

SUSTAINABLE COMMUNITIES!



SCIENCE

for Global Goals



Part 4:

How can housing help our community thrive?

SUSTAINABLE G ALS

developed by



in collaboration with



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Find out More!

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



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.

<u>Activity</u>	Description	<u>Materials and</u> <u>Technology</u>	<u>Additional</u> <u>Materials</u>	<u>Approximate</u> <u>Timing</u>	<u>Page</u> <u>Number</u>
	Task 1	: Why is housing i	mportant?		
Discover	Consider how housing helps you meet your needs.	PaperPens or pencils		15 minutes	153
Understand	Observe how people use housing and analyze whether it is functional for everyone in your community.	PaperPens or pencils	<u>Community</u> <u>Identity Map</u> (Part 2, Task 1)	40 minutes + investigation time	155
Act	Examine and evaluate information about housing in your community.	PaperPens or pencils	<u>Thriving</u> <u>Community</u> <u>Goals</u> (Part 1, Task 3)	15 minutes	159
	Task 2: What a	re housing issues	in my comm	unity?	
Discover	Explore housing issues and your own experiences with housing.	PaperPens or pencils		20 minutes	162
Understand	Investigate housing affordability in your community.	 Paper Pens or pencils 	<u>Survey</u> <u>Instructions</u> (Part 2, Task 1, optional)	20 minutes + investigation time	165
Act	Identify functional and affordable housing issues in your community.	PaperPens or pencils	<u>Part 4</u> <u>Organizer</u> (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.	PaperPens or pencils		20 minutes	172
Understand	Investigate housing design in your research area.	PaperPens or pencils	* StoryMap extension available	55 minutes	176



Activity	Description	<u>Materials and</u> <u>Technology</u>	<u>Additional</u> <u>Materials</u>	Approximate Timing	<u>Page</u> 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) 	<u>Part 4</u> <u>Organizer</u> (Task 1)	30 minutes	180
	Task 4: How can w	e use our housing	in a sustain	able way?	
Discover	Consider different perspectives on saving resources at home.	PaperPens or pencils		25 minutes	183
Understand	Investigate the sustainability of your daily actions at home.	PaperPens or pencils	<u>Resource</u> <u>Use Checklist</u> (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 	<u>Part 4</u> <u>Organizer</u> (Task 1) <u>My Research</u> <u>Area</u> (redesigned, Task 3)	20 minutes	187
Task 5	: How can we make	housing in our co	ommunity m	ore sustainal	ole?
Discover	Consider what you now know, think, and wonder about how housing could be better in your local community.	 Paper Pens or pencils 	<u>Part 4</u> <u>Organizer</u> (Task 1) <u>Thriving</u> <u>Community</u> <u>Goals</u> (Part 1, Task 3)	15 minutes	191
Understand	Decide on individual actions you will take to help your community.		<u>Part 4</u> <u>Organizer</u> (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





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



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.

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.



A 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.

- 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.

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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.

- 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.



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 <u>Community Identity Map</u>? 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.



- 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





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?

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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.

 Work with your team. Title a sheet of paper or a digital document <u>Part 4 Organizer</u>. 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 <u>*Thriving Community Goals*</u> in the *Think* column of your <u>*Part 4 Organizer*</u>.
- 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:



- 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?



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.	



<u>Housing Experience</u>	
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 <u>Housing</u> <u>Experiences</u> 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.



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.

A 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 <u>Housing Problems</u> as functional, affordable, or both. Next to each statement, mark an F for Functional, an A for Affordable, or a B for Both.

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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.	



- 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?

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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?



- 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 <u>Interview an Expert Instructions</u> 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 <u>Calculating Affordability Instructions</u> 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



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

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

A 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



- 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%)



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?

Part 4 Task 2

- 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.



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.

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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.

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





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 <u>Matching Housing to Climate</u> 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.



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.



- 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



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 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?



- 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.

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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 <u>Building a Model</u>. 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.



Part 4 Task 3

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?



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.

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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.

- 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?

Part 4 Task 4

- 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.



Part 4 Task 4

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**.

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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 <u>Resource Use Checklist</u> 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?



- 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?



- 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.

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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?



- 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 <u>*Reducing Resource Use at Home*</u> 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.



- 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.



Part 4 Task 4

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.



Part 4 Task 5

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.

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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?



- 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.



<u>Glossary</u>

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



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



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



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:



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	



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?	

