Smithsonian

SCIENCE
for Global Goals

ENERGY!

Part 6:

Energy to Use and Make Things

SUSTAINABLE DEVELOPMENT GOALS

developed by

Smithsonian
Science Education Center

in collaboration with

iap SCIENCE HEALTH POLICY
the interacademy partnership

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PART 6: ENERGY TO USE AND MAKE THINGS

Find out More!

For additional resources and activities, please visit the *Energy!* StoryMap at http://bit.ly/3Kx41Jy.

Planner

Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Task 1: How do we use energy to power things in our daily life?					
Discover	Reflect on how you use energy in your daily life.	• Paper • Pens or pencils • Watch, clock, or other way to know the time		30 minutes + interview time	172
Understand	Investigate energy efficiency and energy conservation using items from your daily life.	• Paper • Pens or pencils • Internet (optional) • Calculator (optional)		35 minutes	175
Act	Calculate the cost of using items in your daily life and how energy efficiency or energy conservation could help you reduce costs.	• Paper • Pens or pencils • Calculator (optional)		30 minutes	179

Activity	Description	Materials and Technology	Additional Materials	Approximate Timing	Page Number
Task 2: How can we make industry more sustainable?					
Discover	Examine data about greenhouse gas emissions in several kinds of industries.	• Calculator (optional)		15 minutes	183
Understand	Read about how industry uses energy to do work. Then investigate the industries in your community and collect information about the people who are the most affected by these industries.	• Paper • Pens or pencils • Internet (optional) • Online or paper map (optional)		15 minutes + investigation time	185
Act	Analyze the data from your investigation and identify the kinds of actions you want to take.	• Paper • Pens or pencils	*Energy Source Cards* *Futures Mood Board*	25 minutes	191

Meet Your Research Mentor

Meet Lincoln Bleveans. Lincoln (pronounced *LINK-uhn*) will be your research mentor to help you understand how **energy** helps people use things and make things.

Lincoln is the executive director of sustainability and energy management at Stanford University in the United States. He has a bachelor's degree in Chinese, Japanese, and French and a juris doctorate in commercial and international law. Lincoln has worked in the energy industry for more than 30 years and has special expertise in electric power, energy efficiency, and sustainability.

However, he also has knowledge and **perspectives** that come from other parts of his **identity**. Since Lincoln is now working with you, it is important to understand who he is.

Lincoln's Identity Map

- White male
- 56 years old
- Lives in California in the United States
- Is bald, has a beard, and wears glasses
- Has the roles of father and husband
- Is funny
- Enjoys reading
- Likes to podcast
- Likes to surf
- Is both introverted and extroverted
- Is inclusive
- Interested in behavior and languages
- Interested in history and **paleoanthropology**
- Considers himself the ultimate "square peg" in his job

Task 1: How do we use energy to power things in our daily life?

In this task you will ***discover*** how you use energy to **power** the things in your daily life. You will carry out an investigation to ***understand*** how people can reduce the amount of energy they use. You will use calculations and examine perspectives to figure out how you want to ***act*** to reduce personal energy use in your **community**.

Before you begin the rest of Part 6, think quietly to yourself about Lincoln's identity map.

- Are there things you have in common with Lincoln?
- Are there ways in which you are different from Lincoln?
- Can you see anything about Lincoln's identity that makes it easier for him to think about how to use **sustainable** energy to use things or make things?

During Part 6 you will notice Lincoln 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.

Discover: *How do I use energy in my daily life?*

What kinds of items do you use every day? You might be thinking of things like a clock, a cooking surface, a sink faucet, lights, a computer or mobile device, or a radio. All of these items need energy to work. In this activity, you and your team will reflect on how important energy is to your daily life and what kinds of items help you meet your needs.

1. Read *My Energy Reflection* and complete the activity the next time you wake up in the morning.

My Energy Reflection

a. Put a piece of paper and a pen next to where you sleep. You can also choose another way to record information. Also place a clock, watch, mobile phone, or another way to record the time next to where you sleep.
b. Go to sleep.
c. When you wake up, record what time it is.
d. Begin your day. Notice the first time you use something at home that requires energy.
e. Record what time you use that item. (Do not worry about recording what time you used your clock in step c, even though the clock uses energy. Just record the next item that requires energy.)
    - For example, you may use your mobile phone to check for messages from friends. Or you may turn on a light. Or you might take a hot shower. Or you might heat up a cooking surface to help prepare your family's first meal of the day.
f. Reflect on how that item has helped you meet your needs. Record your answer.

