It is designed for a grassland environment. The climate is very cold in the winter. Strong winds often come from all directions. The circular shape protects against wind from all directions and allows the wind to move easily around the ger. There is only one door, to limit the places wind can enter. Layers of woolen felt insulate the ger to keep the inside warm.

Figure 4.4: This is an adobe dwelling made from earth bricks and a small amount of wood in the southwestern United States. It is designed for a desert environment. The climate is hot and sunny during the day for much of the year. It is cold at night. The small windows in the dwelling help block the sunlight to keep the inside cool. The adobe bricks are made of clay, sand, silt, and straw. They are built into thick walls. During the day they absorb energy from the sun, keeping the inside of the house cooler than the outside. At night, they release the absorbed energy, making the inside of the house warmer than the outside.

6. Take out a piece of paper or open a digital document. Now you will think about the local materials and climate of your community. You can write, draw, or use another way to record your ideas.
7. What are the local materials in your area? You can ask an adult if you don't know. Consider:
    a. What materials that come from the area around your community could be used for building?
    b. What would be the advantage to using materials from the area around you?
    c. Are there problems with using the materials from the area around you? For example, maybe the materials are not strong enough to build with or are rare and need to stay in the natural environment.

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8. What is the climate in your area? Consider:
    a. What is the temperature like?
        - Does it change a lot between day and night?
        - Does it change from season to season?
        - Is the temperature outside usually comfortable or uncomfortable for people?
    b. What kind of weather do you need housing to protect you from?
9. Read Mariana's ideas about local needs and housing design.

Mariana Says . . .



Housing design should respond to local needs and should adapt to the existing conditions. You should investigate what kinds of resources you can count on and how you need to adapt to the environment. The cultural and historical connections should always be considered. People who are native to a place have already thought about solutions. It is important to recognize this heritage. And maybe you can improve the design with different types of construction, materials, or technology.

10. What is or was the housing design used by **Indigenous** people in your area? If you don't know, try to find out. What ideas would you want to remember if you were designing housing for your area? Record those ideas. You will use them later in Task 3.

Understand: *How does your local housing design consider your local environment?*

Many decisions are made when designing and building housing. People decide where to build and what materials to use. They decide what direction the house faces and where to put windows and doors. They decide what size, shape, and layout the house will have. These decisions all help determine whether the housing meets the needs of

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the people living there. The decisions also affect how much resources the people living in the housing use. Now you will investigate more about design, using an example of housing in your area.

1. Remember your local climate, which you considered in the Discover activity. With your team, discuss:
    a. Is the outside temperature the way you want to feel inside your housing? If not, do you want to be warmer or cooler? Does it change from season to season?
    b. What are the weather conditions that housing in your climate needs to protect you from?
2. Consider your own housing.
    a. Which is the most comfortable room in the summer?
    b. Which is the most comfortable room in the winter?
    c. Why do you think that is?
3. Now choose a housing unit in your research area that you want to investigate. You can do this individually or as a team. The housing can be for just one family, like a house, or for many families, like an apartment building. It does not need to be your housing, but you do need to be able to move around the outside of the housing and observe it.
4. Go outside your housing building or structure and examine it. Record the information you find out by writing, drawing, recording your voice, or using another method. Consider:
    a. What parts do you notice? For example, a roof or a patio.
    b. What do the different parts seem to be made of?
    c. Does the housing use any of the local materials you listed in the Discover activity?
    d. Do you notice anything that would help keep a comfortable temperature inside the housing or protect you from the weather?
    e. Is there anything you notice about the housing that seems unique to your area?
5. You now will investigate how the housing you are examining is designed for the local climate. Housing can be designed so the surrounding sun, air, land, and water can help make the housing more functional.

6. Sun: Notice the direction the building is facing. If you have trouble knowing which direction is north or south, remember that in general the sun always rises in the east and sets in the west. If you face east and turn to your left, you are facing north; if you turn to your right you are facing south. In the Northern Hemisphere the path of the sun is toward the south. In the Southern Hemisphere the path of the sun is toward the north. Near the equator the path of the sun goes more directly from east to west. You may want to remember what you learned in Part 3, Task 4 about where in the world your community is located.
    a. Passive solar heating: If there are many windows facing the path of the sun, then the housing will get warmer while the sun is shining. This is called **passive solar heating**. In the Northern Hemisphere, southern-facing windows are the most effective for passive solar heating. In the Southern Hemisphere, northern-facing windows are the most effective for passive solar heating. If housing design includes passive solar heating it may mean that people do not need to use as much resources or money to make the house warmer in cold weather.
        - Are there windows on the housing you are investigating?
        - Which way are most of them facing?
    b. Shading: Are there shades, shutters, or overhangs over windows? This can help block the rays of the sun, keeping the inside of the housing cooler. Having shades on the windows that face the path of the sun will help keep the inside of the housing cooler. Winter sun is lower in the sky than summer sun. This may mean that a short overhang may block the higher summer sun and allow the winter sun to reach the inside of the housing. This design keeps the housing cooler in the summer and warmer in the winter.
        - Are all the windows of the housing you are investigating shaded?
        - Do the overhangs let in a lot of sunlight?
        - What time of day or year would the most sunlight go through the windows?
    c. Natural light: If there are many windows or other openings there may be more natural light from the sun in the house. This may be especially true if the windows face the path of the sun. Natural light may help the people who live there use electric lights less. Do you notice windows or openings in the housing that help bring in light from the outside?

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7. Air: Notice how air moves through the house. Are there places where air can flow in or out?
    a. Sealing: If the housing needs to hold onto heat or cold, the housing may be sealed tightly and have insulation. Like a blanket helps to keep you warm, insulation helps to trap heat or cold inside housing. This stops the warmth or cold outside from getting inside and the warmth or cold inside from getting outside. Do you notice anything that makes you think the housing may be tightly sealed?
    b. Wind control: Sometimes there are high winds, especially during storms. Roofs are sometimes blown off buildings. If there are sometimes high winds in your area, notice the roof of the housing you are observing. Sometimes large roof overhangs can catch the wind and create problems. Do you notice anything that would help the housing withstand windy weather?
    c. Breezes: If the housing needs to be cooled, you may notice the design tries to use natural breezes to help. If open windows are across from each other, sometimes air will flow through, creating a breeze inside the house. In some places breezes often come from certain directions. Do you notice anything that would help air move inside the housing to keep it cool?
    d. Rising air: Hot air rises. If you live in a warm climate, do you notice any designs that create spaces for hot air to rise and make the temperature in living spaces more comfortable?
8. Land: Notice how the land around the housing is used.
    a. Shade: Large trees or other plants can help block the sun and provide shade. This can keep the temperature inside more comfortable. Do you notice any large plants providing shade?
    b. Windbreaks: Groups of plants can help protect the house from the wind. A windbreak is a line of plants along the direction of the strongest wind. Do you notice any plants that may be acting as windbreaks?
9. Water: Housing needs to protect the people living there from water. Water comes from the sky in the form of snow, rain, or other **precipitation**. Bodies of water on the ground, like rivers, lakes, or the ocean, can swell and move along the ground.
    a. Rain: Does it rain often in your area? If so, where does the rain go after it falls? Do you notice anything on the housing that helps move or collect the rain?

b. Snow or ice: Does your area get a lot of snow or ice? Heavy snow on roofs can be a problem. Do you notice anything about the roof that helps manage the snow?

c. Bodies of water: Is the housing near a body of water like a river, lake, or the ocean? Does this body of water ever get bigger or higher? Do you notice anything about the housing that would help prepare it for flooding?

10. Record the information you find out from your investigation.



Act: *How would we design housing for our local area?*

Housing design sometimes is well-suited to a place. Other times it can be less functional. Now you will think about designing housing that's well-suited for the place where you live.

1. Take out your *Part 4 Organizer*. Use the *Know* column to record the information you found out about your local area and housing design. Record:
   a. What are the local materials and climate in your area?
   b. How did people who live or lived in this area the longest design their houses?
   c. What are the parts of the housing you examined?
   d. In what way does the design of the housing you examined work well in your local climate?
   e. Are there ways that the housing you examined might not work well in your local climate?
2. Next you will think about what this information means. Record these ideas in the *Think* column. As a team, discuss:
   a. Is the housing you observed well designed for your climate?
   b. If not, why do you think people would build a poorly designed house?
   c. What are the most important things to remember when designing housing in your area?
3. Use the *Wonder* column to list any other questions you have about housing design in your community.

4. Now you will use what you have learned to design housing for your local community. Choose a person or people you will be designing your housing for. Build a **model**, draw, or use another method to design it. If you want to build a model, read *Building a Model*. Remember to consider the four perspectives:
    a. Social: How can the housing be used to serve the needs of the people you are designing it for? Remember what you learned about the way people use their housing and diversity differences that may need different designs.
    b. Economic: How much will the housing cost to build and maintain? Remember your investigation into affordability. What makes a house affordable to build and maintain?
    c. Environmental: Does building and maintaining the housing use a lot of natural resources? Remember what you learned about local materials and climate and how you can use design to meet the needs of your local climate.
    d. Ethical: How can housing be fairer? Remember what you found out about why people may not have housing. Is there a way you can use your design to make your community more fair?

Building a Model

Building a model can help you test your ideas and share them with others. A model is a smaller version of something complex, like a building. If you are building a model you may want to think about these things.

Materials: What can you use to construct your model? Make sure the material you choose is easy to cut into the shapes you need and strong enough to support anything that rests on top of it.

Scale: How big will your model be? When you are designing your model, it is important to keep the parts in proportion to one another. For example, walls are usually taller than doors. A roof probably needs to fit on the tops of the walls. If you want to be exact, you can decide on a scale, like for each meter in length of the real building, your model will use a centimeter in length.

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Direction: Which direction will your building face? You may want to show this direction on your model in some way.

Assembly: How will you put your model together? Think about what materials, such as glue or tape, you could use to connect the pieces of your model.

5. Consider how you can share what you learned. You may not have a chance to build housing, but others in your community might. How could you:
   a. Share what you learned with friends or relatives who are involved in building homes?
   b. Modify your own housing or teach others to modify theirs so it is better designed for your environment? For example, could you add a shade to a window or find a way to help air flow through in a hot place?

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Task 4: How can we use our housing in a sustainable way?

During the last three tasks you learned about different perspectives on housing. Architects, engineers, and builders can make design decisions to make housing more sustainable. People using the housing can also make sustainable choices. In this task you will ***discover*** what you know about individual sustainable choices and housing. Then you will investigate to ***understand*** how your choices could be more sustainable. Finally, you will ***act*** by creating a list of actions you could take in your own housing.



Discover: *How do my choices affect sustainability?*

What makes housing sustainable? Many choices are made when housing is designed and built. Those choices are difficult to change after the housing is built. However, people also choose how they use their housing and what they do in it. These choices may be easier to change.

1. With your team, discuss these questions about your current or past housing. You may not know the answer to all these questions. That's okay, just do your best. Consider:
    a. Where does the water you use in your housing come from?
    b. Where does the energy you use in your housing come from?
    c. What do you do to keep your home a comfortable temperature? For example, do you have a way of heating or cooling your housing?
    d. How do you heat your water?
    e. What appliances do you have? Appliances are things like refrigerators, freezers, washers, dryers, and ovens.
2. Energy and water are examples of two natural resources you use in your home. You can make choices about how much water and energy you use. These choices can either be sustainable or not. Remember, sustainable choices balance different perspectives. Discuss why would it be important to think about how you use water and energy in your home from the following perspectives.
    a. Social perspective: What are the important things you use the water and energy in your home to do?

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b. Economic perspective: Does someone in your household pay for you to use water and energy in your home?

c. Environmental perspective: How does your water or energy use affect the environment?

d. Ethical perspective: Why is the amount of water and energy you are using fair or not fair to others?

Mariana Says . . .



Water and energy are essential for life. Saving and taking care of natural resources is an action we must take every day, and it starts at home. If we all change our habits, we can really help our environment. We can start with small changes, by reducing our use of resources. And we can teach others how to do the same. By taking these actions, we are preserving our environment for ourselves and for future generations.

3. Now that you have thought about using resources sustainably, discuss with your team why you think it is important to try to save resources like water and energy. If you need more ideas, read *Saving Resources*.

Saving Resources

Why is it important to save water?

Water is very important. Not only do we need to drink it, but we need it to grow and raise the things we eat. We use it for cleaning, recreation, and industry. All the living things in the environment depend on water. Places around the world are running out of water as populations grow and droughts happen. **Polluted** water creates problems for us and other living things. Once water is polluted it can be hard to make it clean. Cleaning and moving water to housing takes energy. Fresh and clean water is a limited resource. Saving water saves money, energy, and most importantly, clean freshwater. You can learn more by playing the game Aquation at ssec.si.edu/aquation.

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Why is it important to save energy?

Energy powers our lives. We use it to run machines, give off light, cook, and move ourselves. Most of the energy used around the world comes from burning **fossil fuels** like coal and oil. Reaching these fossil fuels often hurts the natural environment where they are found. When fossil fuels are burned, carbon dioxide and other gases go into the air. They cause air **pollution** and make it harder to breathe. The gases also contribute to a warming global climate. Saving energy saves money, keeps the air cleaner, and helps limit **climate change**.



Understand: *Are my resource use choices at home sustainable?*

We all make daily choices about resources we use. Now you will investigate to find out more about the choices made by you and your household. You will conduct a resource use investigation for your household.

1. Get out a piece of paper, open a digital document, or find another way to record what you observe. You can also use the *Resource Use Checklist* found at the end of this Part.
2. You will be observing resource use in your household. Use the categories and questions in Steps 3 to 8. Remember what you learned about observations in Task 1. Observe yourself and others in your household. Try to not change the way you normally behave during these observations. You may want to spread your observations over a period of days or a week. If you do not know the answers to some of the questions, you can ask an adult in your household if they know.
3. Water use
    a. Number of showers in taken your household in a week
    b. How long are the showers?
    c. Number of baths taken in a week
    d. Do you keep water running while washing dishes?
    e. Do you keep water running while brushing teeth?

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f. Do you have any dripping faucets/taps or water running in toilets?

g. Number of low-flow showerheads, faucets/taps, and toilets. Low-flow showerheads and taps let less water out. Low-flow toilets use less water to flush the toilet.

4. Appliances

   a. Refrigerator

      - If you have a refrigerator, how full is it? (empty, 25%, 50%, 75%, 100%)
      - Number of times opened a day
      - How often do you put hot food in the refrigerator?

   b. Freezer

      - If you have a freezer, how full is it? (empty, 25%, 50%, 75%, 100%)
      - Number of times opened a day

   c. Dishwasher

      - If you have a dishwasher, number of times run a week
      - Number of times the energy saver setting is used per week

   d. Washer

      - If you have a washer, number of loads of laundry a week
      - Number of loads of laundry using cold water
      - Number of small or partial loads a week

   e. Dryer

      - If you have a dryer, number of loads dried a week

5. Heating and cooling

   a. If you have a thermostat for heating, what temperature is the thermostat set to?

   b. If you have a thermostat for air conditioning, what temperature is the thermostat set to?

   c. Do you leave doors or windows open when your heating or air conditioning is on?

   d. How often do you use fans or open windows to cool your home?

   e. If you have a water heater, what temperature is it set to?

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6. Lights and lightbulbs
    a. Number of **incandescent lightbulbs** in your home. Incandescent bulbs are an older type of lightbulb. Most have thin wire filaments that light up.
    b. Number of other lightbulbs in your home
    c. How many hours a day is an electric light on in a room with no one in it?
7. **Phantom load**: Phantom load is a way of thinking about the energy used by things kept plugged in. It includes televisions, cable/satellite boxes, desktop and laptop computers, DVR/DVD players, game consoles, printers, chargers, computer router/modems, stereos.
    a. Number of phantom load devices in your home that are kept plugged in
8. Other resources you use. The things listed in Steps 3 to 7 give you an idea of what you could investigate about resource use in your home. However, there may be other things or ways natural resources are being used. Can you think of any other things you would like to investigate? If so, observe and record that information.



Act: *How will I make my choices more sustainable?*

There are many things you could do to help make your community sustainable. But the most important thing is what *you* will do. Think about your investigation into resource use in your household. You will consider whether there are ways you could reduce your resource use and create a short list of actions you will take.

1. Take out your *Part 4 Organizer*. Work with your team to use the *Know* column to record how you all use resources at home. Put together the information you found from your investigations. Record:
    a. Your team's resource use in their homes. Think about the best way to record this information for the whole team. You might want to use the team average of the numbers you found for the different parts of the investigation. For example, what is the average number of incandescent lightbulbs you found in your housing? If the idea of an average does not make sense to you, find another way to help you remember the information.
    b. When you thought about the way you could improve your use of resources, were there some ideas that were shared by many members of the team?

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2. Next you will think about what that information means. Record these ideas in the *Think* column. As a team, answer:
    a. What are some of the ways you think people in your community could save energy or water? If there were ways many people in your team found they could improve resource use, this might be the same for your community.
    b. Why do you think those changes have not yet been made?
    c. Why is it important for your community to use fewer resources?
    d. What would need to happen for your community to use fewer resources?
3. Use the *Wonder* column to list any other questions you have about using your housing in a sustainable way.
4. Read *Reducing Resource Use at Home* and think about your household resource use. Are there things you or your household could change? Record those ideas.

Reducing Resource Use at Home

Water

Short showers usually use less water than baths. The shorter the shower, the less water you use and the less energy used to heat the water. When washing dishes or brushing your teeth, save water by turning it off when not needed. Repairing dripping faucets/taps or toilets with water running in them saves water. Installing low-flow showerheads, faucets/taps, and toilets saves water.

Appliances

a. Refrigerators: A full refrigerator saves energy. Why? The things in your refrigerator act as cold storage, helping to keep everything inside cool. When you open the door, the cold air inside the refrigerator falls out. If you do not have additional things to store in your refrigerator, you can put in storage containers with water or air inside. This can act as cold storage. You can also try to limit how often and how long you keep the refrigerator door open. If you put hot food in your refrigerator it will need to use a lot of energy to cool it down.

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b. Freezers: A full freezer also saves energy in the same way as a refrigerator. You can also use storage containers or other items to help your freezer stay cold. Limiting the number of times you open the freezer will save energy.
c. Dishwasher: If you have one, using a dishwasher instead of washing by hand can save both water and energy—especially if you use the energy saving setting on your dishwasher. Newer dishwashers do not need you to rinse the dishes before using; just scrape the food off first.
d. Washer: Think before you wash; not all clothes that have been worn are dirty. Most laundry can be washed in cold water, which saves energy and is better for your clothes. Full loads of laundry save water and energy.
e. Dryer: Dryers use a lot of energy. Hanging some or all your clothes outside (or even inside) to dry can help save energy.

Heating and Cooling

If your heating and cooling uses a thermostat, you can save energy by adjusting the temperature on the thermostat. If you are heating your house and make the thermostat lower, you save energy. If you are cooling your house and make the thermostat higher, you save energy. You can try adjusting your thermostat by just a degree or two. Maybe you can still be comfortable and save energy. If you are using heat or air conditioning, you will save energy by keeping outside doors and windows closed so the hot or cool air cannot escape. If you are trying to cool your house, you can save energy by using fans or outside breezes rather than air conditioning. You can also save energy by making the temperature lower on a hot water heater.

Lights and Lightbulbs

If you have electric lights in your home, the choice of lightbulbs can make a big difference in how much electricity you use. Incandescent bulbs are usually the least expensive to buy initially, but LED bulbs last 25 times longer! LED bulbs also use about one-sixth the electricity of incandescent bulbs. Halogen or compact fluorescent light bulbs also last longer and use less energy than incandescent bulbs. Switching from incandescent bulbs saves energy and money. Also save by only using lights when needed.

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Phantom Load

Did you know that many devices use energy even when they are turned off? Televisions, cable/satellite boxes, desktop and laptop computers, DVR/DVD players, game consoles, printers, chargers, computer router/modems, and stereos all use energy when they are plugged in, even when they are turned off. If you unplug these devices, you stop them from using energy. Or you can plug the devices into a power strip and turn off the power strip.