2. Gather with your team.
3. Make a timeline. Mark what time each teammate woke up using a mark, color, symbol, or note. Use a different mark, color, symbol, or note to mark what time each teammate first used something at home that requires energy. Figure 6.1 has an example.

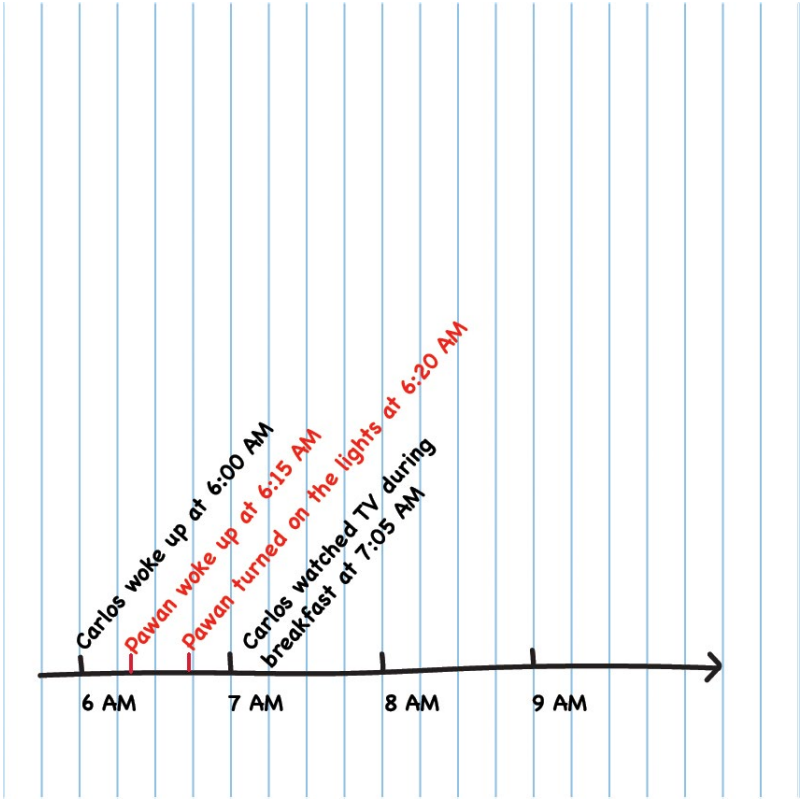

Figure 6.1: Example of a team timeline.

4. Record on the timeline what item each team member used and how it helped them.
5. Discuss as a team:
    a. What was the shortest amount of time it took to use something that requires energy? What was the longest amount of time?
    b. What surprised you about your team's timeline?
    c. What does this timeline tell you about how you use energy in your daily life?

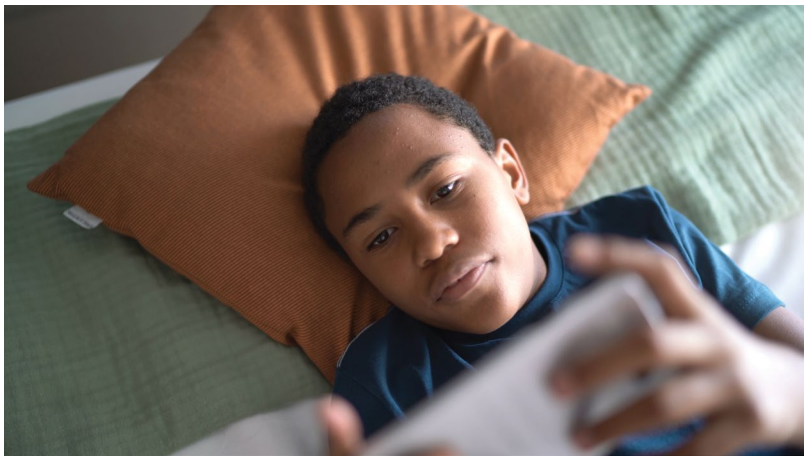

Figure 6.2: This young person uses their mobile phone as soon as they wake up.