Other Ideas

Are there other things you investigated that you might want to change?

5. Think about the ideas you just recorded in your *Part 4 Organizer* about resource use changes you could make.

    a. If there are some ideas you would like to put into action, make a mark next to those ideas.

    b. Is there one change you will start right away? Decide exactly what you will do differently and put that change into action.

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Task 5: How can we make housing in our community more sustainable?

Change happens on different levels. It is important to think about how you personally can make problems in your community better. It is also important to think about the way the **system** of your community needs to change to make problems better. In this task you will ***discover*** what you know about systemic changes needed for your community. Your team will use this information to decide on your community action plan in Part 7. You also will ***understand*** some ways you can personally change your behavior to help your community. Then you will ***act*** on those ideas.



Discover: *How could housing be better in my community?*

Housing can help a community thrive. You have found out a lot of information about housing use and design in your community. Now you will identify housing problems in your community and think about how it could be better.

1. Take out your *Part 4 Organizer*.
2. Your team has already listed information you found out from your investigations in the *Know* column. Add any additional information you want to remember.
3. You have also recorded some of your thoughts in the *Think* column. Now that you have investigated space in different ways, you can think a little more. If you have new ideas, add them to the *Think* column. Use the four perspectives—social, environmental, economic, and ethical—to think about problems you noticed in your community. Consider problems from a:
    a. Social perspective, for example does housing meet the needs of different people and groups?
    b. Environmental perspective, for example how many resources are used to build and use housing?
    c. Economic perspective, for example can people afford functional housing?
    d. Ethical perspective, for example does everyone have the housing they need?
4. Take out your *Thriving Community Goals*. Compare them to the things you *Know* and *Think*. Your *Thriving Community Goals* show you how your team wants your

community to be. What you *Know* and *Think* shows you how your community is. When your community is not the way you want it to be, that is a problem.

5. As a team, discuss:
    a. Did you find any information about your community that shows you are not meeting your *Thriving Community Goals*?
    b. If so, did you already list that as a problem?
    c. If you spot new problems, record those now in your *Think* column.
6. List or draw what your team still wonders about space in your community under the *Wonder* column. Consider:
    a. Are there questions listed in the *Wonder* column that you have already answered?
    b. Are there questions you still have about the way housing is designed in your community?
    c. Are there actions you could take that you think may change for the better the way your community designs housing? For example, maybe you wonder if you could share information about the way housing can be designed for your local climate.
    d. Are there questions you have about the way people in your community use natural resources in their housing?
    e. Are there actions you can think of that may change the way people in your community use resources at home? For example, maybe you wonder if you had friends or family do a resource use investigation whether they could make changes in their housing.
7. Take out your housing design from Task 3. Are there ideas there that you would like to record under the *Wonder* column? Consider:
    a. What things did you think were important when you designed your housing?
    b. Are there other ideas you would like to remember?
8. Keep the *Part 4 Organizer*. You will need it again.

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Understand: *What can I do individually to help?*

In this Part you found out information about why housing is important in your community. You just thought about ways your whole community might better design and use housing. There may be changes to the system that you think need to be made. You will have a chance to put some of these ideas into action in Part 7. However, there are always ways you could make things in your community better through your own individual actions.

1. Examine your *Part 4 Organizer*. Are there any problems you saw that you could help to change all on your own?
2. Discuss your ideas with your team. For example, maybe you could:
   a. Remind others that people may need different things in housing.
   b. Do things that would make your own housing more affordable or functional.
   c. Think about whether you could put some features of your housing design into action. For example, maybe you included a shade tree or a windbreak. Could you plant trees around some housing?
   d. Examine your resource use actions from Task 4 and consider which sustainable choices you will start to make.
   e. Come up with your own ideas.
3. Think quietly to yourself about a change you want to make.
   a. Why do you think this change is important?
   b. How is it connected to problems you noticed in your community?



Act: *How will I put my ideas into action?*

Changing our own behavior is often the first step. Now that you have decided what you will do to improve your community, you can put that idea into action.

1. Plan how you will put your idea into action. If you need to share information, where, when, and with whom will you share it? If you need to do something, what do you need to do it?

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2. Put your plan into action.
3. Think quietly to yourself to reflect on your action.
    a. What seemed to go well?
    b. What was hard?
    c. Were you able to make the changes you thought you would be able to make?
    d. Will you keep going with your changes or are there things you would do differently in the future?

Mariana Says . . .



Designing housing is more than just designing a thing. It is sort of like designing the world to try to make it a little bit better. As architects and researchers, we notice what the problems are. We try to make them a little bit better. We have ideas, we make models and drawings of our designs, we test, we think, then we redesign. This is just like what you do as action researchers.

Congratulations!

You have finished Part 4.

Find out More!

For additional resources and activities, please visit the *Sustainable Communities!* StoryMap at https://bit.ly/2YdHNqB.

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Glossary

This glossary can help you understand words you may not know. You can add drawings, your own definitions, or anything else that will help. Add other words to the glossary if you would like.

Action researchers: People who use their own knowledge and information they find out from their community to make decisions and take action on important issues

Affordable: Something you are able to pay for

Affordable housing: Housing can pay for and have enough money left to pay any other expenses needed for your household

Architect: Someone who designs and help build buildings and other spaces

Appliances: Machines in homes like refrigerators, freezers, washers, dryers, and ovens

Climate: Weather conditions in a place over a long period

Climate change: Rapid warming of the global climate

Community: A group of people that have a place or other thing in common

Design: Decide on the look and function of a building, space, process, or object

Diversity: Variation among people or other things

Economic: About money, income, and use of wealth

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Empathy: Trying to understand the perspective of another

Environmental: About the natural world

Ethical: The fairness of something

Fossil fuels: Substances like oil or natural gas that are taken out of the Earth

Functional: Something that meets your needs

Household: People who live with you in the same home

Housing: A building or other structure where people make their home

Housing density: How many homes are found within an area

Identity: Characteristics that make up each person or thing

Incandescent lightbulbs: Older type of light bulb that has thin wire filaments and gives off heat

Inclusive: Making sure no one is left out

Indigenous: A group of people or other living things that are native to a place and have not migrated from elsewhere

Investigate: Find out more information

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Local building materials: Materials used in building found in the local area

Maintenance: Activities needed to keep something functional and in good repair

Mentor: Someone who has experience and can help guide you

Model: A smaller version of something complex, like a building

Observation: Recording what you notice without adding your own opinion

Observe: Use your senses to get information about something

Oral history: Recording information from people talking about their past

Passive solar heating: When housing is warmed using the sun

Perspectives: A specific way of thinking about the world around us

Phantom load: Energy used by electrical devices when plugged in but not in active use

Polluted: Water, soil, or other natural systems that have been contaminated with things that do not belong in them

Pollution: Things that do not belong in and can harm an environment

Precipitation: Water falling to the ground as rain, snow, sleet, or hail

Reflect: Think carefully about something

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Resources: Materials we use to meet our needs

Social: About the interaction of people in a community.

Survey: A list of questions that you can give to a group of people

Sustainable: A balanced long-term approach to social, environmental, economic, and ethical concerns

Sustainable community: A group that balances the needs of living things and the resources available in a way that does not hurt future generations

Sustainability: An idea that requires that people do not use more resources or create more waste than the biocapacity of the Earth can meet

System: Something made up of parts that work together

Thrive: When something is working or growing well

Urban: A city or place with high housing density

Other words:

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Resource Use Checklist

Water Use	
Number of showers taken in your household in a week	
How long are the showers?	
Number of baths taken in a week	
Do you keep water running while washing dishes?	
Do you keep water running while brushing teeth?	
Do you have any dripping faucets/taps or water running in toilets?	
Number of low-flow showerheads, faucets/taps, and toilets	
Appliances	
Refrigerator	
If you have a refrigerator, how full is it? (empty, 25%, 50%, 75%, 100%)	
Number of times opened a day	
How often do you put hot food in the refrigerator?	
Freezer	
If you have a freezer, how full is it? (empty, 25%, 50%, 75%, 100%)	
Number of times opened a day	
Dishwasher	
If you have a dishwasher, number of times run a week	
Number of times is the energy saver setting is used per week	
Washer	
If you have a washer, number of loads of laundry a week	
Number of loads of laundry using cold water	
Number of small or partial loads a week	
Dryer	
If you have a dryer, number of loads dried a week	

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Heating and Cooling	
If you have a thermostat and heating, what temperature is the thermostat set to?	
If you have a thermostat and air conditioning, what temperature is the thermostat set to?	
Do you leave doors or windows open when your heating or air conditioning is on?	
How often do you use fans or open windows to cool your home?	
What temperature is your water heater set to?	
Lights and Lightbulbs	
Number of incandescent lightbulbs in your home	
Number of other lightbulbs in your home	
How many hours a day is an electric light on in a room with no one in it?	
Phantom Load	
Number of phantom load devices kept plugged in	
Other Ideas	
What other things can you think to investigate the resource use of your household?	

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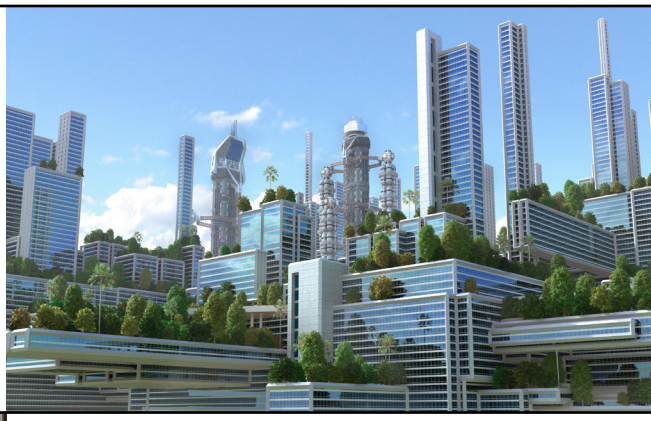



Part 5:

How can the transportation system help our community thrive?

SUSTAINABLE DEVELOPMENT GOALS

developed by

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Smithsonian Science Education Center Module Development Staff

Executive Director - Dr. Carol O'Donnell

Division Director for Curriculum, Digital Media, and Communications - Laurie Rosatone

Science Curriculum Developer - Heidi Gibson

Research Mentor
Hooi Ling Khoo, PhD

Technical Reviewer
Kathleen Rooney

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PART 5: HOW CAN THE TRANSPORTATION SYSTEM HELP OUR COMMUNITY THRIVE?

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Find out More!

For additional resources and activities, please visit the *Sustainable Communities!* StoryMap at https://bit.ly/2YdHNqB.

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Planner

Timing note: *The time used for investigations, observations, and actions can vary. When different options are listed within an activity, some options may take longer than others.*

Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Task 1: Why is transportation important?					
Discover	Explore how you use transportation and how it helps you.	• Paper • Pens or pencils		15 minutes	210
Understand	Investigate how people in your community use the local transportation system.	• Paper • Pens or pencils	*Survey Instructions* (Part 2, Task 1, optional) *Oral History Instructions* (Part 2, Task 2, optional) *Focus Group Instructions* (Part 3, Task 1, optional)	20 minutes + investigation time	211
Act	Consider how a transportation system can help your community thrive.	• Paper • Pens or pencils	*Thriving Community Goals* (Part 1, Task 3)	10 minutes	213
Task 2: What is the transportation system like in my community?					
Discover	Examine the transportation system within your research area.	• Paper • Pens or pencils	*My Research Area* (Part 1, Task 4)	25 minutes	215
Understand	Investigate to find out how different locations encourage different types of transportation.	• Paper • Pens or pencils	* StoryMap extension available	20 minutes + investigation time	217
Act	Develop and record ideas about how to redesign the transportation system in your area.	• Paper • Pens or pencils	*Part 5 Organizer* (Task 1)	20 minutes	219

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Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Task 3: How do transportation systems affect the environment?					
Discover	Consider your transportation choices and calculate your travel-related carbon footprint.	• Paper • Pens or pencils	* StoryMap extension available	35 minutes	222
Understand	Investigate the origin of items you use and consider how they might have traveled to you.	• Paper • Pens or pencils • Items to investigate (for example, clothing, food)	* StoryMap extension available	25 minutes	225
Act	Share what you have learned about transportation and carbon footprint with others.	• Paper • Pens or pencils	*Part 5 Organizer* (Task 1)	20 minutes + action time	228
Task 4: How do transportation choices affect my community?					
Discover	Explore different perspectives on how the transportation system affects your community.	• Class board or poster paper • Pens or pencils		25 minutes	230
Understand	Conduct an impact assessment for a new part of your community's transportation infrastructure.	• Paper • Pens or pencils	* StoryMap extension available	20 minutes + investigation time	232
Act	Propose changes to the new transportation infrastructure to make it more sustainable.	• Paper • Pens or pencils	*Part 5 Organizer* (Task 1)	20 minutes	234

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Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Task 5: How can we improve transportation in our community?					
Discover	Consider what you now know, think, and wonder about how transportation can make your community more sustainable.	• Paper • Pens or pencils	*Part 5 Organizer* (Task 1) *Thriving Community Goals* (Part 1, Task 3)	15 minutes	236
Understand	Decide on individual actions you will take to help your community.		*Part 5 Organizer* (Task 1)	15 minutes	237
Act	Put your idea for individual change into action and reflect on it.			10 minutes + action time	238

* StoryMap extension found at https://bit.ly/2YdHNqB

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5 Part 5: How can the transportation system help our community thrive?

In Part 1 you learned that **infrastructure** are things that are built and stay in your **community**. Infrastructure supports all sorts of different **systems**, such as transportation, power, water, and the Internet. In this part you will think about the transportation infrastructure in your community. The transportation infrastructure allows people and things to move around your community. When it is working well, transportation can be an important part of helping your community **thrive**.

Remember: *In this guide you and your team are in charge. You can always change the instructions in the steps to make them work better for you and your team.*

Your Research Mentor

Sharing your experiences with others and learning from others' experiences is part of being a good **action researcher**. In Part 6, you will have a research **mentor** to help you understand some issues about transportation in your community and how to research those ideas. A mentor is someone who has experience and can help guide you.

Meet Khoo Hooi Ling, Your Part 5 Research Mentor



Meet Dr. Khoo Hooi Ling. She goes by Khoo (pronounced *Cool*) for short. Khoo is an associate professor in the Department of Civil Engineering at the Universiti Tunku Abdul Rahman in Malaysia. She researches traffic and transport. Her research includes traffic safety, public transport, and how to manage transportation demand. Khoo is the chairperson of the Highway and Transportation Engineering Technical Division for the Institute of Engineers Malaysia. You, your team, and Khoo are all part of the many researchers around the world trying to find ways to make the spaces around them more **sustainable**. Khoo will be your research mentor to help you understand the transportation system in your community.

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Khoo has degrees in civil engineering and engineering science. However, her knowledge and **perspectives** come from many parts of her **identity**. Since Khoo is now working with you, it is important to understand who she is. To help you, Khoo filled out an identity map, just like you did in Part 1. Khoo's identity map includes the following things.

- Associate professor
- Loves singing, watching movies, jogging, and meditation
- Buddhist, believes in karma and finding eternal happiness
- Tall and plump
- Likes to wear T-shirt and pants
- PhD in transportation engineering
- Stock market investor
- Smiles often and is nice
- Oldest in the family
- Wife, since 2009
- Mother to one daughter and one son
- Determined and dedicated

Before you begin the rest of Part 5, think quietly to yourself about Khoo's identity map.

- Are there things you have in common with Khoo?
- Are there ways in which you are different from Khoo?
- Can you see anything about Khoo's identity that would help her understand different perspectives on how to help a community thrive?

Throughout Part 6 you will notice Khoo sharing ideas and experiences with you. She may help you understand better ways to conduct investigations, or she may share some of the work she has done.

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Task 1: Why is transportation important?

Transportation can help meet important needs. In this task you will first ***discover*** how the transportation system is important to you. You will **investigate** to ***understand*** how transportation is used in your community. Then you will ***act*** by using this information to help you consider how transportation could be used to help your community thrive.

Discover: *Why is transportation important to me?*

You move around your community all the time. How do you do it and why is that important?

1. Think quietly to yourself about the different types of transportation you use to get around your community. Record your ideas by drawing, writing, or using another method. Consider:
    a. **Active transportation**, which is ways of traveling that need energy from you, like walking, biking, skateboarding, or pushing a wheelchair
    b. Individual motorized transportation, like shared or owned electric bikes, e-scooters such as the ones in Figure 5.1, or motorized wheelchairs



Figure 5.1: E-scooters

    c. Personally owned transportation that could carry more than one person, like a car or motorcycle
    d. Shared transportation that can carry many people, like buses, trains, or ferries
    e. Any other way you move around your community

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2. With your team, share the types of transportation you use. Did you get any new ideas of different types of transportation from your teammates? Record them now.
3. Discuss with your team why you use the types of transportation you do. Consider:
    a. What makes you use one type rather than another?
    b. Who decides what type of transportation you use?
4. Now think about the way transportation helps you meet your needs. Start by listing your needs or finding another way to record them. If you did Part 3, Task 1 you can take out the list you made about your needs and your community's needs. If you did not do Part 3, you can list your needs now by referring back to that task. Remember to consider the needs:
    a. Of your body
    b. For safety
    c. For relationships with others
    d. Personal needs and wants
5. Next to each of your needs, list the ways transportation helps you meet this need. For example, next to your need for food, you might list how you travel to the place where you get food, like a shop. You also might list that food needs to travel from where it is grown to the shop.



Understand: *What transportation infrastructure is found in my community?*

The transportation system can serve important needs in your community. It can help or hurt individual people. It can bring communities together or push them apart. In this task you will investigate what people in your community think and feel about your transportation system.

1. With your team, record questions you would like to answer about how people move around your community. For example, think of questions about:
    a. Types of transportation people use
    b. When people use transportation
    c. Where people use transportation
    d. How people use transportation

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e. The costs of transportation

f. Problems people have using transportation

2. Next, record questions your team would like to answer about how people feel about the transportation system in your community. For example, think of questions about:

   a. Has the transportation system changed?

      - What was better about it in the past?
      - What was worse?

   b. How does the transportation system affect the local community?

      - How does it make lives easier?
      - How does it make lives harder?

2. Then record questions about how things are moved around your community. For example, think of questions about:

   a. Do people know where the food, water, energy, clothing, and other things they use come from?

   b. How do these things reach individual people?

3. With your team, choose how you will find out how people in your community use and feel about the transportation system you are investigating. Decide how you will get answers to the questions you just thought about. You have several options, including:

   a. Give out a **survey**, either in person or online. You may have used a survey to understand the people in your community better during your investigations in Part 2. You can refer back to the *Survey Instructions* in Part 2, Task 1 if you need more information.

   b. Conduct interviews. Talk to individual people in your community to get more information. This is similar to the **oral histories** you may have used in Part 2, only it is getting information from people about the present, not the past. You can refer back to the *Oral History Instructions* in Part 2, Task 2 if you need more information.

   c. Conduct a focus group. A focus group brings a small group of people together to discuss a certain topic. This allows you to gather information from several people at one time. It also allows the people in your focus group to think together to come up with better ideas. You can refer back to the *Focus Group Instructions* in Part 3, Task 1.

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d. Find existing research. Sometimes governments or other organizations have put out reports or done surveys about the transportation system in your community. This information may be found in print or online. You may be able to use this existing research to understand how people use and feel about the transportation system in your community.

c. Use another method or a combination of methods.

4. Remember, including everyone is important. Different ways to investigate have different advantages. Try to pick a way to investigate that allows everyone on your team to participate. Don't forget to think about timing, comfort, location, and format to make sure everyone can take part. You can look back at Part 2, Task 1 if you need more information about making your investigation **inclusive**.
5. Work with your team to plan how you will collect information. For example, if you decide to conduct a survey, decide how you will give the survey, what questions you will ask, and who will record the answers.
6. Conduct your investigation with your team. Record the information you find out.
7. Read Khoo's thoughts about the parts of a transport system. Are there any parts of the transportation system you need to find out more about?

Khoo Says . . .



What are the parts of transport system? You have people, infrastructure, and vehicles. These are the three important components that make up the transport system. People need to travel for **economic, social**, or other reasons. When people need to move around, then you need to have transport infrastructure—the roads, the tracks, and the stations. Finally, you need the vehicles to help the people move around using the infrastructure.

Act: *How does transportation help us build a thriving community?*

A thriving community needs a transportation system that meets people's needs. Now you can consider whether the transportation system in your community is helping your community thrive.

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1. Work with your team. Title a sheet of paper or a digital document *Part 5 Organizer*. Make three columns, just as you did for your *Part 2 Organizer.* Write the words "Know," "Think," and "Wonder" at the top of the columns.
2. Use the *Know* column to list everything you found out about transport infrastructure in your community. You investigated different types of transport infrastructure. Then you considered all the transport infrastructure systems together. Record:
    a. Types of transportation you found in your community
    b. Types of transportation people use the most.
    c. Where, when, and how people use transportation
    d. How people feel about the transportation in your community
    e. Problems people shared with you about transportation in your community
3. Next you will think about what that information means. Record these ideas in the *Think* column. As a team, discuss:
    a. How does transportation affect daily life in your community?
    b. Why do people make the choices they make about transportation?
    c. Are there problems people shared that you would like to find out more about?
    d. How might the transportation system change if people's habits changed? For example, if people started working closer to their homes, would the transportation system change?
4. Use the *Wonder* column to list any other questions you have about the transportation system in your community.
5. Take out your *Thriving Community Goals*. These goals show you how your team wants your community to be. Consider:
    a. Are there goals listed that relate to transportation?
    b. Are there goals that may not be about transportation, but you would have trouble reaching if transportation was a problem?
6. Record any problems you notice related to your *Thriving Community Goals* in the *Think* column.

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Task 2: What is the transportation system like in my community?

The transportation system includes all the ways people and things are moved around your community. In this task you will think about the transportation system in your community. You will ***discover*** what is part of the transportation system and where these parts are found. You will investigate to ***understand*** how the system promotes different types of transportation. Then you will ***act*** by redesigning the system to be better.

Discover: *Where is the transportation system in my research area?*

Transportation systems can have many parts. You may have thought of some of these if you mapped the streets in your research area in Part 3. Other parts you may not have noticed yet.

1. Take out your *My Research Area* map. Take out another piece of paper as well. A thin piece of paper that you can see through would be easiest, so if you place it on top of the *My Research Area* you can see the map below.
2. Examine the map closely with your team. What parts of the transportation system do you notice? For example, the map may have roads, train tracks, or waterways. Place the thin piece of paper on top of the map and draw the places where you found transportation system parts, as in the example in Figure 5.2.

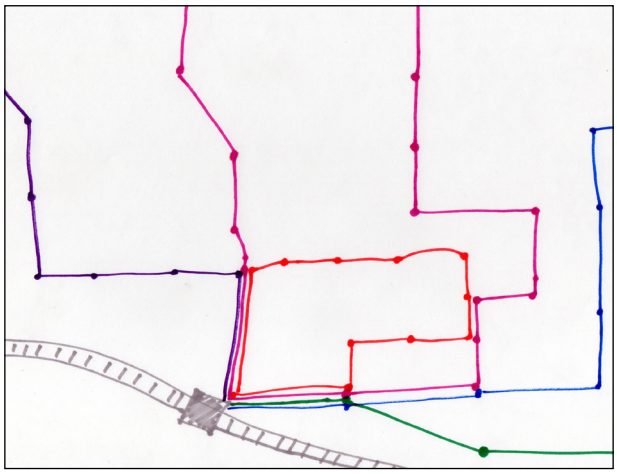

Figure 5.2: Example of a research area with the transportation system marked

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3. Are there other parts of the system that are not marked on the map, for example, bus routes and stops or places for bicycling? Mark those on the thin paper now, using the map beneath as a guide. If you do not know where these places are in your research area, consider how you could find out. For example, you could:
    a. Find train, bus, or bicycle route maps
    b. Ask someone who knows about transportation in your community
    c. Travel around your research area and notice different transportation system parts
4. Examine your thin piece of paper. You have just made a map of the transportation system in your research area. Discuss with your team and record:
    a. What do you notice about the system? For example:
        - Are there more transportation options in some places in your research area?
        - Is the system evenly divided between different types of transportation or are there more parts for one type?
    b. What do you think is working well and what is working badly in the system? For example:
        - Do you think all the parts of your research area are equally connected to the transportation system?
        - Are there places that you think might be problem spots? For example, are there places where there is a lot of traffic or where there is a safety issue?
5. Examine the transportation infrastructure system in your community. Are there ways you would **design** it differently? Record your ideas by writing, drawing, or marking them on your map.
    a. Are there places without many transportation links where you would like to add those links?
    b. How much space in your community is used for transportation infrastructure?
    c. Is there too much space for one type of transportation, like cars?
    d. Are there things that could change so you could have different types of transportation?

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Understand: *How does infrastructure encourage specific types of transportation?*

People may consider different things when they choose how they will move around the community. They want to feel safe. Sometimes they want to get where they are going quickly. People also may think about cost and comfort.

1. Read Khoo's ideas about why people make the transportation choices they do.

Khoo Says . . .



Sometimes people do not have access to a lot of different transport choices. But often choices depend on more than **accessibility** issues. Choices relate to attitudes, like the perception of convenience and the perception of safety. Every one of us will have travel costs in our mind when we make decisions about transportation. The travel costs include the out-of- pocket costs—for example, if you are driving a car, your parking costs and your petrol (gasoline) costs. There are even costs that people sometimes forget, like insurance and **maintenance** costs of owning a car.

You compare these things to make a choice, like between public transportation and a private vehicle.

2. Think quietly to yourself:
   a. What are the things you want from your transportation method?
   b. Does this ever change? For example, maybe sometimes you want to get somewhere quickly and other times you want to enjoy the journey.
   c. What are the costs that are part of different methods you can think of? Consider how convenient the method is for you, the time it uses, the daily costs, and the long-term costs, like car insurance.
3. Pick a part of your research area where people can get around in different ways to **observe**. You will use this area to investigate part of the transportation system in your community.

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4. Read the *Transportation Checklist Instructions* and create your own checklist of things you want to notice when you are in the area.

Transportation Checklist Instructions

The things on your checklist will remind you to notice those things when you do your investigation. Think about what you think is most important to notice so you can understand how people in your community are using transportation and why they make those choices. Consider adding some of your ideas here to your checklist.

Transportation Types

a. What transportation types do you notice being used?
b. How many people are using each type?
   What infrastructure do you notice for the different types of transportation? For example, are there sidewalks, benches, bus stops, bike lanes, roads, parking spaces, train tracks, or other built places for transportation?

Safety

a. What do you notice that would make you feel safe or not safe if you were using each type of transportation?
b. Are there places where bicyclists or other active transportation users might feel threatened by cars?
c. Are there places where walkers could easily trip?
d. Are there places that would be difficult to move through for wheelchair users, people using a stroller for children, or people pushing carts?
e. Are there things along the sidewalk, like litter or poles, that make it difficult to pass?
f. Are there marked places for people to cross the street? Do vehicles stop at these places to let people cross? Do the crossings feel safe?

Time and Cost

a. How long does it take to travel through the area using different types of transportation?
b. How much does it cost to use the different types of transportation?

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Comfort and Interest

a. Are there things you miss if you go quickly, for example art, gardens, or other people?
   Is it comfortable to walk or use a wheelchair? For example, is it shaded, does it feel pleasant, is it separated from motorized vehicles?
b. Are there reasons you would want to go to this area?

⚠ Physical Safety Tip

Talk to your teacher or another trusted adult before you go. Never go alone and always be aware of your surroundings. Pay attention to local guidance on whether it is safe to interact with people outside of your home.

5. Go to the area and get ready to observe closely. If you cannot go in person to the place, you may be able to use a tool such as Google Maps Street View so you can still observe the area. Record what you observe by drawing, writing, or recording your voice. If you want, you can make a map of the area and mark your observations on the map.



Act: *How could the infrastructure be changed to help the people in my community thrive?*

The infrastructure in a community can encourage different types of transportation. If walking is pleasant, safe, and convenient, people may be more likely to walk. If parking a car is difficult, people may be less likely to drive to a place. Are there changes you can think of for the area you investigated that would make the transportation system better?

1. Take out your *Part 5 Organizer*. Use the *Know* column to record the information you found out about transportation in your community. Record:
   a. What types of transportation systems are found in your research area?

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b. Are there some places with few transportation options?

c. How many people did you notice using each type of transportation during your investigation?

d. Did you find any parts of the transportation system that were not safe during your investigation?

e. Did you find any parts of the transportation system that were not comfortable during your investigation?

2. Next you will think about what that information means. Record these ideas in the *Think* column. As a team, discuss:

   a. When you investigated, what did you notice about why people might use one type of transportation over another?

   b. What changes can you think of that would make the transportation system better?

   c. Can you think of anything that is currently happening in your community that encourages people to use active transportation?

3. Use the *Wonder* column to list any other questions you have about the transportation system in your community.

4. By yourself or with your team, think about the place you investigated. If your goal was to encourage more people to walk or use their wheelchair in that place, what would need to change? Record your ideas by writing, drawing, or marking them on your map.

   a. What would make the place seem safer for walkers or wheelchair users?

   b. What would make the place seem more interesting for walkers or wheelchair users?

   c. What would make the place seem more comfortable for walkers or wheelchair users?

5. Read Khoo's ideas about active transportation and think about the ideas your team had. Are there any ideas that you could put into action? Discuss with your team how that would work.

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Khoo Says . . .



We can design our residential and school areas to be more favorable to people walking, biking, or using active transportation. A good design encourages these types of transportation. This includes traffic safety. There are many things that can be done. For example, if you reduce the speed of vehicles on the road, it becomes a better place to walk. Or in the case of kids bicycling to school, there can be a bicycle lane. There can be special treatment at intersections for bicyclists so they can be safer while cycling.

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Task 3: How do transportation systems affect the environment?

In this task, you will ***discover*** how your daily transportation choices affect the global environment. You will investigate to ***understand*** how the things you use to travel in your community might affect the environment. Then you will ***act*** by deciding if you or your community needs to change your choices.



Discover: *What daily choices do we make about transportation infrastructure?*

Several main types of transportation use **fossil fuels**, such as oil or natural gas, that are taken out of the Earth. When these fossil fuels are burned for energy, **greenhouse gases** are released into the atmosphere. These greenhouse gases trap heat, causing the global atmosphere to warm and the **climate** to change. Globally, transportation is responsible for 14% of greenhouse gases that are released. But in many countries it is an even higher percentage. For example, transportation creates 29% of the greenhouse gases released in the United States.

1. By yourself, think about all the trips you made over the past week. Record how far you went and what type of transportation you used. If you need to, you can examine a map to help you remember that information.
2. Compare your answers with your teammates. Consider:
   a. Do some of you travel farther each week?
   b. Do you take different types of transportation?
3. Read *Calculating Your Transportation Carbon Footprint* and calculate your carbon footprint using the instructions in the box.

Calculating your Transportation Carbon Footprint

Something released into the air is an **emission**. Figure 5.3 shows some emissions released by cars. Different types of transportation release different amounts of emissions to travel the same distance. The amount of greenhouse gases you cause to be emitted is called your **carbon footprint**.

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Figure 5.3: Emissions from cars

There are several types of greenhouse gases, but the most common one is carbon dioxide (CO_2). Other types of greenhouse gases are compared to CO_2 and shown as grams of CO_2 equivalent (CO_2 eq). The chart in this box shows the amount of CO_2 eq emissions per person traveling 1 kilometer using different types of transportation. These CO_2 eq emissions are related to the fuel used to power the vehicle.

Change to Kilometers

If you used miles when you recorded your list of weekly trips, change each distance to kilometers. You can do this by multiplying the number of miles by 1.6.

Miles × 1.6 = kilometers

Find Transportation Type

Examine the types of transportation in your list of trips you have taken this week. For each type, find the grams of CO_2 eq emitted for each kilometer (km) from the *Type of Transportation* table. The table lists the average CO_2 eq for each passenger using that type of transportation.[1]

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Type of Transportation	Average Grams of CO_2 eq per Passenger km
Walking	0
Bike	0
E-bike	12
E-scooter	6
Motorbike (medium)	102
Train (long distance)	6
Bus (average)	105
Metro/urban train/subway	31
Car (medium, petrol/gas)	192
Hybrid car (medium)	109
Electric car (medium)	53
Passenger ferry (on foot)	19
Passenger ferry (in car)	130
Airplane (1 hour or less)	255
Airplane (less than 4 hours)	156
Airplane (more than 4 hours)	150

Calculate Travel Emissions for Each Transportation Type

Multiply the emissions for each type of transport by the number of kilometers you traveled.

Grams of CO_2 eq × km = travel emissions

Find your Carbon Footprint

After you have calculated your emissions for each travel type, add all the emissions together to find your carbon footprint.

For example, if you walked, drove, and rode on a train your calculation would be:

Travel emissions for walking + travel emissions for car + travel emissions for train = carbon footprint

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4. Think quietly to yourself about these questions.
    a. Are you happy with your carbon footprint?
    b. Why do you use the transportation you do?
    c. Could you make different choices?
5. Discuss with your team:
    a. Why do some people have larger carbon footprints than others?
    b. Do you think your carbon footprint is bigger or smaller than most people in your community?
    c. What could you do to decrease your carbon footprint?
6. Read Khoo's ideas about public transportation. Why do you think your transportation choices are important?

Khoo Says . . .



Everyone can make a difference. If you try to support public transport, then it may help to reduce a lot of traffic issues, like emissions, congestion, or noise. Public transport is able to carry more people. This means you reduce the number of vehicles on the road, and you reduce emissions as well. This is especially true for cars that use petrol (gasoline). Vehicle traffic is one of the major causes of **pollution** and CO_2 emissions in the world. Reducing traffic on the road has a very big **impact.**

***Understand**: How do choices individuals make about transportation affect their communities and their world?*

Transportation includes more than just moving people. It also includes moving things. Moving both people and things affects the environment.

1. Examine Figure 5.4. Carbon dioxide (CO_2) is the most common greenhouse gas emission. Discuss with your team:
    a. What do you notice about the graph? For example, which categories are the largest?

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b. What do you think is important about the graph? For example, if you wanted to decrease global CO_2 emissions from transportation, what might you try to do?

c. What do you wonder about global emissions and transport that is not answered in the graph?

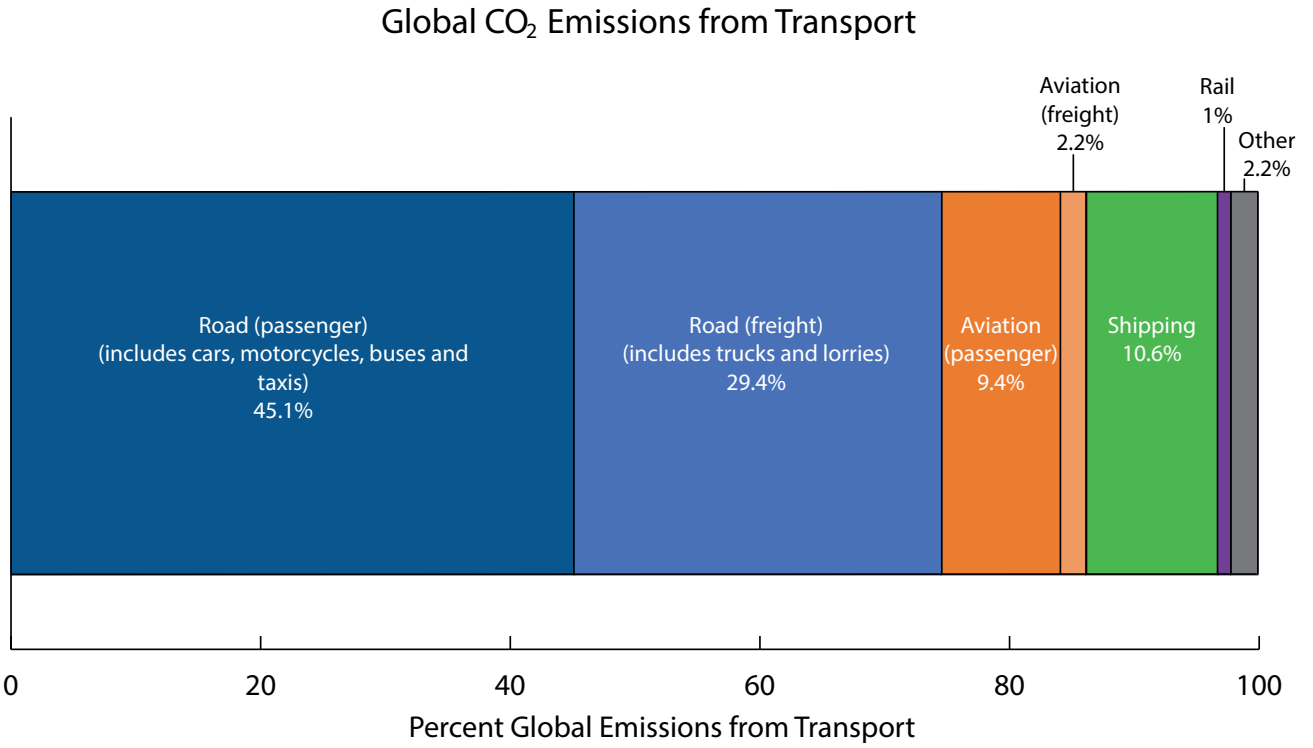

Figure 5.4: Global emissions from transportation sources[2]

2. Notice the percentage of CO_2 emissions from road freight, shipping, aviation, and rail. **Freight** means transporting many things.
3. Think about the things you use every day, like food, clothing, furniture, or other items in your home. Pick one type of item to investigate. You will be investigating the **origins** of these items. Origin means where something comes from.
4. Read *Items Origin Investigation* and investigate with your item.

Items Origin Investigation

Pick one type of item that you use to investigate. You could choose clothes, shoes, stationery, food, furniture, or any other type of item. You may want to do this investigation individually and then compare your results with the rest of your team.

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Decide Where You Will Investigate

a. You may decide to investigate in a shop or other place in your community where you can buy things.
b. You also might decide to investigate at your home, for example, by looking at where all your clothes come from.

Determine the Manufacturing or Growing Origin

a. Examine each item closely for a tag, label, or other indication of where it was made or grown. Tags and labels often list "Made in . . ." and then a country name. An example of a tag is show in Figure 5.5.



Figure 5.5: Clothing tag

b. If you cannot find a tag or label, you could ask a worker or search for further information at the shop where you bought the item.
c. Record the origin of each item.

Thinking About Transport

a. Examine a map of the world.
b. Where did the item come from?
c. How do you think it may have gotten to you? For example, maybe it was first sent by ship and then put on a train and finally put in a truck to get to the store where you bought it.

5. Share what you found out with your teammates and compare your results. Consider:
    a. Do certain items, like food, travel shorter distances than other items, like clothing?
    b. How does using items from different places affect you and your community?
    c. How do you think manufacturing or growing items used in different places affects those communities?
    d. There are good and bad sides to having items that travel around the world. Discuss the good and bad things you can think of with your team.
    e. How could you make different choices so things do not travel as far to reach you?



Act: *How could I make more sustainable choices?*

The choices you and others make are important. Your carbon footprint includes transportation to move you around your community. It also includes transportation to move items you use to your community. Both of these things are part of your carbon footprint and also have other effects on your local and global communities.