6. If you have the time, you can ask other members of your household to do the *My Energy Reflection* activity and add their information to your team timeline. As a team, discuss the same questions from step 5.
7. Keep your timeline in a safe place. You will need it in the Understand activity.

Understand: *How can people in my community reduce the amount of energy we use?*

In the previous activity you discovered how you and your team use energy every day and how that energy helps you meet your needs. You know that one way to create a more sustainable energy future is avoid energy sources that produce a lot of carbon. To accomplish that, you can shift to use lower-carbon and more sustainable sources of energy. You can also try to reduce the amount of energy you use per day.

In this activity, you will conduct investigations that help you figure out how to use **energy efficiency** and **energy conservation** to reduce the amount of energy you use in your daily life.

1. Think about what item you recorded in the *My Energy Reflection* activity. Answer the following questions on your own:
   a. How would your life be different if you could *not* use this item?
   b. Do you think you could make a choice to use this item *less often*? Why or why not?
2. Read *Energy Efficiency and Energy Conservation*.

Energy Efficiency and Energy Conservation

Energy efficiency is a term that describes items or processes that use less energy to do the same tasks. For example, an energy-efficient refrigerator has improved **technology** that enables it to keep food cool using less energy than a regular refrigerator.

Energy conservation is a term that means changing your behavior to use less energy. You might try to stop using an item or use it less than you did before.

Figure 6.3: These light bulbs are energy-efficient. They are light-emitting-diode bulbs, *or LEDs. They can provide the same amount of light as an* incandescent bulb, *but they use much less energy.*

3. Read *At the Smithsonian*.

At the Smithsonian

Mauricio Rodriguez is a mechanical engineer and design manager in the Office of Planning, Design & Construction at the Smithsonian Institution. Read what he says about how the Smithsonian Institution works to conserve energy and make appliances more efficient in its kitchens.

"Many kitchens use constant-volume **grease hoods**. This means you turn the fan on in the morning and it stays on until the end of the day. The grease hood helps move greasy vapors and harmful gases to the outside of the building. We have now installed a variable volume-hood at the National Museum of African American History and Culture. Variable-volume hoods have heat and smoke sensors to help them tell when someone is cooking. When someone is cooking, the hoods run at 100%. When no one is cooking, the hoods switch to 30% power. This saves energy."

4. Read Lincoln's thoughts about how people's behavior can affect sustainable energy use. What behaviors do you think people can change about the energy they use?

Lincoln Says . . .

In my industry, people tend to get so excited about new technology and **innovation**. But what we're finding is that behavior change is the secret. Technology is cool, but it doesn't make a difference without the behavior change.

5. Gather as a team.
6. Read *How Can I Use Less Energy in My Daily Life?* You can work by yourself or with others to complete the investigation.

How Can I Use Less Energy in My Daily Life?

Remember what you read in *Energy Efficiency and Energy Conservation*. This investigation will help you or your team members think about how you can use energy efficiency and energy conservation in your daily life. You are going to examine up to three of the most important items you use each day, either at home or at school. You will then think about how you can reduce your energy use by either changing the item you use or the way you use it.

a. Get out a piece of paper or choose another way to record information.
b. Make a table like the one in Figure 6.4.
c. Think about some of the most important items you use every day. For example, items you use the most often or that help you meet your needs.
d. In the column titled *Item name* list up to three of the most important items you use every day. Each item should get its own row. You can use the item you recorded in the Discover activity if you think it is one of the most important.
e. In the column titled *How much energy does it use?* follow these steps to help you calculate how much energy this item uses:

   - Examine the item to see if it lists how many **watts** it uses. Watts are a measure of power. For example, you might find a label that reads "60 watts." If the watts are not listed on the item, use the Part 6 StoryMap to help you find other ways to calculate the watts for that item.