1. Take out your *Part 5 Organizer*. Use the *Know* column to record the information you found out about how you use transportation. Record:
    a. What did you calculate as your carbon footprint?
    b. Where do the items in your community come from?
    c. Do certain types of items travel farther?
2. Next you will think about what that information means. Record these ideas in the *Think* column. As a team, discuss:
    a. How could you decrease your carbon footprint?
    b. How could others in your community decrease their carbon footprints?
    c. Why do you think items in your community often travel long distances before reaching you?
    d. How do you think that affects different communities around the world?
3. Use the *Wonder* column to list any other questions you have about the transportation system in your community.

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4. With your team, think about how you could share what you have learned about travel and transportation with others.
    a. Is there important information you learned that others may not know?
    b. Why is it important that people know this information?
    c. How could you share the information with others? For example, could you design a poster, record a podcast, or just decide you will each talk to a few other people?
5. Put your ideas into action with your team.

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Task 4: How do transportation choices affect my community?

Transportation systems can have social, economic, **environmental**, and **ethical** effects on the community. In this task you will ***discover*** more about how the transportation system affects you. Then you will investigate to ***understand*** the effects of a specific piece of transportation infrastructure. Finally, you will ***act*** by choosing between alternatives for that infrastructure.



Discover: *How does the transportation system affect me and my community?*

You thought about why people make certain choices when it comes to transportation. Now you will think about the effects of these choices.

1. With your team or by yourself, get out a large piece of paper or go to the board. Divide your paper or board into four large boxes. Label these boxes "Social," "Economic," "Environmental," and "Ethical."
2. Now consider how transportation affects the social part of your community. Draw pictures or write words in the *Social* box to help you remember your ideas. For example, how does the transportation system:
    a. Bring your community together by providing a space where community members can interact?
    b. Pull your community apart by creating disagreements or physical space between different groups?
    c. Encourage people to become healthier, happier, or more educated?
3. Next move onto the *Economic* box. Consider how transportation affects the economy of your community. For example, how does the transportation system:
    a. Help things people buy and sell come into and go out of your community?
    b. Help people get to work?
    c. Create costs for users, like ticket prices or the costs of owning a car?
4. Next move on to the *Environmental* box. Consider how transportation can affect the local and global environment. For example, how does the transportation system:

a. Affect the living things around where it is built, like if a road is built on land that used to be a home for animals and plants?
b. Affect the air quality, like if pollution from cars and trucks makes it hard to breathe?
c. Affect global emissions of greenhouse gases and make climate change worse?

5. Finally, move to the *Ethical* box. Consider how transportation can affect whether your community is a good and fair place for everyone. For example, does the transportation system:
   a. Let everyone have easy access to the things they need, like food, school, and work?
   b. Create a situation where one group of people benefits from something, like the faster transportation of a highway, while others are hurt by it, like pollution from cars on the highway harming those who live next to it?
   c. Let some people only spend a little time or money on transportation while other people spend a lot of time or money on the transportation they need?
6. With your team, remember the types of transportation that you have in your community. Are there other types of transportation you do not have, but wish you did? Write or draw those types of transportation.
7. You will now rank each transportation type in the order of which is best from each perspective.
   a. Return to your *Social* box. Examine all the ways transportation can help or hurt people and their relationships in your community. Which transportation types are best from a social perspective? Which are worst? Put them in order.
   b. Return to your *Economic* box. Examine all the ways transportation can help or hurt the economy of your community. Which transportation types are best from an economic perspective? Which are worst? Put them in order.
   c. Return to your *Environmental* box. Examine all the ways transportation can help or hurt the environment of your community. Which transportation types are best from an environmental perspective? Which are worst? Put them in order.

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d. Return to your *Ethical* box. Examine all the ways transportation can make your community fairer for everyone. Which transportation types are best from an ethical perspective? Which are worst? Put them in order.



Understand: *What is the impact of my infrastructure?*

Building transportation infrastructure can have a big impact on the people and other living things around where the infrastructure is built. Impact means the effect one thing has on another.

1. Choose a new part of your community's transportation infrastructure that is not yet built. You will be assessing the impact of this infrastructure on your community. You can either:
   a. Choose a part that is already planned for your community. For example, you might choose a planned bridge, dam, or airport that will be built in the future.
   b. Come up with your own plan for a new part. You can use your transportation system map from Task 2, Discover, to help you decide where you think new infrastructure is needed. For example, you might consider adding a new trail, road, or ferry terminal. If you come up with your own idea, make a drawing or write down details about where it will be built.
2. Read the *Community Impact Assessment Instructions* for more information about how to do an impact assessment. An **impact assessment** is when you examine the effects of a piece of infrastructure or other project on the local community.

Community Impact Assessment Instructions

Understanding the impact of a piece of infrastructure can help you understand the ways it helps and hurts your community. Go to the place where the infrastructure is planned and observe the surrounding areas closely.

- What do you notice?
- Are there people you can talk to?
- Are there other ways to answer the questions on the impact assessment?

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Social Impact

a. Will the infrastructure change the way people live, work, play, go to school, or interact with one another? If so, how?
b. Will the infrastructure change the culture of the people around it in any way? For example, if a road is built over an important cultural place, like where people gather or worship.
c. Will the infrastructure change the health or well-being of the people living around it? If so, how?

Economic Impact

a. Are there new business opportunities that may be available to people because of the infrastructure?
b. Will the infrastructure take away a source of food or money for people? For example, if it makes it impossible to fish in a river.
c. How much does the infrastructure cost and who will pay for it? You may not be able to find this out at the location. You may need to do research at a local government office or online. If you cannot find the answer, do not worry, just move on.
d. Will goods be able to travel to the community more or less easily because of the infrastructure?

Environmental Impact

a. Do you think the infrastructure will change the types of living things that can be found in the area? For example, if a wetland is drained to build a road, you may have fewer birds, amphibians, and plants.
b. Will the water in the area change? For example, maybe when it rains water runs off in one direction. Will that change after the infrastructure is built?
c. Will the air in the area change? For example, if there will be a lot of new traffic in the area, the air quality will be worse.

Ethical Impact

a. Who are the main people who will benefit from the infrastructure?
b. Who are the main people who will be hurt by the infrastructure?
c. Will the infrastructure help the community become fairer?

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⚠ Physical Safety Tip

Never go out alone and always be aware of your surroundings. Pay attention to local guidance on whether it is safe to interact with people outside of your home.

3. Work with your team to plan how you will conduct the assessment. For example, when will you go to the location, how will you collect observations, who will record the observations?
4. Remember, including everyone in your investigation is important. Don't forget to think about timing, comfort, location, and format to make sure everyone can take part. You can look back at Part 2, Task 1 if you need more information about making your investigation inclusive. If you cannot go in person to the location, think about other ways you could find out the information you need.
5. Conduct your investigation with your team. Record the information you find out.



***Act:** How could we make the impact of the infrastructure more positive?*

Transportation infrastructure can be designed to make any negative impact as small as possible. Sometimes after an impact assessment, researchers will come up with different ideas so people and governments can decide what is best for the community.

1. Take out your *Part 5 Organizer*. Use the *Know* column to record the information you found out about transportation in your community. Record:
   a. What are the social, economic, environmental, and ethical impacts of transportation systems?
   b. What social impacts did you notice during your impact assessment?
   c. What economic impacts did you notice during your impact assessment?
   d. What environmental impacts did you notice during your impact assessment?
   e. What ethical impacts did you notice during your impact assessment?

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2. Next you will think about what that information means. Record these ideas in the *Think* column. As a team, discuss:
    a. Which types of transportation did you think were best from the different perspectives?
    b. Which types of transportation did you think were worst from the different perspectives?
    c. What do you think were the most important impacts you found out about during your impact assessment?
3. Use the *Wonder* column to list any other questions you have about the transportation system in your community.
4. By yourself or with your team, think about your results of your impact assessment. When professionals present impact assessments they usually also present alternative ideas.
    a. Can you think of two other ways the infrastructure could be designed to take away the negative impacts?
    b. The other option is to do nothing. Between the original idea, doing nothing, and your two ideas for redesigning the infrastructure, which do you think is best?
    c. Discuss your ideas with your team and see if you can find **consensus**.
5. Think quietly to yourself about these questions.
    a. If you examined the impact of planned infrastructure, how could you share your results and ideas with people making decisions?
    b. If you had an idea for new infrastructure, how could you share that idea with the people making decisions?

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Task 5: How can we improve transportation in our community?

Now you will consider how you can use the information you have learned to make your community better. First you will ***discover*** your ideas about ways to make transportation in your community more sustainable. You will consider the transportation system and how it could be improved. Then you will ***understand*** some of the possible actions you could personally take. Then you will ***act*** to make a change.



Discover: *How can transportation make my community sustainable?*

Transportation can help a community thrive or not. You have found out a lot of information about transportation in your community. Now you will identify problems with transportation and think about ways it could be better.

1. Take out your *Part 5 Organizer*.
2. Your team has already listed in the *Know* column information you found out from your investigations. Add any additional information you want to remember.
3. You have also recorded some of your thoughts in the *Think* column. Now that you have investigated infrastructure in different ways, you can think a little more. Consider:
    a. Why do you have the transportation system you have in your community?
    b. Why do you think transportation is used the way it is in your community?
    c. Do you think there are problems with transportation in your community?
4. Take out your *Thriving Community Goals*. Compare them to the things you *Know* and *Think*. Your *Thriving Community Goals* show you how your team wants your community to be. What you *Know* and *Think* shows you how your community is. When your community is not the way you want it to be, that is a problem.
5. As a team, discuss:
    a. Did you find out any information in Part 5 about your community that shows you are not meeting your *Thriving Community Goals*?
    b. If so, did you already list that as a problem?
    c. If you spot new problems, record those now in your *Think* column.

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6. List or draw what your team still wonders about infrastructure in your community under the *Wonder* column. Consider:
    a. Are there questions listed in the *Wonder* column that you have already answered?
    b. Are there questions you still have about transportation in your community?
    c. Are there actions you could take that you think may change the transportation system in your community for the better? For example, maybe you wonder if the transportation system could be designed to meet the needs of people more fairly.
    d. Are there other ideas you would like to remember?
7. Keep the *Part 5 Organizer* safe. You will need it again.



Understand: *What can I do individually to help?*

In this Part you found out information about why transportation is important in your community. Transportation can help meet many different needs. It can also have both positive and negative effects. You just thought about ways transportation might be better for your whole community. You will have a chance to put some of these ideas into action in Part 7. However, there are always ways you could make things in your community better through your own individual actions.

1. Examine your *Part 5 Organizer*. Are there any problems you saw that you could help to change all on your own?
2. Discuss your ideas with your team. For example, maybe you could:
    a. Talk to people in your community about places that do not have equal access to transportation. Are changes needed?
    b. Are there ways you could change the area you investigated so it would be better for walkers, bikers, and people using wheelchairs or others?
    c. Are there ways transportation in your community could be better for the environment? What could you do to make that happen?
    d. Are there different daily choices you could make about the way you use transportation that would be more sustainable?
    e. Come up with your own ideas.

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3. Think quietly to yourself about a change you want to make.
    a. Why do you think this change is important?
    b. How is it connected to problems you noticed in your community?



Act: *How will I put my ideas into action?*

Changing your own behavior is often the first step. Now that you have decided what you will do to improve your community, you can put that idea into action.

1. Make a plan for how you will put your idea into action. If you need to share information, where, when, and with whom will you share it? If you need to do something, what do you need to do it?
2. If you already completed other actions as part of this guide, what did you learn? Remember to use what you learned before to make this action even better.
3. Put your plan into action.
4. Think quietly to yourself to **reflect** on your action.
    a. What seemed to go well?
    b. What was hard?
    c. Were you able to make the changes you thought you would be able to make?
    d. Will you keep going with your changes or are there things you would do differently in the future?

Khoo Says . . .



Young people are the future of the world. You have to be well-equipped with knowledge so you can contribute and change the world to become a better one. Promoting an efficient transport system is crucial if we want to enjoy livable communities in the future.

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Congratulations!

You have finished Part 5.

Find out More!

For additional resources and activities, please visit the *Sustainable Communities!* StoryMap at https://bit.ly/2YdHNqB.

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Glossary

This glossary can help you understand words you may not know. You can add drawings, your own definitions, or anything else that will help. Add other words to the glossary if you would like.

Accessibility: A place, thing, or idea that is easily reached or used

Action researchers: People who use their own knowledge and information they find out from their community to make decisions and take action on important issues

Active transportation: Ways of traveling that need energy from you, like walking, biking, skateboarding, or pushing a wheelchair

Carbon footprint: Amount of greenhouse gases emitted because of the actions of a person

Climate: Weather conditions in a place over a long period

Community: A group of people that have a place or other thing in common

Consensus: A balanced decision that works for everyone in the group

Design: Decide on the look and function of a building, space, process, or object

Economic: About money, income, and use of wealth

Emission: Something released into the air

Environmental: About the natural world

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Ethical: The fairness of something

Fossil fuels: Substances such as oil and natural gas that are taken out of the Earth

Freight: Transporting many things

Greenhouse gases: Gases such as carbon dioxide or methane that cause the atmosphere to get warmer

Identity: Characteristics that make up each person or thing

Impact: The effect one thing has on another

Impact assessment: Examination of the impacts of a piece of infrastructure or other project

Inclusive: Making sure no one is left out

Infrastructure: Built things that stay in your community (for example, bridges, buildings, train tracks)

Investigate: Find out more information

Maintenance: Activities needed to keep something functional and in good repair

Mentor: Someone who has experience and can help guide you

Observe: Use your senses to get information about something

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Oral history: Recording information from people talking about their past

Origin: Where something comes from

Perspective: A specific way of thinking about the world around us

Pollution: Things that do not belong in and can harm an environment

Reflect: Think carefully about something

Social: About the interaction of people in a community

Survey: A list of questions that you can give to a group of people

Sustainable: A balanced, long-term approach to social, environmental, economic, and ethical concerns

System: Something made up of parts that work together

Thrive: When something is working or growing well

Other words:

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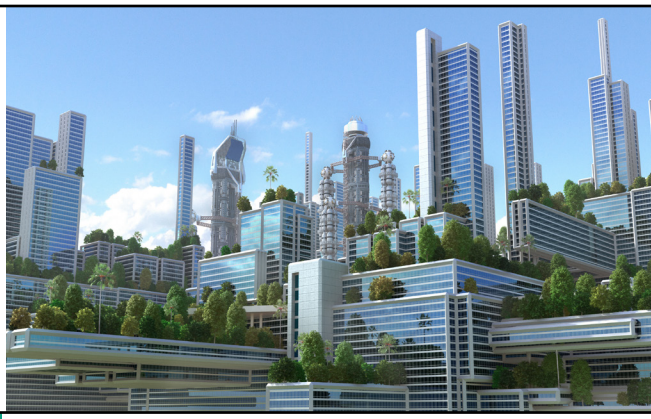
SUSTAINABLE COMMUNITIES!





Part 6:

How can we use resources wisely to help our community thrive?

SUSTAINABLE DEVELOPMENT GOALS

developed by

Smithsonian
Science Education Center

in collaboration with

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Smithsonian Science Education Center Module Development Staff

Executive Director - Dr. Carol O'Donnell

Division Director for Curriculum, Digital Media, and Communications - Laurie Rosatone

Science Curriculum Developer - Heidi Gibson

Research Mentor
Steven O. Nelson, MA

Technical Reviewer
Jessica Loding, M.S.

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Find out More!

For additional resources and activities, please visit the *Sustainable Communities!* StoryMap at https://bit.ly/2YdHNqB.

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Planner

Timing note: *The time used for investigations, observations, and actions can vary. When different options are listed within an activity, some options may take longer than others.*

Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Task 1: What resources do I use and how renewable are they?					
Discover	Observe and analyze the resources you use.	• Paper • Pens or pencils		25 minutes + observation time	253
Understand	Investigate the source and sustainability of the electric energy used in your community.	• Paper • Pens or pencils		25 minutes + investigation time	256
Act	Consider ways to make resource use in your community more sustainable.	• Paper • Pens or pencils	*Thriving Community Goals* (Part 1, Task 3)	15 minutes	258
Task 2: What waste does my community produce?					
Discover	Explore the waste you produce and what happens to it.	• Paper • Pens or pencils	*List of Things Used* (Task 4)	35 minutes	262
Understand	Investigate the amount of plastic waste you produce.	• Paper • Pens or pencils	* StoryMap extension available	20 minutes + investigation time	264
Act	Decide how you will reduce the waste you produce and put these ideas into action.	• Paper • Pens or pencils	*Part 6 Organizer* (Task 1)	20 minutes + action time	266

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Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Task 3: How can my community reuse instead of waste?					
Discover	Search for evidence of a circular economy system in your community.	• Paper • Pens or pencils	* StoryMap extension available	40 minutes	268
Understand	Repurpose an item to create a new use for it.	• Paper • Pens or pencils • Items to repurpose	* StoryMap extension available	25 minutes + creation time	270
Act	Share what you have learned about the circular economy with others.	• Paper • Pens or pencils	*Part 6 Organizer* (Task 1)	15 minutes + action time	272
Task 4: How can my community recycle waste?					
Discover	Explore recycling options and rules in your community.	• Paper • Pens or pencils	* StoryMap extension available	45 minutes	274
Understand	Investigate composting opportunities in your community.	• Paper • Pens or pencils	* StoryMap extension available	40 minutes	275
Act	Plan ways you could help your community do more recycling or composting.	• Paper • Pens or pencils	*Part 6 Organizer* (Task 1)	30 minutes	280
Task 5: How can we improve transportation in our community?					
Discover	Consider the ecological footprint of your community and how it could be more sustainable.	• Paper • Pens or pencils • Computer (optional)	*Part 6 Organizer* (Task 1) *Thriving Community Goals* (Part 1, Task 3) * StoryMap extension available	25 minutes	283

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Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Understand	Decide on individual actions you will take to make your resource use and waste more sustainable.		*Part 6 Organizer* (Task 1)	15 minutes	287
Act	Put your idea for individual change into action and reflect on it.			10 minutes + action time	287

* StoryMap extension found at https://bit.ly/2YdHNqB

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6 Part 6: How can we use resources wisely to help our community thrive?

People use **resources** to meet our needs. Most people use many different resources in many different ways. For example, we need resources to make the roads we travel on, the homes we live in, the food we eat, and the clothes we wear. The resources we use originally come from natural materials found on Earth. Sometimes these natural materials are found in the ground, like metals or petroleum (oil). Sometimes these materials grow on or in the ground or ocean, such as plants or animals.

Often, we use resources only once and then they become **waste**. Waste are materials that we throw away or get rid of. There are other possibilities for resource use, however. In this part, you will learn about ways to use fewer resources and create less waste. Right now, people on Earth use more resources than the Earth can renew. But by making wise choices about resource use and waste, our **community** and our world can become more **sustainable**.

Remember: *In this guide you and your team are in charge. You can always change the instructions in the steps to make them work better for you and your team.*

Your Research Mentor

Sharing your experiences with others and learning from others' experiences is part of being a good **action researcher**. In Part 6, you will have a research **mentor** to help you understand some issues of resource use and waste in your community and how to research those ideas. A mentor is someone who has experience and can help guide you.

Meet Steve Nelson, Your Part 6 Research Mentor



Meet Steve Nelson. Steve (pronounced *Steev*) is the zone manager for the Smithsonian's National Zoo and Conservation Biology Institute. Steve is in charge of the buildings and outdoor spaces. He also leads the Recycling Task Force for the Smithsonian. You, your team, and Steve are all part of the many researchers around the world trying to find ways to make the

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spaces around them more sustainable. Steve will be your research mentor to help you understand the use and waste of resources in your community.

Steve has degrees in mechanical technologies, production management, emergency management, technology administration, and homeland security. However, he also has knowledge and **perspectives** that come from other parts of his **identity**. Since Steve is now working with you, it is important to understand who he is. To help you, Steve filled out an identity map, just like you did in Part 1. Steve's identity map includes the following things.