- Figure out how many hours a day you use this item. Some items you may use for only a few minutes and other items may stay on for 24 hours a day. Use a decimal if you need to show you use an item less than a full hour. For example, if you use an item for 30 minutes, that is 0.5 hours.
- Calculate the **Kilowatt-hour (kWh)** daily use for this item. Daily kWh is a way of measuring how much energy an item uses each day. You can calculate kWh using this equation along with the watts and hours of use you just gathered: Daily kWh= (watts × hours used per day) ÷ 1,000
- If the item does not use electricity, try to find another way to estimate the amount of energy it uses. For example, if you are using a natural gas stove to cook, measure how many minutes it takes you to cook. Or if you are using firewood, measure how many sticks you need to cook.

f. In the column titled *Could I use a more energy-efficient item?* investigate to search for another, more energy-efficient item to meet your needs. Some items come with a label that tells you they are energy-efficient. You can also do research on the Internet or ask a person who works in a shop that sells these kinds of items. Consider why you might or might not be able to get this kind of item. Does it exist? Can you afford it? Is it for sale in your community?

g. In the column titled *Can I use this item less?* consider whether you could use this item less often. Explain your reasoning.

h. Leave the column titled *What perspectives should I consider?* blank for now. You will complete that in the Act activity.

Item name	How much energy does it use?	Could I use a more energy-efficient item? Why or why not?	Can I use this item less? Why or why not?	What perspectives should I consider?
Lamp and light bulb. I think the bulb is incandescent.	60 watts of electricity x 4 hours a day ÷ 1,000 = 0.24 kWh	I could use a different kind of bulb. I heard that LEDs use 90% less energy than a regular incandescent bulb. But these bulbs are more expensive.	I need this light to do my homework at night. But I could go into my brother's room at night, since he is also using a lamp. Then we won't have two lamps on at once.	

Figure 6.4: Example of a table for recording data about items that use energy.

7. Keep your table in a safe place. You will need it in the Act activity.
8. Read Lincoln's thoughts about energy efficiency and energy conservation. He uses the example of energy use in California in the United States. Do you think you should do the same things to save energy in your area, or is your situation different?

Lincoln Says . . .

Here in California, we have a lot of solar power and generate a lot of electricity in the middle of the day. If we are going to hit 100% renewables or close to it, that means nighttime energy has to be renewable too. You can only build so much storage. And there's only so much wind and geothermal that will produce at night. Using this energy in the right way means changing 100 years of behavior. So if everybody charges their cars at night, that is a problem. How do we create incentives and **infrastructure**, so that everybody's like, "Oh, sun's out. I'm plugging in."

Act: *What do I want to change about how people in my community use energy?*

In this activity, you will calculate how energy conservation and energy efficiency can help you reduce the amount of energy you use and reduce the cost of using that energy. You will also examine how **economic**, **ethical**, **environmental**, and **social** perspectives affect the decisions you make about energy conservation and energy efficiency.

1. As a team, examine your *How Can I Use Less Energy in My Daily Life?* table from the Understand activity.
2. Each person should choose an item they were able to calculate the kWh for. If there are not enough of those items, it is okay to work together and share an item.
3. Make a note of the daily kWh of your item. You will need this in the next step.

4. Find out on your own how expensive it is to use each item. Use the following information to help you:
    a. Find out how much each kWh of power costs in your home or school. This information may be on a utility bill, or you can ask an adult or use the Internet to look up your average local cost of each kilowatt-hour. This is your **utility rate per kWh**.
    b. Use this equation to calculate the daily cost to use your item:

        Cost = daily kWh × utility rate per kWh

5. Calculate how expensive it would be to use this item if you:
    a. Reduced the number of hours a day you used the item (energy conservation). Use the following equations to calculate the new cost:
        - Daily kWh = (watts × hours used per day) ÷ 1,000
        - Then use your new daily kWH to calculate the new cost:

            Cost = daily kWh × utility rate per kWh
    b. Use an energy-efficient item instead. For example, an older washing machine might use 1,400 watts per wash cycle but a more energy-efficient one might use 400 watts. If you know the wattage for a more energy-efficient item, you can use the equations from step 5a to calculate the new cost.

*Figure 6.5: This person has purchased an energy-efficient **heat pump** to heat and cool their home.*

6. In the column titled *What perspectives should I consider?* think about the social, environmental, economic, and ethical perspectives that might affect your decisions. For example, here are some questions you might want to consider when thinking about decisions related to different types of items:
    a. Social: How might your relationships change if you stopped using a mobile phone to communicate with others?
    b. Environmental: Could you reduce your impact on the environment if you switched from using natural gas to electric for cooking?
    c. Economic: Can you, your household, or your school afford to purchase a new energy-efficient item?
    d. Ethical: Is it fair to ask someone to use an item less if they need it to meet their needs?