- 55+ years young, male
- 34 years in the military, retired, and a former law enforcement officer
- Spent many years running the environmental program on base
- Born in the United States in Kansas, migrated to West Virginia, now working at the National Zoological Park in Washington, DC, and Front Royal, Virginia
- Grew up working on Grandpa and Uncle Jim's dairy farm . . . still get up hours before the sun rises!
- Interested in the environment, mechanical systems (to take apart and put back together), science, biology, and people (specifically their actions and reasoning driving those actions)
- Actively involved in **composting** and diverting waste away from the **landfills** and oceans
- My favorite hobby is not only a hobby—it is my work!
- Enjoy learning new things and taking on new challenges to better people's lives, improve animal welfare, and help improve the environment
- Quiet, curious about everything, and only engineers seem to understand my sense of humor
- Husband, father, grandfather, brother, and loyal companion to puppy Tuck (gray beard, so not much of a puppy anymore!)

Before you begin the rest of Part 4, think quietly to yourself about Steve's identity map.

- Are there things you have in common with Steve?
- Are there ways you are different from Steve?

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- Can you see anything about Steve's identity that would help him understand different perspectives on how to help a community **thrive**?

Throughout Part 6 you will notice Steve sharing ideas and experiences with you. He may help you understand better ways to conduct investigations, or he may share some of the work he has done.

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Task 1: What resources do I use and how renewable are they?

All living things use resources. Resources are the materials we use to meet our needs. From the air you breathe, to the food you eat, to the house you live in, you are using resources. In this task you will ***discover*** more about the resources you use. Then you will **investigate** to ***understand*** where energy resources you use come from. Finally, you will ***act*** on this information to consider ways to make your energy use more sustainable.



Discover: *What resources do I use daily?*

Everyone uses resources to meet their needs. Some of the resources you use are **renewable**, meaning they can easily be replenished. For example, the oxygen in the air you breathe is a renewable resource. It is part of a quick natural cycle that involves plants and animals, such as humans. Plants produce oxygen through **photosynthesis** and release it into the air. Humans get oxygen from the air they breathe in. Other resources you use may be **non-renewable**, meaning it would be impossible or take a long time to replenish them. For example, many things dug out of the ground, like **fossil fuels**, rocks, and minerals, would take millions of years and very specific conditions to form again.

1. **Observe** yourself and your actions for an hour or two. Write down, draw, or find another way to make a list of all the things you notice that you are using. For example:
    a. Are you inside a building? Add the building to your list.
    b. Are you using furniture? Add the furniture to your list.
    c. What is your body using? Add the air you are breathing and anything you drink or eat.
    d. Are you using power for anything that needs electricity or has a battery, such as lights, a phone, or a computer? Add those items to your list.
    e. What are you wearing? Add those items to your list.
    f. Are you using anything to move around, like a car or bicycle? Add that to your list.
    g. What other items are you using? Add those items to your list.

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2. Examine your list. Pick one item and list the materials you know are in it. Use Figure 6.1 as an example of a list. The item chosen on that list is a chocolate ice cream pop on a stick that had a wrapper. The materials include chocolate, cream, and sugar for the ice cream, then wood for the stick, and **plastic** for the wrapper. You also might be able to use the label to find out more details about what is in different items.

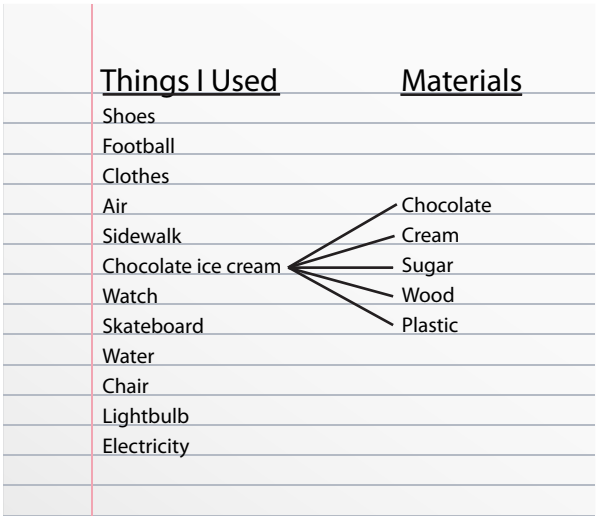

Figure 6.1: Sample list of things used and the materials the ice cream pop is made from

3. Next list where the materials come from, if you know. For example, milk may have come from a cow. Sugar and chocolate come from plants. Wood comes from trees. Plastic is made from petroleum, sometimes called oil.
4. Trace the materials that compose each item as far back as possible. What was needed to produce those materials? For example, if the milk came from a cow, a cow needs water and plants to live. The plants it eats also need water to live.
5. If you know that it took energy to make something, show that as well. For example, with your chocolate ice cream, something cold was needed to freeze the ice cream and keep it cold. This needed energy to make ice or keep a freezer cold. A machine that uses energy may have been needed to mix up the ice cream, too. Figure 6.2 shows an example of a list with one completed item. The blue ovals in the figure show the places energy is needed to make the materials. For example, making sugar out of plants takes energy. Using that sugar to make ice cream also takes energy.

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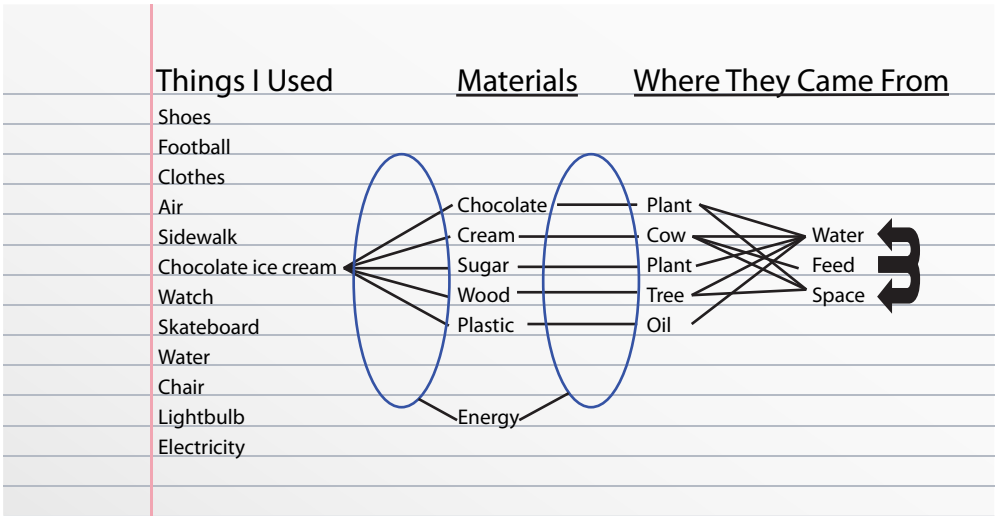

Figure 6.2: A sample list of things used, the materials in the ice cream pop, and where they come from

6. Go through this process again to find all the resources used to make several other items on your list. For example, in Figure 6.2 the resources needed to make the chocolate ice cream would be water, feed, space, plants, cow, tree, oil, chocolate, cream, sugar, wood, plastic, and energy.
7. Compare the resources you found with your other teammates. Discuss:
    a. Are there some resources that were needed to make many of the things we use? For example, maybe a lot of things needed water to grow or be made?
    b. Which of the resources are renewable? Which are non-renewable? Just answer what you know. For example, you may know that plants and water are renewable resources. You may know that oil is not a renewable resource. But maybe you are not sure about energy. Whether energy is renewable or not depends on how the energy is made. You will have a chance to investigate that further in the next activity.
    c. Why do you think some people believe humans should try to use only renewable resources? Do you agree with them?
    d. What would make it easier to use only renewable resources?
    e. Are there some situations where non-renewable resources really should be used?

8. With your team, create a list of resources you use often. For example, the list might include energy, water, oil, wood, and other materials. If several people on the team are using a resource or one person is using it many times, include it in the list.



Understand: *How renewable is the energy I use?*

The energy used in homes, businesses, and transportation can come from different sources. These energy sources can be renewable, like harnessing the energy of the sun, wind, and water, or the heat of the Earth. Or they can be non-renewable, like burning fossil fuels to generate electricity. Electric energy can be generated in one location and then sent through wires to other locations. Often energy is generated for whole communities at a place called a **power plant**. Electric energy can also be generated at the place where it is used. Do you know where your electricity comes from?

1. As a team or by yourself, go outside, move around nearby, and observe. Do you notice anything related to generating energy or moving it from one place to another?
   a. For example, you may notice wires on poles going to many different buildings. Or maybe you notice solar panels on a roof or a wind **turbine** in a field.
   b. Record any **observations** you make.
2. Read *Energy Source Investigation Instructions* and plan your investigation.

Energy Source Investigation Instructions

Electric energy is often supplied by companies, which are sometimes run by local or national governments and sometimes by **private** companies. The energy **system**, including central power plants and electricity supplied to many locations, is sometimes called the **grid**.

a. Choose one building that is using electricity from the grid to investigate further. Perhaps your school or your home. If there are no buildings using grid energy in your community, you can choose to investigate a building that uses grid energy in another community.

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b. Investigate which company provides electricity to the building. If you have trouble finding out, remember that energy companies bill their customers. Ask the adults in charge of the building who charges them to use electricity.
c. Consider how you can find out more about how that company generates its power. You might be able to find this information:

- Online: Check for websites run by the company, the government, local environmental organizations, or other energy experts.
- In print: The company may publish a yearly statement, report, or other documents. You may be able to ask them to send you a copy.
- By interviewing an expert: Someone from the company or an expert on energy generation may be willing to talk with you about how the company generates its energy.

d. When you have found out how the company produces energy, try to consider any problems created by generating electricity this way, such as:

- Any problems related to getting the resources. For example, if the resource is in the Earth, it may need to be taken out by being mined or quarried. This can damage the surrounding environment.
- Any waste produced when the energy is produced. For example, if coal is burned to generate electricity, it leaves behind coal ash. A company burning coal needs to find a way to reuse or safely store this ash.
- Any **emissions** produced by generating the power. For example, burning fossil fuels releases carbon dioxide and other **greenhouse gases** into the air.
- Any dangerous situations caused by generating the electricity. For example, when nuclear materials are used to generate electricity, they leave behind waste that can be dangerous.
- Any other environmental problems caused by generating electricity. For example, dams built on rivers can capture the energy of the water and generate hydroelectricity. But damming a river might create problems for the animals living in the river and the people living around it.

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3. Carry out your investigation and discuss the results with your team.
    a. Is the grid electricity used in your community from renewable sources?
    b. Are there problems that you found with the grid electricity in your community?
4. With your team, consider the **impact** of the way the grid power is generated. How does it affect the local and global community? Consider the four perspectives.
    a. **Social** perspective, for example does pollution from the plant affect people's health?
    b. **Economic** perspective, for example is the power **affordable** enough that it is not creating a problem for individuals and businesses?
    c. **Environmental** perspective, for example are greenhouse gas emissions from generating electricity contributing to **climate change**?
    d. **Ethical** perspective, for example is the way electricity is being generated hurting one group of people in your community more than others? Is it hurting future generations?



Act: *How can my community use its resources more wisely?*

A thriving community needs to use resources to meets people's needs. But that resource use needs to be sustainable. Moving toward renewable resources can be an important step.

1. Work with your team. Title a sheet of paper or a digital document *Part 6 Organizer.* Make three columns, just like you did for your *Part 2 Organizer*. Write the words "Know," "Think," and "Wonder" at the top of the columns.
2. Use the *Know* column to list everything you found out about energy and resources in your community. You investigated the resources you use and how people in your community get their energy. Record:
    a. What resources does your team use a lot?
    b. Where does the grid electricity used in your community come from?
    c. How is that electricity generated?
3. Next you will think about what that information means. Record these ideas in the *Think* column. As a team, discuss:

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a. Remember the resources you listed in the Discover activity. Are the resources your team uses often renewable or non-renewable?
b. What are the impacts you found from a social, economic, environmental, and ethical perspective?
c. What are the problems with energy generation in your community?

5. Use the *Wonder* column to list any other questions you have about resources and energy.
6. Discuss with your team, are there ways to change the sources of the energy you use to be cleaner and more renewable? Often people try to do this by either:
   a. Encouraging the energy company to switch to more renewable energy sources.
   b. Using renewable energy sources themselves at their homes or businesses.
7. The renewable source of energy that is best for your community may depend on the location and climate of your community. Read *Renewable Energy Options*. Which options do you think would be the best fit for your community?

Renewable Energy Options

Renewable energy can take many forms, but they all use natural and renewable resources to generate electric energy.

Water

The movement of water can be used to generate electricity. Along a river, some of the water can be rerouted to the side of the river. This moving water can spin a device called a turbine. Water flowing out of dams can also spin turbines. In the ocean, the movement of the tides can spin turbines, as shown in Figure 6.3. The spinning motion of turbines is one part of a system that generates electricity.



Figure 6.3: Tidal turbine

Air

Wind can be used to make turbines spin and generate electricity. Wind turbines are more common in places that are often windy, like on top of rounded hills, on open plains, or near coasts. A group of wind turbines are shown in Figure 6.4.



Figure 6.4: Wind turbines

Biomass

Biomass includes wood and other plant materials. Humans have burned biomass for heat and cooking for thousands of years. It can also be burned to generate electricity. Waste from homes, businesses, or farming is also used. Biomass is

renewable if the materials are replenished, like by planting new trees. However, burning biomass releases carbon dioxide and air **pollution.**

Land

The Earth is hotter underneath the surface. **Geothermal energy** uses Earth's natural heat to generate electricity. The heat can be used to make steam to turn a turbine. Sometimes this heat is close to the surface, like in places with volcanic activity. This can make it easier to use. Sometimes people use the heat below the Earth's surface to directly heat and cool their homes, although this does not generate electricity.

Sun

The energy of sunlight can be used to generate electricity in a couple of ways. Solar panels in calculators, on roofs, and in some large installations on the ground use chemical reactions within the panels to convert **solar energy** into energy we can use. In other large solar installations, mirrors direct solar energy to a central area to heat water and make steam, which turns a turbine and generates electricity.

8. Consider the options in the *Renewable Energy Options* box. Then think about the climate and location of your community. Record your ideas in the *Think* column.
    a. Which renewable energy options do you think would be the best fit for your community?
    b. Have you noticed individuals and businesses in your community using these types of renewable energy? If not, why do you think that is?
    c. Are there actions you could take that would help make more of the energy used in your community come from renewable sources?
9. Take out your *Thriving Community Goals*. Your *Thriving Community Goals* show you how your team wants your community to be. Consider:
    a. Are there goals listed that will need a renewable source of energy?
    b. Are there goals listed that are related to using renewable resources instead of non-renewable resources?
10. Record any ideas or problems you notice related to your *Thriving Community Goals* in the *Think* column.

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Task 2: What waste does my community produce?

In Task 1 you learned about the resources you use, including energy. In this Task you will consider the waste produced after using resources. You will first ***discover*** more about the waste produced in your community and what happens to it. Then you will investigate to ***understand*** how much plastic waste you produce. Finally, you will ***act*** on this information by figuring out actions you can take to reduce this waste.



Discover: *What are the effects of waste in my local and global community?*

Sometimes we are so used to producing waste, we may not even realize we are doing it. Until we are aware of the waste we produce and what happens to it, it can be difficult to notice what could change.

1. By yourself, examine the list of things you use from Task 1. Next to each item, write down or mark what waste is produced after you use it. These are the things you would get rid of after using the item.
    a. For example, if you are thinking about the ice cream from Task 1, you probably would list the plastic wrapper and the wooden stick as waste.
    b. Sometimes, the item itself becomes waste. For example, if you listed a chair in Task 1 and you would plan to throw the chair away if it broke, then record that information.
2. Next record how often you produce the waste you just wrote down. For example, if you have an ice cream once a week, then you produce that waste once a week. If you think you will throw away and replace your chair every five years, write that down.
3. With your team, read Steve's ideas about waste and discuss:
    a. What are the things you are using that make a lot of waste?
    b. What changes can you think of that would change the amount of waste you produce?
    c. What would happen if you refused to buy things that would be wasted? What if your whole community or whole country refused?

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Steve Says . . .



Your first goal on anything is waste reduction. If you don't buy something, then you don't have to worry about **recycling** or anything else. It is a huge deal if you don't buy it in the first place. For example, with packaging, you have choices. You can choose between a brand that uses very minimal packaging or one that's got the big fancy stuff to make it marketable. If you choose the one with minimal packaging, you are helping to save the environment because you're not buying waste.

4. As a team, consider what happens to waste in your community. Write or draw your ideas to help you remember everything you know.
5. Does your waste:
    a. Stay in the place where you live, for example, get buried or burned just outside your home?
    b. Get moved by someone to another place to get rid of it?
6. With your team, think about what might be done to your waste if it gets moved to another place.
    a. Sometimes waste is gathered in a big pile and eventually is buried. This is called a landfill. Can you think of some problems that might happen if your community uses a landfill?
    b. Sometimes waste is burned. In some cases this can help generate electricity. Can you think of some problems that might happen if your community burns your waste?
    c. Sometimes, waste is dumped in a natural environment like the ocean or a ravine. Can you think of some problems that might happen if waste is dumped in the environment?
7. If you can, find out what happens to waste in your community. You could use the Internet or printed documents to research or ask an expert to help you find out.
8. Read *Take Make Waste*. Discuss with your team:
    a. What are the problems created using a *Take Make Waste* system?
    b. What are other possibilities you can think of for a different type of system?

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Take Make Waste

The Take Make Waste system has resources moving in only one direction.



Take Make Waste

1. Take: Resources come from the land, water, or air. Resources include things like petroleum to make plastic or cotton to make shirts.
2. Make: Resources are made into different items used by people.
3. Waste: The items are discarded as waste.

When new items are needed, the system begins again.



Understand: *How much plastic do I waste?*

One of the major waste problems today is what to do about plastic waste. Plastic is a material that has been mass-produced since the early 1900s. Most plastics are made from petroleum. Many researchers think it will take up to 500 years for some plastics to **decompose**. However, plastics have not been around for that long, so we don't really know how long it will take.

1. Examine Figure 6.5. Answer these questions by yourself or with your team.

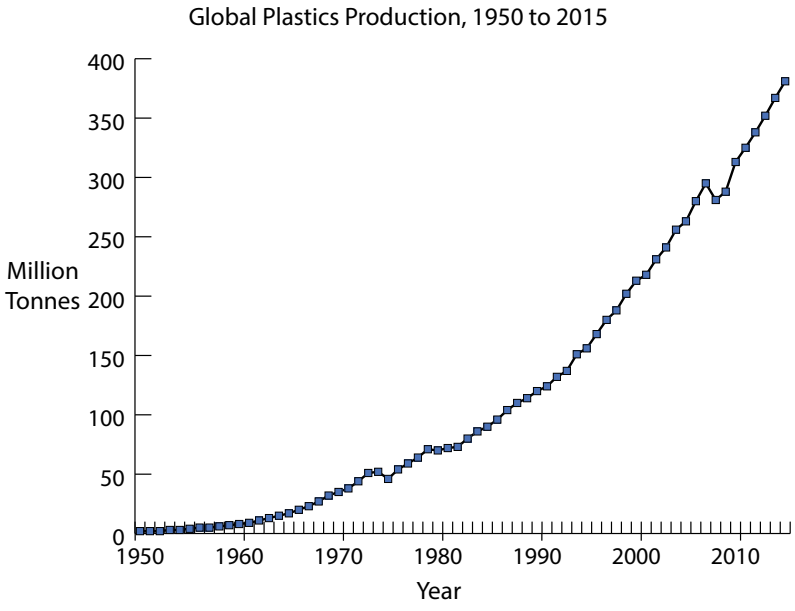

Figure 6.5: Global plastics production[3]

a. What do you notice about the change in plastic use since 1950?
b. What do you think is causing this change?
c. What do you wonder about the effects this change will have on the world and the living things on it?

2. Think quietly to yourself: How much plastic do you think you use?
3. Read *Plastic Waste Investigation Instructions*.

Plastic Waste Investigation Instructions

You and your team will be investigating how much plastic waste you produce and where it comes from. Follow the steps to do this investigation.