Item name	How much energy does it use?	Could I use a more energy-efficient item? Why or why not?	Can I use this item less? Why or why not?	What perspectives should I consider?
Lamp and light bulb. I think the bulb is incandescent.	60 watts of electricity x 4 hours a day ÷ 1,000 = 0.24 kWh	I could use a different kind of bulb. I heard that LEDs, or light-emitting diodes, use 90% less energy than a regular incandescent bulb. But these bulbs are more expensive.	I need this light to do my homework at night. But I could go into my brother's room at night since he is also using a lamp. Then we won't have two lamps on at once.	Economic: I don't know if my parents can afford to buy energy-efficient light bulbs. Social: It is easier to do my homework alone in my own room.

Figure 6.6: Example of a table for recording data with the perspectives column filled in.

7. Read Lincoln's thoughts about why it is important to think about economic perspectives when encouraging people to use energy more sustainably. What should your team think about when planning changes in your community?

Lincoln Says . . .

Some people say, "Let's use sustainable energy for everything right now!" But that process can be expensive. Expensive energy is okay if you have plenty of money, but if you do not, it can be devastating. For example, many Americans already make a monthly decision between paying for food and paying their utility bills. We must switch to sustainable energy, but we have to also recognize that all of us are not living in nice houses and paying our energy bill without a thought. Energy costs in general drive food decisions and health care decisions, and that's just in the United States!

8. As a team, read through your *How Can I Use Less Energy in My Daily Life?* tables. Think about how you could make changes to the way you use those items. Which changes do you think would make the biggest difference to energy use in your community?
9. Get out your *Futures Mood Board*. What **hopes** or **concerns** from this task to you want to add? Add them now.

Task 2: How can we make industry more sustainable?

People use energy to make things we need and use. The process of making things is called **industry**. Industry can include processes such as **mining**, **agriculture**, **manufacturing**, **construction**, and making materials such as metals, paper, and **chemicals**. All industries use energy to do work. In fact, industry is one of the largest **consumers** of energy in the world. Right now, much of that energy comes from **fossil fuels**.

In this task you will ***discover*** how industry uses energy and what impact that can have on your local area and the globe. You will ***understand*** how energy sources and energy use in industry can affect people in your community. You will ***act*** to come up with ways you can make industry more sustainable and **equitable** in your community.

Discover: *What do I think and feel about how industries use energy?*

In this activity, you are going to examine some **data** about the amount of **greenhouse gas** emissions that come from several kinds of industry around the world. Greenhouse gases are gases that cause the atmosphere to get warmer. Carbon dioxide is the most common greenhouse gas produced by human activities, but there are others, too, such as methane. The **low-carbon** or zero-carbon energy sources you have learned about produce little or no carbon dioxide.

1. Examine the following graph on your own.

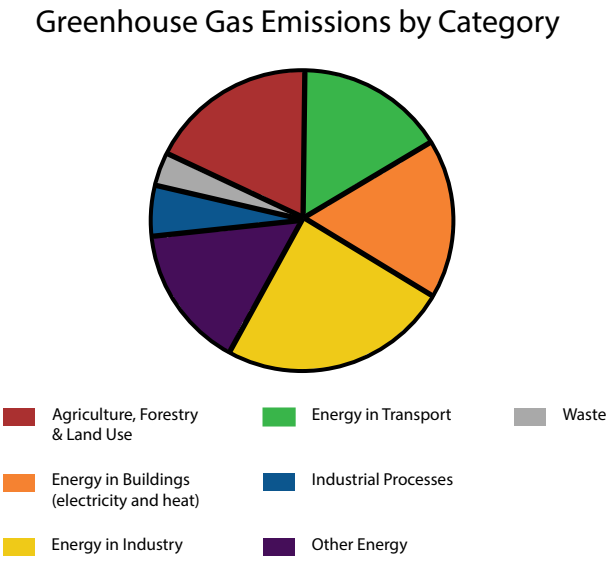

Figure 6.7: This graph shows the percentage of greenhouse gas emissions by category.[1]