Search

a. Move around your home or school and search for as many items containing plastic as you can find.
b. Notice plastics in different rooms and used for different purposes. We use plastic for many things other than containers. How many can you find?
c. Come back together with your team and compare answers. Did anyone else find plastic materials you had not thought about?

Collect

a. Pick a period, such as a week, to collect the plastic you use and throw away.
b. Decide whether you will collect just the plastic you use or also the plastic everyone in your household uses.
c. Find a place to store the plastic or find another way to keep a record of the plastic you throw away, such as by creating a list or taking pictures.

Calculate

a. Count the number of pieces of plastic waste you threw away.
b. Depending on how long you collected plastic, multiply that number to figure out how much plastic you use a year. For example, if you collected plastic for one day, multiply the amount of plastic you use in a day by 365 days in a year.

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If you collected plastic for one week, multiply the amount of plastic you used in a week by the 52 weeks in a year. Record your answer.

c. Imagine yourself at age 70. How much plastic waste will you have made by then, if you continue making the same amount? To find out, figure out how many years between your current age and age 70. Then multiply this number by the number of pieces of plastic you use a year.

4. Discuss your results with your team.
    a. Were you surprised by your plastic waste production?
    b. Are you concerned about how the plastics you are using will affect the Earth?
    c. Out of the plastics you collected, were there some that could be replaced by reusable items, such as cloth bags?



Act: *How could we reduce our waste?*

Reducing waste can be a big part of a more sustainable community. It can reduce the number of resources you use. It can also reduce the waste that is buried, burned, or polluting the environment.

1. Take out your *Part 6 Organizer*. Use the *Know* column to record the information you found out about waste in your community. Record:
    a. Are there some items you throw away that you have only used a short amount of time?
    b. Are there some items you use that make a lot of waste?
    c. Where does the waste from your community go?
    d. How much plastic waste are you making every year?
2. Next you will think about what that information means. Record these ideas in the *Think* column. As a team, discuss:
    a. Do you think there are problems with the amount of waste you and your community produce?
    b. Why do you think you and others in your community decide to throw things away?

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c. Do you think there are things that could be changed to reduce the amount of plastic waste from you and others in your community?

3. Use the *Wonder* column to list any other questions you have about waste and plastic.
4. Examine the list of waste you made and the results of your plastic waste investigation. Write or draw your ideas about:
   a. What changes could you make to reduce the amount of waste you produce?
   b. What would be the easiest thing to do?
   c. What would you need to do to put that idea into action? For example, if water is safe to drink in your community you might start using a reusable water bottle instead of one that can only be used once—a single-use plastic bottle. To do that, you would need a reusable water bottle.
5. Share your plan to reduce your waste with your team or with a partner. After one week, come back and tell them how you are doing with your action. Remember, do not be discouraged; it can be difficult to break habits. Partners and teams should support one another to put their waste reduction ideas into action.

Steve Says . . .



Manufacturers will continue to create single-use plastics as long as there is a market for single-use plastics. You can influence what the manufacturer does if you stop buying single-use plastics and choose a different type of container. It puts a lot of pressure on the company to do something different. I think the biggest message is that one person can make a difference. One person cannot change everything, but one person can change what they do. If that one person becomes a million people, they are going to make a big change. Collectively, you have power. You are the ones that are making the purchases. Your choices help decide whether that manufacturer is making that single-use plastic. Choose something that does not use single-use plastics, but it has the same function. It's all about our choices.

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Task 3: How can my community reuse instead of waste?

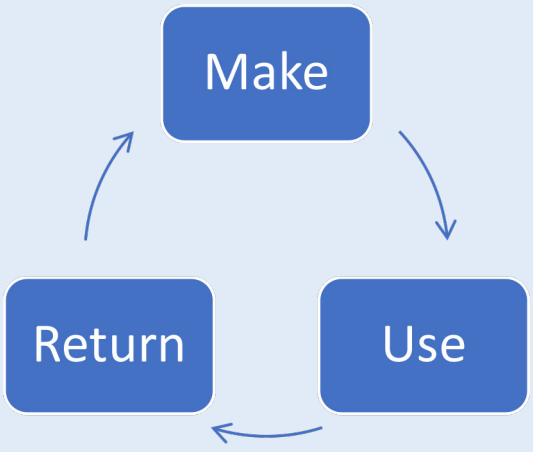
Sometimes when you are finished using a thing for one purpose, it can be used for another purpose. In this task, you will ***discover*** ways in which your community may already be repurposing things. Then you will ***investigate*** to ***understand*** new opportunities to repurpose items. Finally, you will ***act*** on your ideas by creating a repurposed item of your own.

Discover: *How does my home, school, and community reuse and repurpose instead of waste?*

Have you ever used something, like clothing, a bicycle, furniture, a book, or another item, that was originally used by someone else? This is called **reusing**. Have you ever reused a thing for a reason other than its original purpose? This is called **repurposing**. Maybe you used a plastic food container to grow seeds. Or maybe you changed a shirt into a pillow. Reusing and repurposing things is an important strategy when trying to reduce resource use and waste. When we reuse existing items, it uses less energy and fewer materials than it takes to produce new items. We also prevent the things we are reusing from creating waste.

1. Read *Searching for the Circular Economy Investigation*.

Searching for the Circular Economy Investigation



Keeping items in use creates a cycle called the **circular economy**. The circular economy does not move in only one way, like the Take Make Waste system.

Returning items to the system may include reusing, repurposing, repairing, or recycling. In this investigation you will be searching for items that have been reused, repurposed, or repaired. You will learn more about recycling in Task 4.

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Location

You can search for evidence of reused, repurposed, and repaired items anywhere.

a. If you are working by yourself, it may be easiest to search at your home.
b. If you are working with your team, it may be easiest to search at school.

Where to Search

a. If you are in a home, make sure to examine the bathrooms, any place where cleaning supplies are kept, the kitchen, and any place where things are grown or created.
b. If you are at a school, make sure to examine art or other creativity supplies, outdoor areas, and classrooms.

Observe

Move around your location, paying close attention to items that are being reused, repurposed, or repaired. You can also search for items that could be reused, repurposed, or repaired.

Reuse

Some groups or businesses help reuse things that might have been thrown away by matching them with new owners. Used clothing, cars, bikes, toys, and other items are often sold or donated to new owners. Do you notice any items that may have originally been used by a different owner?

Repurpose

Some items may have had a different use or appearance originally but were changed and used some more, maybe in a different way. For example, maybe furniture was repainted to match the room, rather than thrown away. Maybe a hat is now being used as a lampshade. Do you notice any items that originally had another purpose?

Repair

When items break, it is a choice whether to get rid of them or repair them. Repairing items is one way to reduce waste. Do you notice any items that might have been repaired?

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2. By yourself or with your team, go on a search for things that have been reused, repurposed, or repaired. Draw, write, or make another record to help you remember the items you found.
3. When you have finished your search, come back together with your team. Share all the information you found. Discuss with your team:
    a. Were you surprised by any of the items you noticed being reused, repurposed, or repaired?
    b. When items were reused from another owner, were there groups or businesses that helped connect the old owner to the new owner?
    c. Are there any ways that you noticed items being repurposed, reused, or repaired that could be used in other locations? For example, maybe you noticed at home that torn T-shirts were being used as cleaning rags. You could share this idea with your teammates for them to use at home.
    d. What makes someone repair an item rather than throw it away and buy a new one?

Understand: *How can things be repurposed?*

Reusing and repurposing things is an important way we can reduce our waste and resource use. Often there are opportunities to repurpose items that we have not yet thought of because we haven't paid close attention. In this activity, you will have the chance to pay close attention to new possibilities for repurposing things.

1. Read Steve's story about starting the Banners to Bags program. What can you learn from this story?

Steve Says . . .



Consider everything that's being wasted now with an open mind. At the Smithsonian we've got these huge display banners in the museums. They are up for a while and then the exhibit changes. They take the banners down and put up new ones. In

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the past those banners went to the landfill. Now we turn them into tote bags, like the ones in Figure 6.6.



Figure 6.6: Tote bags made out of Smithsonian display banners

By doing that, we've just removed all the banner waste from the landfill. We've also taken a bunch of single-use plastic bags out of the waste stream, because now people can reuse this tote bag instead. We need to start thinking beyond what we are doing right now. We need to consider what is possible.

2. By yourself or with your team, observe what is being thrown away at your house, at your school, or another location.
    a. You may have noticed that one of the ways the Smithsonian Institution thought of the Banners to Bags program was by considering what they threw away. You can do the same thing.
    b. Record the waste you are creating. This is a list of materials that you have available.
3. Notice items you currently have to buy. What is being bought new that could be replaced by materials you already have?
    a. Pay attention to things you, your household, your school, or another location are buying.

b. Record these items. This is a list of needs that are currently being filled by buying new things.

4. By yourself, with a partner, or with your team, examine the two lists together. Is there anything you notice that would allow you to fill the needs you have by repurposing materials that are currently going to waste?
5. Examine Figure 6.7 to help inspire you. How can you creatively repurpose something that is usually wasted?



Figure 6.7: Repurposed items, including a pallet bench, drink carton toys, boot planters, and a jeans bag

6. Create your repurposed item.

Act: *How can I contribute to a circular economy?*

Shifting from a Take Make Waste system to a circular economy needs the support of many people. Now you can consider your role in making this shift.

1. Take out your *Part 6 Organizer*. Use the *Know* column to record the information you found out about reusing, repurposing, and repairing items in your community. Record:
   a. What examples did you find of items being reused, repurposed, or repaired when you searched?
   b. What are the types of things that are being thrown away?
   c. What are the types of things people are buying?

2. Next you will think about what that information means. Record these ideas in the *Think* column. As a team, discuss:
    a. Where are the opportunities you noticed to reuse, repurpose, or repair items?
    b. Are there things being thrown away that someone else might be able to use, like clothing, school supplies, or toys?
    c. Why are people not already doing these things? For example, is it because they have not thought of reusing? Or they do not understand why reusing items is important? Or is it because there is no group to coordinate reusing items?
    d. Why do people throw items away instead of repairing them?
    e. What do you think you could do to help others in your community start to consider reusing, repurposing, and repairing?
3. Use the *Wonder* column to list any other questions you have about reusing, repurposing, and repairing things.
4. Take the item you repurposed and consider how you can share the story of it with others. For example:
    a. Can you tell your friends or family about your repurposed item?
    b. Could you display it at your school with information about it?
    c. Could you, or an adult, post a picture to a social media site telling others about it?
5. Put your ideas into action.

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Task 4: How can my community recycle waste?

Reducing what we use is one important strategy to reduce the waste we produce. Another important strategy is to reuse items we already have in different ways. If that is not possible, then we should try to recycle items as much as possible. Recycling allows the materials that things are made out of to be reused for other purposes. It is an important part of the circular economy. Taking materials out of the Earth requires energy and uses up materials. Recycling can reduce the amount of new material taken from the Earth and the energy needed to make things. It can also reduce the waste we make. In this task you will ***discover*** opportunities to recycle things in your own community. You will ***understand*** how recycling natural materials through composting can help reduce waste. Then you will ***act*** to share these ideas with others.



Discover: *What are the opportunities to recycle things in my community?*

Recycling keeps materials in the circular economy. Certain materials are easier to recycle than others, though. For example, metal, glass, and paper can be recycled again and again—almost forever. However, plastic is more complicated. Different types of plastic must be recycled separately. As plastic is recycled, the quality gets worse. After a little while, new materials must be added.

Some places only recycle certain types of materials. Each community has different recycling rules and options. Do you and others know how to recycle in your community?

1. With your team, discuss the options you know about for recycling items in your community. Consider:
    a. If waste is collected from your home, is there a possibility to separate different types of waste, like paper, metal, garden waste, and general recycling?
    b. Are there places in your community you can go to drop off recycling, such as glass or plastic bag collection sites?
    c. Some items must be treated carefully because they could harm the environment. Items such as computers, phones, batteries, paint, and fluorescent lightbulbs all can be hazardous if they are thrown away improperly. Is there a place in your community to recycle or dispose of these items safely?

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d. Sometimes people or businesses in the community gather items for recycling and sell them. Does your community have any people or businesses doing that?

2. With your team, discuss if there are rules for recycling in your community. For example, if plastics are being recycled, are there only some types of plastic that can be accepted? Record what you know.
3. With your team, write down questions you still have about recycling options and rules in your community.
4. Make a plan and investigate further with your team. How could you learn more about recycling in your community? For example, you could:
   a. Use a local government website or online search to find out more.
   b. Search for signs, posters, or flyers with information about recycling.
   c. Ask people who might know, like adults in your community or people who work with waste in your community.
   d. Use your own ideas.
5. With your team or by yourself, examine the list of things you use that you made in Task 1.
   a. Which items on your list could be recycled in your community?
   b. Are there some items that you could take apart, like a skateboard, and then recycle some parts of them?
   c. Do you normally recycle the items on the list that can be recycled?
6. Have each team member interview one person in your community to find out what they know about recycling. You could interview a friend, a younger student, a family member, a neighbor, or someone else. Ask the person questions and record their answers.
   a. Do they know the options for recycling in your community?
   b. Do they understand the rules for recycling in your community?



Understand: *How can I recycle natural waste?*

Many materials need to be recycled by professionals. However, natural materials from plants can be composted by anyone. Composting is a way of recycling plant material to add back into soil; compost can be used to help other plants grow.

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1. Examine Figure 6.8 closely. Write or draw your answer to these questions.
    a. What do you notice about the picture?
    b. What do you think is happening in the picture?



Figure 6.8: Rotting log

2. Now discuss with your team:
    a. How does this picture relate to composting?
    b. How do you think composting works? Write or draw your ideas. Don't worry if you are not sure. You can keep adding ideas as you go.
3. Read *Composting Instructions*. What would you need to do to compost in your home, school, or other place in your community? Take notes to remember your ideas.

Composting Instructions

In natural systems, living things break down and turn into soil after they die. This is called **decomposition**. Composting is when people deliberately encourage decomposition. This reduces waste going to landfills and creates a material that can help plants grow. Food and other natural materials decomposing in landfills often produce **methane**. Methane is a greenhouse gas that contributes to climate change. Composting and keeping food waste out of landfills helps limit the production of methane and helps slow climate change.

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People have been composting their waste for thousands of years. Anyone can compost. All that is needed is space, plant materials, decomposers, water, air, warmth, and time.

Space

Find a place for the compost. Compost can take up a lot of space or just a little. It can be done in a box or a heap on the ground if you have a lot of space. It works best if you have a 1-meter (3-feet)-by-1-meter (3-feet) space if you are composting on the ground. Composting can also work if you dig a hole, fill it partway with plant materials, and then cover it up. You can compost in a small bucket or other container if you only have a little space or no access to land.



Figure 6.9: Examples of composting locations

Plant Materials

Compost is formed by breaking down plant materials. These materials can be divided into browns and greens. You need to add about equal amounts.

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Browns include things like small twigs, dried leaves, straw, paper, newspaper, and cardboard.



Figure 6.10: Examples of brown materials for composting

Greens include green plants, grass clippings, coffee grounds, tea leaves, and vegetable and fruit scraps. You should not put meat, dairy, or bones in your compost if you are doing it at home.



Figure 6.11: Examples of green materials for composting

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Decomposers

Most compost is decomposed by microscopic decomposers like bacteria and fungi. These living things are found in the environment around the compost; they do not need to be added. If the decomposers have enough moisture, air, and plant materials to decompose, they will do their job. Other living things, like worms and centipedes, can also help to decompose the compost.

Water

Often the moisture in the greens provides enough water for your compost, but you need to be sure. If your compost is slightly moist, that is good. If it is too dry, add some water. If it is too wet, try adding some additional brown materials.

Air

Many of the compost decomposers need air to be able to do their job. When you choose where to compost, you will need to figure out how to make sure your compost gets air. For example, you usually need to turn the compost to add air to the material in the middle. If you are composting on the ground, you can use a shovel or other tool to turn the compost. Some composters are designed to spin. If you are composting in a bucket, you may be able to turn the bucket on its side and roll it to add air. If you are using a closed container to compost, you will need to add air holes.



Figure 6.12: Compost tumbler designed to spin to add air to compost

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Warmth

Compost works best when it is hot but not too hot. The decomposers will release heat as they start to work. If it is cold outside, you may want to leave your compost in a sunny spot to help heat it. If it is hot outside, you may want to leave it in the shade.

Time

Making compost can take from a few weeks to a few years. Warm, moist compost that is turned often and has small pieces of plant material in it decomposes the fastest.

4. Move around an area of your community. You could choose your home, your school, a local garden, or other location.
    a. Do you notice anything decomposing?
    b. Do you notice any composting?
    c. Do you notice any plant materials being thrown away that could be composted instead?
    d. Are there spaces that might work for composting?
5. Come back together and share what you noticed with your team.
6. Discuss with your team about how you could encourage composting. Consider:
    a. Where did you notice composting materials going to waste?
    b. What are some of the things people think are difficult about composting?
    c. What would you need to do to start your own compost at home, school, or another location?
    d. Does your local government or another group collect compost materials?
    e. How could you encourage others to compost?



Act: *How can we encourage recycling and composting in our community?*

Where are the best opportunities to make a difference with recycling in your community?

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1. Take out your *Part 6 Organizer*. Use the *Know* column to record the information you found out about recycling in your community. Record:
    a. What are the possibilities to recycle waste in your community?
    b. Do people in your community understand how to recycle?
    c. Do people in your community understand how to compost?
2. Next you will think about what that information means. Record these ideas in the *Think* column. As a team, discuss:
    a. What do you think stops people from recycling?
    b. Are there recycling options that you wish were available in your community?
    c. What do you think stops people from composting?
    d. What could you do as a team to encourage composting or recycling?
3. Use the *Wonder* column to list any other questions you have about recycling and composting.
4. Discuss with your team whether you are more interested in starting to help your community do more recycling or more composting.
5. If you choose recycling, gather everything you know and have found out about recycling in your community. Discuss with your team:
    a. Do you think everyone in your community understands the information you now know about recycling in your community?
    b. If not, how could you share this information with them?
    c. Make a flyer, poster, play, song, or podcast, talk to family, friends, or another class, do a demonstration, or find another way to share the information you have learned about recycling in your community.
6. If you choose composting, plan for how you could start composting at your school or another location. Think about:
    a. Who do you need permission from?
    b. What would you need to do?
    c. What materials would you need?
    d. Read Steve's idea about starting a composting program. What challenges should you be prepared for?

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Steve Says . . .



The thing people fear the most is the smell. But once the compost starts you don't have the smell of the food. You mix your brown materials in there and you stir it up. You are not going to have a stinky mess. You're going to have compost cooking.

Sometimes people worry about pests. You need to be cautious about putting your compost somewhere where pests can't reach it. Have a container to put stuff that's got a lid. If you are collecting food scraps, it helps to have a location where you can put the container so it can be sealed off until it gets to the compost area.

If you are doing it at a school or at your home, you have to get an adult to support the idea. You can compost yourself or you can often pay someone to come pick up food scraps and they will compost them.

But anybody can do it. You don't have to invest in a composting machine to compost. You can compost in a pile in your backyard. It is a sustainable loop. Instead of putting your food in the landfill, you have compost you can use for gardening, to grow new plants.

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Task 5: How can we improve resource use in our community?

Using fewer resources is an important part of making our local and global communities sustainable. The Earth's natural systems are impressive. They can provide many resources and dispose of a lot of waste. However, today people use more resources than the Earth can provide over the long term. People make more waste than the Earth can process. In this task you will ***discover*** how resource use could be more sustainable in your community. Then you will ***understand*** actions you could take individually to make your own impact more sustainable. Finally, you will ***act*** on these ideas to improve your local and global community.



Discover: *How can resource use make my community sustainable?*

You have investigated how your community generates waste and uses resources. Now you will consider whether those levels are sustainable. You will think about changes in your community that could make resource use and waste more sustainable.