2. Think about the following questions on your own:
    a. What do you notice about the graph?
    b. How do you feel about the information this graph shows?
3. Discuss with your team:
    a. Which category has the most greenhouse gas emissions?
    b. Why do you think there are so many greenhouse gas emissions from energy used in industry?
    c. Why would it be important to know the information in this graph if you were thinking about reducing the greenhouse gases released into the atmosphere?
4. Examine your *Energy Source Cards*. More than half the energy used in industry produces greenhouse gases. Which energy sources might be used more often to generate that electricity?
5. Consider you other *Energy Source Cards*. Are there low-carbon or zero-carbon energy sources and that might be able to replace fossil fuels that release a lot of greenhouse gases?
6. With a partner, have one partner pay attention and have the other partner share.
7. As the sharing partner, pick a sustainable energy source and imagine you were trying to convince a company to change their source of energy. Share with your partner why you think this change might be important and why you picked this energy source.
8. Switch roles and have the other partner share information about a different energy source.
9. Discuss with your partner:
    a. If you were a business or company owner, what might convince you to change?
    b. Are there certain things you would need from your energy source? For example, maybe it is really important that energy is reliable if you are using it to manufacture things.

Understand: *What industries are in my community and who do they affect?*

You are going to investigate which industries are located in or near your community. You will also gather information about the kind of energy sources they use. This investigation will help you figure out who in your community is most at risk of harm from energy use in industry. The data you collect can help you create a more equitable future for your community. The data can also help you figure out where in your community you should **advocate** for using more sustainable sources of energy.

1. Read *Energy in Industry*.

Energy in Industry

Across the world, 68% of the energy used in industry currently comes from fossil fuels. Fossil fuels are a not a sustainable form of energy, and using fossil fuels produces greenhouse gases. These greenhouse gases change Earth's climate. This is a problem both for people and other living things on the planet. This section will help you understand how energy is used to power certain processes in industry.

Powering Machines and Vehicles

Energy is needed to power machines that perform a variety of jobs in industry. In mining, energy is needed to power drills, dig tunnels, move materials from a mine to the surface, and dig up materials on the surface. Mined materials are used in many products, such as mobile phones. In agriculture, vehicles and machines use energy to plant, water, and **harvest** crops. In manufacturing, machines use energy to put parts of products together or seal them in a package.

Fossil fuels, including fuels created from **petroleum (oil)**, such as gasoline, are often used to power these machines and vehicles or to generate the electricity that powers them.

How can powering machines and vehicles be more sustainable? Industries can use electric vehicles or vehicles that run on **biomass** instead of gasoline. Fuels can

be created from biomass sources such as wood, algae, corn, or fat. Sustainable electricity from low-carbon sources can be used to power vehicles and machines, instead of fossil fuels.

Figure 6.8: This plant uses machines to assemble cars.

Making Heat

Some industries need heat to make products. For example, cement is made by heating limestone to a very high temperature in a **kiln**. Steel, paper, chemicals, and certain kinds of food are also made using large amounts of heat. When fossil fuels are burned to produce heat, they release carbon dioxide and other harmful chemicals into the air, which can affect the air quality and the health of nearby communities.

How can making heat be more sustainable? Industries can use **solar**, **geothermal**, or biomass energy to produce heat. Electricity from low-carbon energy sources can also produce heat.

Supplying Feedstocks

Sometimes energy sources are used as **feedstock**. In industry, feedstock is any material can be turned into something else. Fossil fuels such as coal, natural gas, and petroleum can be turned into products such as tires, medicine, cosmetics, plastics, fertilizer, clothing, and detergent.

How can making these products be more sustainable? Industries can use leftover or recycled materials, such as recycled plastic, to make products instead of using fossil fuels. Industries can also use biofuels to make certain kinds of products

instead of fossil fuels. People can also stop using or reduce how often they use products that come from fossil fuel feedstock. If you are interested in finding out more about bioplastics and other more sustainable materials, please explore the *Biotechnology!* guide.

2. Gather as a team.
3. Read *Investigation of Industry in My Community* and carry out your investigation.

Investigation of Industry in My Community

You and your team are going to meet two goals with this investigation:

- Investigate what kinds of industries are in or near your community and how they use energy to do their work.
- Investigate who in your community is most at risk of harm from these industries.