1. Read *Ecological Footprint and Sustainability*.

Ecological Footprint and Sustainability

Remember, when something is sustainable it can keep working for a long time. On Earth, this means the **biocapacity** of Earth needs to be greater than the **ecological footprint** of people.

Biocapacity

The natural systems on Earth can generate resources and help process waste. The amount of resources and waste processing available on the Earth is called biocapacity. In Figure 6.13, biocapacity is measured in global hectares per person. A **hectare** is a certain amount of land. A global hectare is the global average of the resources produced by that amount of land. In 2017, the Earth's biocapacity was 1.6 global hectares per person.

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This means if all the resources available were divided evenly among all the people on Earth, each person would get the resources produced by 1.6 hectares of land.

Ecological Footprint

If you did the activities in Part 5, you learned about **carbon footprint**, the emissions created because of the actions of one person. An ecological footprint is a bigger measure that includes the resources and space used and the emissions and waste created by a person. The ecological footprint is also measured in global hectares. In 2017, each person on Earth used an average of the resources of 2.8 global hectares.

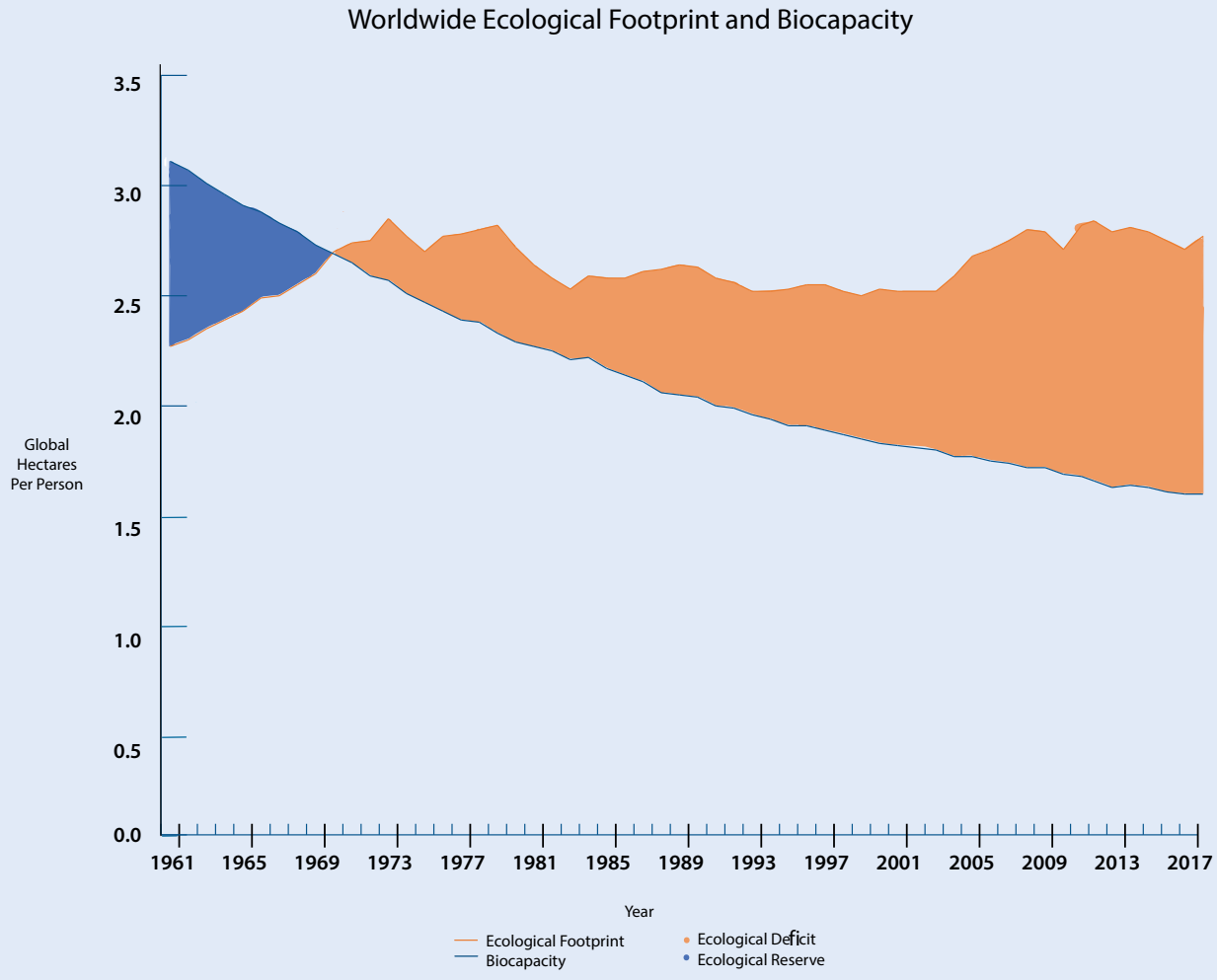

Figure 6.13: Chart of Earth's biocapacity and ecological footprint[4]

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Sustainability

Sustainability requires that people do not use more resources or create more waste than the biocapacity of the Earth can meet. However, since 1970, worldwide the ecological footprint per person has been greater than the biocapacity of the Earth. Examine Figure 6.13.

a. What do you notice about the graph?
b. What are the problems you think the graph shows?
c. What do you wonder about what could happen in the future?

If you want to examine data from your country, you can go to https://data.footprintnetwork.org/#/ to find out the biocapacity and ecological footprint per person in your country. Consider:

a. How does your country compare to other countries?
b. What are the reasons for your country's ecological footprint?
c. How do you feel about the differences between countries?
d. What can be learned from countries that have a small ecological footprint?

2. Take out your *Part 6 Organizer*.
3. Your team has already listed information you found out from your investigations in the *Know* column. Add any additional information you want to remember. For example, if you found out the ecological footprint for people in your country, you may want to record that.
4. You have also recorded some of your thoughts in the *Think* column. Now that you have investigated resource use and waste in different ways, you can think a little more. Consider:
    a. Why do you use the things you do? For example, do you need all the clothes you buy or is it part of your culture to frequently have new clothes?
    b. Do you think you use and waste too many resources?
    c. Do you think others in your community use and waste too many resources?
    d. What do you think are the most important things to change?
    e. What do you think are the most important alternatives to resource use and waste?

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5. Take out your *Thriving Community Goals*. Compare them to the things you *Know* and *Think*. Your *Thriving Community Goals* show you how your team wants your community to be. What you *Know* and *Think* shows you how your community is. When your community is not the way you want it to be, that is a problem.
6. As a team, discuss:
    a. Did you find any information in Part 6 about your community that shows you are not meeting your *Thriving Community Goals*?
    b. If so, did you already list that as a problem?
    c. If you spot new problems, record those now in your Think column.
7. List or draw what your team still wonders about resource use in your community under the *Wonder* column. Consider:
    a. Are there questions listed in the *Wonder* column that you have already answered?
    b. Are there questions you still have about resource use and waste in your community?
    c. If everyone understood what you now know about resource use and waste, do you think anything would change in your community? For example, maybe you wonder if everyone understood how much plastic they use, would they change their behavior and use less?
    d. Are there actions that you think would make resource use more sustainable in your community? For example, maybe you think your school could start a composting program or could help match used items with new owners.
    e. Are there other ideas you would like to remember?
8. Keep the *Part 6 Organizer*. You will need it again.

Steve Says . . .



Cultural change does not happen quickly. It can take years. Persistence is very important. If somebody hears you talking about a thing five times, they are more likely to listen than if they hear you saying something one time. Work you do carries over. Cultural shifts happen when people take what they have learned and move it to new places.

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Understand: *What can I do individually to help?*

In this Part you found out information about using resources wisely. It is important to use the resources available in a sustainable way. You just thought about changes your whole community could make. You will have a chance to put some of these ideas into action in Part 7. However, there are always ways that you could make things in your community better through your own individual actions.

1. Examine your *Part 6 Organizer*.
    a. Are there any problems you saw that you could help to change all on your own?
    b. Are there any ideas you listed under *Wonder* that you might be able to do by yourself?
2. Think to yourself or discuss your ideas with your team. For example, maybe you could:
    a. Investigate and share how you could use renewable energy at your home or school.
    b. Reduce your use of plastic or other materials.
    c. Challenge yourself to repurpose things instead of throwing them away.
    d. Start composting by yourself or with others.
    e. Teach others how to recycle in your community.
    f. Come up with your own ideas.
3. Think quietly to yourself about a change you want to make.
    a. Why do you think this change is important?
    b. How is it connected to problems you noticed in your community?

Act: *How will I put my ideas into action?*

Changing our own behavior is often the first step. Now that you have decided what you will do to improve your community, you can put that idea into action.

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1. Make a plan for how you will put your idea into action. If you need to share information, where, when, and with whom will you share it? If you need to do something, what do you need to do it?
2. If you already completed other actions as part of this guide, what did you learn? Remember to use what you learned before to make this action even better.
3. Put your plan into action.
4. Think quietly to yourself to **reflect** on your action.
    a. What seemed to go well?
    b. What was hard?
    c. Were you able to make the changes you thought you would be able to make?
    d. Will you keep going with your change or are there things you would do differently in the future?

Steve Says . . .



It's the habit. Individually, we will can only make a small difference. But collectively, if each individual is doing their part, we will make a huge difference. Young people can make the most difference, because if they build habits of waste reduction and diversion, those actions can carry over and last for a lifetime. You may start asking questions like, why don't we recycle? Why don't we compost?

Congratulations!

You have finished Part 6.

Find out More!

For additional resources and activities, please visit the *Sustainable Communities!* StoryMap at https://bit.ly/2YdHNqB.

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Glossary

This glossary can help you understand words you may not know. You can add drawings, your own definitions, or anything else that will help. Add other words to the glossary if you would like.

Action researchers: People who use their own knowledge and information they find out from their community to make decisions and take action on important issues

Affordable: Something you are able to pay for

Biocapacity: The amount of resources and waste processing available on the Earth

Biomass: Wood and other plant or organic materials

Carbon footprint: Amount of greenhouse gases emitted because of the actions of a person

Circular economy: A system that keeps items in use by reusing, repurposing, repairing, and recycling

Climate change: Rapid warming of the global climate

Community: A group of people that have a place or other thing in common

Composting: Deliberately encouraging the decomposition of natural materials

Decompose: Break down into smaller parts

Decomposition: Turning living things into soil after they die

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Economic: About money, income, and use of wealth

Ecological footprint: The resources used and waste created by a person

Emission: Something released into the air

Environmental: About the natural world

Ethical: The fairness of something

Fossil fuels: Substances like oil or natural gas that are taken out of the Earth

Geothermal energy: Heat from the Earth that can be used to generate electricity

Greenhouse gases: Gases such as carbon dioxide or methane that cause the atmosphere to get warmer.

Grid: The system that that supplies electricity to many locations in a specific area

Hectare: A specific amount of land

Identity: Characteristics that make up each person or thing

Impact: The effect one thing has on another.

Investigate: Find out more information

Landfill: A place where waste is gathered in a big pile and eventually is buried

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Mentor: Someone who has experience and can help guide you

Methane: A greenhouse gas that contributes to climate change

Non-renewable: Impossible or difficult to replenish

Observation: Recording what you notice without adding your own opinion

Observe: Use your senses to get information about something

Perspective: A specific way of thinking about the world around us

Photosynthesis: Process that plants use to make food, taking in carbon dioxide and releasing oxygen

Plastic: A material that has been mass-produced since the 1900s, most often made out of petroleum

Pollution: Things that do not belong in and can harm an environment

Power plant: A place where energy is generated for many people

Private: Owned by one person, group, or company

Recycling Reusing the materials that things are made out of for other purposes

Reflect: Think carefully about something

Renewable: Easily replenished

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Repurpose: Using an item again for a new purpose

Reuse: Using an item again

Resources: Materials we use to meet our needs

Social: About the interaction of people in a community

Solar energy: Electricity that has been generated by sunlight

Sustainability: An idea that requires that people do not use more resources or create more waste than the biocapacity of the Earth can meet

Sustainable: A balanced, long-term approach to social, environmental, economic, and ethical concerns

System: Something made up of parts that work together

Thrive: When something that is working or growing well

Turbine: A device spun by wind, water, steam, or gas that generates electricity

Waste: Materials that we throw away or get rid of

Other words:

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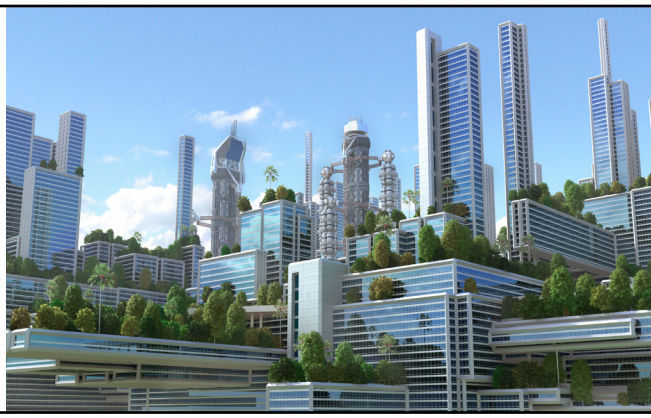
SUSTAINABLE COMMUNITIES!





Part 7:

How will we act to help our community thrive?

SUSTAINABLE DEVELOPMENT GOALS

developed by

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Science Education Center

in collaboration with

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Smithsonian Science Education Center Module Development Staff

Executive Director - Dr. Carol O'Donnell

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PART 7: HOW WILL WE ACT TO HELP OUR COMMUNITY THRIVE?

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Find out More!

For additional resources and activities, please visit the *Sustainable Communities* StoryMap at https://bit.ly/2YdHNqB.

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Planner

Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Task 1: What is the problem we want to take action on in our community?					
Discover	Explore ways in which your community is doing well and ways in which it could be doing better.	• Paper • Pens or pencils	*Part 2, 3, 4, 5, 6 Organizers* (from Task 1 in each Part)	30 minutes	298
Understand	Report on problems in your community and consider the connections between the root causes of these problems.	• Paper • Pens or pencils	*Connected Problems* (Task 1)	25 minutes	300
Act	Come to a team consensus about which community problem you want to take action on.	• Paper • Pens or pencils	*Thriving Community Goals* (Part 1, Task 3)	25 minutes	303
Task 2: How will we try to solve our problem?					
Discover	Imagine different actions you could take to help address your team problem.	• Paper • Pens or pencils		25 minutes	305
Understand	Explore ways your possible actions could be more sustainable.	• Paper • Pens or pencils	*Team Action Plan* (Task 2) *Community Identity Map* (Part 2, Task 1)	20 minutes + investigation time	306
Act	Come to a team consensus on which action you will take.	• Paper • Pens or pencils	*Thriving Community Goals* (Part 1, Task 3)	20 minutes	308
Task 3: How will our team take action in our community?					
Discover	List the steps needed for your action.	• Paper • Pens or pencils	*Community Communica-tion* (Part 2, Task 5)	15 minutes	310
Understand	Organize the action steps.	• Paper • Pens or pencils		20 minutes	311

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Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Act	Create an inclusive team action plan.	• Paper • Pens or pencils	*Team Action Plan* (Task 2)	25 minutes	312
Task 4: Putting our plan into action					
Task 4	Put your plan into action!	• Varies, depends on action plan		Varies, depends on action plan	313
Task 5: What did I learn?					
Task 5	Reflect on your action and your feelings.	• Paper • Pens or pencils	*My Feelings* (Part 1, Task 5) *Team Identity Map* (Part 1, Task 2)	15 minutes	314

* StoryMap extension found at https://bit.ly/2YdHNqB

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7 Part 7. How will we act to help our community thrive?

As **action researchers** you now have a lot of information about your **community**. You discovered what is important to you and your team. You understand the science of **sustainable communities**. You understand the way decisions are made. You understand the values of people in your community. And you understand one or more parts of a Sustainable Community. Now you will put those ideas together. In this part you will decide how your team will act to create a **thriving** community. Then you will put those plans into action.

Remember: *In this guide you and your team are in charge. You can always change the instructions in the steps to make them work better for you and your team.*

Task 1: What is the problem we want to take action on in our community?

In this task you will decide what problem you want to solve. Start with information from the investigations you did and questions you asked. Now you will ***discover*** connections between problems in your community. You will use these connections to help you ***understand*** the causes of problems you identified. Then you will decide what problem you will ***act*** to help solve.



Discover: *What is my community doing well and what could we be doing better?*

Each community has some things that it is doing well and some things it can be doing better. You probably noticed many of these things as you created your *Part Organizer* sheets as you worked through each Part. Now your team will work together to make a list of what your community is doing well and what it can be doing better. Then you will look at connections between the things that could be better in your community. These connections will help your team make a list of problems you could take action on.

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1. Get out all your team's *Part Organizer* sheets for Parts 2, 3, 4, 5, and 6. If you did not do all the Parts, that is okay, you can just use the information you have.
2. As a team, use the information from your *Part Organizer* sheets to make a new list of what your community is doing well and what your community could do better. You can write this list, draw it, or record your voices. You will need this list later, so be sure to record it in a way that works for your team. Look at the information you listed in all three columns, *Know*, *Think*, and *Wonder*. Your new list should have two categories: "Doing Well" and "Need to Do Better."
    a. For example, maybe your team knows that many people in your community take public transportation so the air is not so polluted. Your team would list that under *Doing Well*.
    b. Maybe your team thinks there is a lot of waste from using plastic water bottles, like the ones shown in Figure 7.1. Your team would list that under *Need to Do Better*.



Figure 7.1: Plastic bottle waste

3. Consider the list of things in the *Doing Well* category. These things might be going well because people in your community took action to solve problems. Someday, the action your team takes could be on this list too!
4. Now your team is going to find connections between the things in the *Need to Do Better* category. The things in this category are problems in your community.

Connecting these problems will help you figure out which are most important to solve. Now you will make those connections.

5. First, a team member will share a piece of information from the *Need to Do Better* category. Then a different team member will share another piece of information that connects to the first one and explain how it relates. For example, someone might say:
   a. "I think that problem is connected to this problem because . . ."
   b. "I would put these problems together in one group because . . ."
   c. "I notice this problem happens over and over again in different ways. . . ."
6. You can share ideas in several ways. You could talk out loud or sign to each other. You could pass an object from teammate to teammate to show who is talking. You could roll or pass a string between people to show that ideas are connected. Pick the best way for your team.
7. Show the connections you identified in your *Need to Do Better* category. For example, maybe you noticed a problem about how far some people in your community need to travel to get to green spaces. You also noticed that this same group of people needs to travel a long way to get to public transportation. If you wrote or drew your list, you might want to draw a line between those two problems to show the connection.
8. You now have a list of connected problems you could take action on in your community. You can label this list *Connected Problems*.



Understand: *What are the causes of problems in my community?*

In the activity you and your team made a list of things your community could be doing better. Helping to make things better is your team's important job as action researchers. Before you decide how you will make things better, you need to think about the causes of the problems you found. Listing these causes will help you take action in your community.

1. Move into a circle with the rest of your team. You are going to report on problems in your community. This will help you to start thinking about what is causing these problems.

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2. Choose one team member to record your ideas.
3. Pick one team member to go first.
4. Imagine you are giving a news report to someone who knows nothing about your community. You can imagine using some of the tools shown in Figure 7.2. The first team member will say, "We are reporting from (put the name of your community in here), where there is a problem. The problem is (state your problem here)." Examine your *Connected Problems* list to help you remember the problems you found.



Figure 7.2: Tools used for news reports

5. Then the second person in the circle continues the report: "Some people in the community think this problem is caused by . . ." and says one thing that might be causing the problem. The second person should use information from their investigations and knowledge of their community to figure out what they think the cause is.
6. The third person in the circle can add another cause by saying, "Yes, and other people think this problem is caused by . . ."
7. The team continues going around the circle and reporting on causes of the problem until your team shares all your ideas. You and your team are almost done with your reporting. There is one more important step.
8. Discuss with your team what you think is the **root cause** of the problem you are reporting about. What is a root cause? Like roots that are under a tree, root causes are all the way under each problem. The best news reports help people understand the root cause underneath a problem. For example:

a. Imagine the problem in your community is that people use too much energy.

b. Your team reported that one cause might be people leaving the lights on in their homes, like the picture in Figure 7.3. Another cause might be people running machines or other objects that use up a lot of energy.



Figure 7.3: Using energy by leaving the lights on

c. What could be the root cause? It might be that people in your community don't think it is important to save energy. They may not understand where their energy comes from. They may imagine they will always be able to get more energy.

9. Record the root cause or root causes next to the problem your team is reporting on. How will it help your team to know the root cause? It can help you take action that is **sustainable**. Remember that **sustainable action** lasts for a long time. If the root cause of problems in your community is that people don't think it is important to save energy, you might decide to take action on that cause. You might try to educate people about saving energy. You might try to show them what happens when they waste energy. You might help them understand that not all kinds of energy last forever.
10. When the team has decided the root cause of each problem, move on to doing a news report for the next problem.
11. After you finish with your news reports, discuss whether any of the root causes are the same. For example, maybe you noticed problems related to wasting food,

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energy, and water. Perhaps in all three cases you thought the root cause was a lack of knowledge in the community about why it is important not to waste **resources**.

12. If you notice any root causes that are the same, be sure to record that information. Keep this information, because you will need it in the Act activity.



Act: *What problem will we take action on?*

Now you will decide what problem your team will act on. You will pick a problem that is important to you, your team, and your community.

1. Take out your *Thriving Community Goals*, and your community, team, and individual **identity** maps.
2. Examine the goals and identities and remind yourself of what you and your team value.
3. Now you will use that information to pick a problem you will take action on.
4. Examine your *Connected Problems*. If there are problems you found that had the same root cause, you can examine those together.
5. As a team, discuss what problems would be most important to take action on if you want to reach your *Thriving Community Goals*.
6. Make a mark next to any problems that everyone thinks are important.
7. There are many problems, but some are very hard for young people to change. Think about what problems you think your team would be able to act on and really make a difference,
8. Make a mark next to problems you think your team could help to change.
9. As a team, discuss who you help when you solve each problem. Think about who you would most like to help. For example, you could choose:
    a. Helping the most people
    b. Helping people who have often been left out in the past
    c. Helping people who need the most help
10. Make a mark next to problems that affect the people you chose.

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11. You now have a list of problems with marks next to them. One by one, for each problem, ask the team, "Is this the most important problem to take action on?" You and your teammates can say:
    a. Yes
    b. Maybe (if you are not sure)
    c. No
12. If everyone agrees on the same problem, record the problem. Then you can move on to Task 2.
13. If some people disagree, you need to come to **consensus** as a team. Remember the skills you used to come to consensus in Part 1? You can use those skills again. Here are some ideas. You can choose whatever works best for your team.
    a. List the good things and bad things about taking action on each problem. Discuss as a team.
    b. Try to find the same values. Are there some problems that have the similar root causes? Is there a way to combine those problems?
    c. Build a sense of the group opinion. Each person can mark one problem to solve. This can help you understand which problems are most important to your team. You can discard any problems no one picked.
    d. Find a slow consensus. Find a partner and as a pair find consensus on which problem is most important. Then in a group of two pairs (four team members) you can find consensus. Then in a group of four pairs (eight team members) you find consensus. Keep adding together groups until you have found a team consensus.
    e. Consider your goals. Examine your *Thriving Community Goals*. Do some problems relate to many of the goals? If so, those might be more important to solve.
    f. Consider your **impact**. Think about who benefits. Which group are you most interested in helping?
14. Keep discussing your ideas until you come to consensus about the best problem to try to help solve as a team. Record that problem.

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Task 2: How will we try to solve our problem?

Action researchers and scientists seek problems, try to understand them, and then solve them. You have thought about problems in your community. You have **investigated** to understand these problems. Now you will have a chance to decide how to try to solve the problem you chose in Task 1. You will ***discover*** possible actions. Then you will ***understand*** how different actions might help solve your problem from different **perspectives**. Finally, you will decide how you will ***act*** to help solve that problem.



Discover: *What are some actions we could take?*

You have decided what problem your team will take action on to improve your community. Now you need to decide what type of action you want to take.

1. As a team, take out a piece of paper or create a digital document. Title it *Team Action Plan*. On the first line write or draw the problem your team is going to work to make better. You can label this part "Problem."
2. On the next line write or draw the causes and root cause of the problem, which you identified during your problem news report in the Task 1 Understand activity. You can label this part "Causes."
3. Next, record your ideas about who is affected by your problem. Think about if it is mostly people of a specific age, or people who live in a specific place, or people who have another thing in common. You can label this part "Who Is Affected."
4. Now look at some of the ideas you had under your *Wonder* columns of your *Part Organizer* sheets. Are there any ideas there that might help you take action to help solve your problem? If so, record those ideas. You can label this part "Actions."
5. If you can think of any other actions, record those under *Actions*.
6. If you are having trouble thinking of actions you can take, here are some ideas:
    a. Personal change: Change something in your daily life or home, for example, riding your bike to school instead of an adult driving you in a vehicle.
    b. Change at home: Make changes with the people who live in your home, for example, start composting food waste (as shown in Figure 7.4) instead of throwing it away.



Figure 7.4: Composting food waste

c. Class or school change: Encourage changes at your school, for example, making the shared outdoor space more accessible or exciting.

d. Communicate with your community: Help the community understand the problem or change their behavior by designing posters, composing songs, recording podcasts, making public service announcements, setting up a social media campaign, or using other ways to communicate.

e. Government change: Try to change what your local or national government is doing, for example, write letters to officials or speak at local government meetings to share your concerns about your problem.

f. Global change: Collaborate with others around the world who are worried about the same problem. For example, join a group that works together to make the air cleaner.

g. Come up with your own ideas!

Understand: *How will we make our action sustainable?*

Remember there are different perspectives or ways of thinking about problems in your community. Actions may help solve a problem from one perspective, but not from another. Sustainable actions need to consider **social, environmental, economic**, and **ethical** perspectives. Considering the needs of as many people and perspectives as possible makes the actions you take more sustainable.

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1. Take out your *Team Action Plan*.
2. Consider the actions you listed. Would each action help solve your problem from:
    a. A social perspective? For example, helping to build relationships between people.
    b. An environmental perspective? For example, helping to make the air cleaner.
    c. An economic perspective? For example, making it easier for people to earn money.
    d. An ethical perspective? For example, making your community fairer.
3. Make a mark next to each action that shows from which perspectives it helps. You can use abbreviations, symbols, or whatever works best for your team. An action may help solve the problem from one perspective or more than one perspective.
4. Think about the actions and perspectives you have written down. What can you change about your actions so they help solve the problem from more than one perspective? Make those changes now.
    a. For example, maybe your action is picking up plastic bottles that are polluting a nearby river, like the one shown in Figure 7.5. This action mainly helps from an environmental perspective.



Figure 7.5: Polluted river

    b. Could you add a social perspective by encouraging community members to work together to pick up the bottles so that the shared space around the river becomes better for socializing?
    c. Could you add an economic perspective by clearing bottles near a tourist area so it looks nicer and people will go to the restaurants there?

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d. Could you add an ethical perspective by making sure that your action is fair? Maybe you pick up bottles all along the river, not just in some places.

e. In a perfect world, each action would help from all four perspectives. That might not be possible. Just do your best.

5. Take out your *Community Identity Map*. Use it to remember all the different people in your community.
6. Think about how your community members might feel about your action ideas. As a team, discuss for each action:
   a. Who does this action help?
   b. Are there people who are left out? If so, what could you change about the action so it does not leave them out?
   c. Does this action hurt anyone? If so, what could you change about the action so it does not hurt them?
   d. Are there things that might happen when you take this action that you do not want to happen? If so, what could you change about the action so they don't happen?
   e. Are there other ways you want to change any action so it will work better?
   f. Make any changes you feel are needed.
7. In a perfect world each action would make your whole community better. Sometimes that is not possible. Just do your best.



Act: *How will we take action?*

Your team is ready to decide what action you will take.

1. Think quietly to yourself about the actions you have listed. Ask yourself:
   a. Does the action help fix the root cause of your problem?
   b. Is this an action your team can take? Think about your time, any costs involved, and whether everyone can participate.
   c. Would you be excited to take this action?
2. As a team, discuss the actions you have listed. Get rid of any actions that would not be helpful or that you cannot do.

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3. Take out your *Thriving Community Goals*. Discuss which of the actions will be best for helping your community move toward your goals.
4. Pick the best way to come to consensus for your group. You can use any of the ways you used in Part 1, earlier in Part 7, or come up with a new way.
5. Use your consensus-building skills to decide what action your team will take.

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Task 3: How will our team take action in our community?

You and your team have picked an action that will make your community better. As action researchers, your next task is to plan exactly how to take that action. You will ***discover*** the steps you think are most important. Then you will ***understand*** the steps your team would like to take. Finally, you will ***act*** as a team to build an action plan to carry out in Task 4.



Discover: *What are the steps needed to take action?*

The first thing to do when planning an action is to figure out the steps that are part of that action. Your action could need permission from someone. Your action could need your team to do some things one day and other things another day. Your action could take place in several areas. All of these ideas could be different steps in your action plan.

1. Think quietly to yourself about the steps that could be part of the action your team picked.
2. Write, draw, or use another way to record your ideas on small pieces of paper. Each piece of paper should have one step. You will share these pieces of paper in the Understand activity. If you would like, you can also make a list of your ideas on a computer, phone, or other device. Just make sure these ideas can be shared with others.
3. Take out your *Community Communication* paper from Part 2, Task 5. Use it to remember the best ways to communicate with your community.
4. Think about how you will tell the community about your action. Record the steps involved. Remember, if people feel like they are a part of something they may be more likely to help. Telling the community about what you are doing can help make your action better.
5. Think about how you will measure the way your action is making your community better. Record the steps involved. For example:
    a. Could you ask people in the community if they feel like the action helped?
    b. Could you count how many people or living things you have affected?
6. Write your name next to any steps you would like to help with.

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Understand: *How can we organize our action steps?*

You have thought about what your team needs to take action. But it is also important to find out what the other people on your team are thinking. Then you will need to organize your ideas as a team.

1. Have each team member place their pieces of paper from the Discover activity on a table or another surface. This will help your team share their steps. Your team can also share their steps on a computer or other device using a program like Padlet or Google Classroom.
2. Read through the steps from your teammates.
    a. Did you notice any steps that were similar to yours?
    b. Do you think your team is missing any steps?
3. Start to organize your team's steps. You can move the pieces of paper around as you do this. Thinking about your team's steps will help you decide how you will take action.
    a. Group any similar steps together.
    b. Remove any steps that you don't think are needed to help your team take action.
    c. Think about how each team member will help. Put their names with the steps they would like to help with.
    d. Think about what steps might be missing. Add those steps.
4. Start putting the steps in order. For example, what do you think the team needs to do first? Place that piece of paper before all the others.
5. Make a list of things you need to help you take action.
    a. What materials do you need?
    b. How much time do you need?
    c. Do you need an adult to help you get permission?
6. Keep these steps and the list of things you need for the Act activity.

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Act: *What will we put in our action plan?*

In this activity you and your team will create your action plan. You will use this plan in Task 4 when you take your action in your community. Think back to the steps you and your team organized in the Understand activity. Now you need to turn those steps into an action plan.

1. You will record your action plan so everyone on the team can use it. You may want to add it to your *Team Action Plan* document. Your team can record your action plan in whatever way you would like.
    a. Write
    b. Draw
    c. Create a storyboard that shows the steps in order
    d. Type the plan on a computer, phone, or other device
    e. Record your team saying the steps
2. Remember the steps and materials you chose in the Understand activity. Use that information and this checklist to help you record the following:
    a. The steps your team would like to take
    b. The order of those steps
    c. Who will help with each step (it might be more than one person)
    d. When and where you will take these steps
    e. How you will communicate your action plan to the community
3. Think about what you will do if your plan doesn't work or you run into another problem (for example, an adult in your community says you need permission and you don't have it yet). Record these ideas as part of your action plan.
4. Remember to create an **inclusive** action plan. Being inclusive means everyone on your team can participate in some way. You may need to make changes to the plan so that everyone feels safe, comfortable, and able to help. Those changes are okay! They are part of being a good action researcher and a good teammate.

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Task 4: Putting our plan into action 

You finally have arrived at the most exciting part of action research! You ***discovered*** your own knowledge and values. You used science and **social science** investigations to ***understand*** the problems of your community. Now it is time to ***act***!

1. Put the plan you created in Task 3 into action.

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Task 5: What did I learn?

Great job! You took action to make your community better! In this task you will reflect on the action you took with your team. **Reflecting** means thinking carefully about something. You will also reflect on your role as an action researcher in this Community Research Guide. Why? Reflecting is something all action researchers do. Reflecting helps you figure out what worked and what didn't work about your action. It helps you take even better action in the future.

1. Find a place to rest that is quiet and comfortable. Start by closing your eyes, if that feels comfortable for you. Breathe in slowly through your nose. Let your belly and chest expand with air. Breathe out slowly through your mouth. Push out all of the air that was in your belly and chest.
2. This exercise helps your brain get ready to reflect. Repeat it as many times as you would like so you can feel ready.
3. Gather with your team. You are going to reflect on your action together.
4. Get three large pieces of paper. You can also do this activity by talking out loud or sharing ideas online.
5. Label each piece of paper with one of the following questions:
    a. "What went well?"
    b. "What could have been better?"
    c. "How did our action make our community better?"
6. Write your answers on each piece of paper. Let everyone on the team add their answers.
7. Read the answers from your teammates. Notice what you agree with. Notice what surprises you.
8. Talk with your team to answer this next question. Use what you wrote on the three pieces of paper to help you answer.

    a.What would you do differently if your team planned another action?
9. Now you will take some time to think about how you have grown as an action researcher.

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10. Take out the *My Feelings* paper from Part 1, Task 5. Remember, you thought about:
    a. What worries me about being an action researcher?
    b. What excites me about being an action researcher?
    c. What do I hope I will learn about my community?
    d. What do I hope I will learn about the topic of sustainable communities?
    e. How do I think my team will work together?
    f. Do I feel ready to take action to make my community better?
    g. How do I hope I will feel at the end?
11. Think about your answers. Then record your thoughts about:
    a. If I had to answer these questions now, how would my answers change?
    b. What did I do in this guide that surprised me?
    c. What was hard for me to do?
    d. What are the most important things I learned?
    e. What makes me the proudest?
    f. How have I changed?
12. Come back together with your team.
13. You will create a final identity map. This identity map will help you understand how your team has changed after finishing this guide.
14. Pick one person on the team to lead the discussion.
15. Have the team leader write the word "Team" on the board or on a piece of paper. Circle it. You can look at Part 1 for an example.
16. The team leader will start by sharing one way they changed while doing the *Sustainable Communities!* Community Research Guide.
    a. For example, maybe the team leader says, "I feel more able to change my community."
17. The team leader will write their item on the team identity map.
18. Then the team leader will ask other team members to share how they have changed.
19. Write each item on the team identity map.
20. Repeat until all members of the team have shared and added one item to the team identity map.

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21. Quietly consider the team identity map. It shows how your whole team has changed since the beginning of this guide. These changes are important. We hope your changes make it easier for you to take action in the future.

Congratulations!

You finished the *Sustainable Communities!* Community Research Guide!

All of us should be trying to do what we can to change ourselves and our world for the better. Maybe you took a big action. Maybe you took a smaller action. Maybe it had a big impact. Maybe it had a small impact. The most important thing is that you did something. When you take action to make your community better, you create the world you want to live in. You and your team are changing the world, one step at a time!

> *Never underestimate the power of a small group of committed people to change the world.*
>
> *In fact, it is the only thing that ever has.*
>
> —Margaret Mead

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Glossary

This glossary can help you understand words you may not know. You can add drawings, your own definitions, or anything else that will help. Add other words to the glossary if you would like.

Action researchers: People who use their own knowledge and information they find out from their community to make decisions and take action on important issues

Community: A group of people that have a place or other thing in common

Consensus: A balanced decision that works for everyone in the group

Economic: About money, income, and use of wealth

Environmental: About the natural world

Ethical: The fairness of something

Identity: Characteristics that make up each person or thing

Impact: The effect one thing has on another.

Inclusive: Making sure no one is left out

Investigate: Find out more information

Perspective: A specific way of thinking about the world around us

Reflecting: Thinking carefully about something

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Resources: Materials we use to meet our needs

Root cause: The reason underlying a problem

Social: About the interaction of people in a community

Social science: Study of human communities and interactions

Sustainable: A balanced, long-term approach to social, environmental, economic, and ethical concerns

Sustainable action: Actions that can continue for a long time and take into account many perspectives

Sustainable community: A group that balances the needs of living things and the resources available in a way that does not hurt future generations

System: Something made up of parts that work together

Thriving: Something that is working or growing well

Other words:

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Meet Heidi Gibson, Your Sustainable Communities Guide Developer



Meet Heidi Gibson. Heidi (*Hi-dee*) was the main person writing this guide. She talked with lots of researchers to get information. However, like anyone, she has her own perspective. You have learned it is important to consider the perspectives of your teammates and research mentors. Perspectives affect what we think and how we think. It is also important to think about the perspective of the writer. This can help you understand why the guide was written the way it was. Considering the source of information is always a good idea.

Heidi has degrees in biology and international education. However, she also has knowledge and perspectives that come from other parts of her identity. Since you have been reading a lot of what Heidi has written, it is important to know who she is. To help you, Heidi filled out an identity map, just like you did in Part 1. Heidi's identity map includes the following things.

- Purpose is to help young people realize their power to transform the world
- Past jobs include laboratory research, civic education, international development, and diplomacy
- Grew up and lives now in Arlington, Virginia, USA
- Husband is Scottish and they lived there as a family, so that feels like her second home
- Also lived in Germany, China, Malawi, and Fiji
- Two children, ages 15 and 12
- Six siblings
- Loves being outdoors, especially the beach
- Walks around her garden looking at what is growing every day
- Enjoys travel, reading, singing, and being with family and friends
- Likes learning new things—cultures, ideas, languages, skills

Before you finish the guide, think quietly to yourself about Heidi's identity map.

- What questions do you have about the way the guide was written?

- What perspectives does Heidi have that might have made her write the guide the way it is?
- Are there things you would include that were not included?

Do you want to tell Heidi what you would change about the guide? Email her at scienceeducation@si.edu. She'd love to hear from you!

References

1. OECD/ITF. September 17, 2020. "Good to Go? Assessing the Environmental Performance of New Mobility." https://www.itf-oecd.org/good-go-assessing-environmental-performance-new-mobility
   UK Department for Business, Energy & Industrial Strategy. June 9, 2020. "Conversion Factors 2020." https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2020
2. Ritchie, Hannah. October 6, 2020. "Our World in Data: Global CO_2 emissions from transport." https://ourworldindata.org/co2-emissions-from-transport#licence
3. Geyer, R., J.R. Jambeck, and K.L. Law. 2017. "Our World in Data: Global plastics production 1950 to 2015." https://ourworldindata.org/plastic-pollution
4. National Footprint and Biocapacity Accounts 2021 edition (Data Year 2017). August 6, 2021. "Ecological Footprint and Biocapacity from 1961 to 2017." https://data.footprintnetwork.org/#/countryTrends?cn=5001&type=BCpc,EFCpc

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Figure 1.6 – United Nations
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Smithsonian Science for Global Goals (SSfGG) is a freely available curriculum developed by the Smithsonian Science Education Center in collaboration with the InterAcademy Partnership. It uses the United Nations Sustainable Development Goals (SDGs) as a framework to focus on sustainable actions that are student-defined and implemented.

Attempting to empower the next generation of decision-makers capable of making the right choices about the complex socio-scientific issues facing human society, SSfGG blends together previous practices in Inquiry-Based Science Education, Social Studies Education, Global Citizenship Education, Social Emotional Learning, and Education for Sustainable Development.

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