What kinds of industry are in my community?

Decide on How to Gather Information

Decide how you will gather information about the kinds of industry in your community. You can:

a. Move around your community and directly observe any buildings or locations that have a kind of industry.

⚠ Physical Safety Tip

If you choose to move around your community to observe industry directly, be very careful. Some industries use dangerous chemicals, machinery, processes, or vehicles. Do not get too close to any buildings, locations, or areas without permission and an adult present. Many industries are on private property and do not allow visitors.

b. Examine a map of your community that has each building or site in the community labeled. You can use a paper map or go online and search for a digital map. Search for words such as "farm," "mine," "construction site," "steel mill" or "steel works," "manufacturing plant," "cement," "paper mill," "chemical plant," "food processing," "factory," and "industrial."
c. Use the Internet to do a search, using the terms in step b and the name of your community.
d. Ask adults in the community.
e. Ask your local government or council for a list.
f. Remember that you did a Community Energy Observation activity about places that use energy in Part 1. Review that investigation. Is there data you can use to help you in this investigation?

Decide How to Record Information

Decide how you want to record information about the kinds of industry in your community:

a. Make a new map or change an existing map so you can mark all the places in your community that have industry.
b. Make a written list of the places you find.
c. Make an audio or video recording of all the buildings and locations.

Pick an Industry

Each team member should pick one kind of industry in your community.

Try to find out what energy source each kind of industry is using and what it uses energy to do. Is it powering vehicles or machinery, producing heat to make something, or using energy sources as feedstock? It may be a combination of some or all of these. Here are some ways you could find out.

a. Communicate directly with each kind of industry and ask what kind of energy is used and what that energy is used for.
b. Use the Internet to research.
c. Ask adults in the community, especially adults that work in each kind of industry.
d. Ask your local government or council if they have information.

⚠ Emotional Safety Tip

It may be difficult to ask people about the industry they work in. Some people or companies are happy to share information, but others want to keep their information private, even to young people. You are not doing anything wrong by asking, but do not worry if you have trouble getting this information. Just do your best.

How could industry use energy differently?

a. If you can, figure out if the way the industry you investigated is using energy has any positive or negative effects on the community. For example, a positive effect might be that they are able to use renewable energy and create an example for the community. A negative effect might be they are wasting energy by leaving the lights on or creating pollution when they generate electricity. To find out more you could:

- Ask community members.
- Ask advocacy groups that protect people in at-risk communities.
- Check if your local or national government keeps records of air pollution and water pollution from industry.
- Remember that your team did a Community Effects Investigations in Part 1 about how energy affected your community. Review that investigation. There may be data that can help your investigation now.

b. With your team, think about the industries you investigated. To become more sustainable, industries could try to save energy or they could switch to a different energy source.

c. Turn to a partner and share how you think the industry you investigated could become more sustainable in their energy use.

d. If you thought they should save energy, share some ways you think they could do that. For example, maybe turning off the lights at night or using more energy-efficient equipment.

e. If you thought they should switch energy sources, take out your *Energy Source Cards*. Examine them and share with a partner which energy source you would choose to change to.

f. Switch roles.

g. Gather in a circle and discuss with your team, what are the barriers or reasons that industries have not changed? Go around the circle and list one barrier that might stop your industry from making the change you recommend. You can use social, environmental, economic, or ethical perspectives to help you think about barriers.

Figure 6.9: People living near mines may experience noise, dust, and vibrations from large mining machinery such as these trucks.

h. Go around the circle again and share how you might help a company overcome the barrier you identified.

If you would like to find out more about how industry may harm certain groups, you can use the *Environmental Justice!* guide to investigate further.

4. Keep your observations and information in a safe place. You will use them in the Act activity.
5. Read Lincoln's thoughts about the importance of using reliable, affordable, and sustainable energy sources. Discuss with your team: What industries in your community most help meet people's needs? What kind of reliable, affordable, and sustainable energy sources do you think they should consider?

Lincoln Says . . .

Energy in your community has to be reliable, affordable, and sustainable, because if you miss one of those things, it's not going to work. All the sustainability in the world doesn't matter if the electricity is not reliable and affordable, because the electricity can't be used. And affordability alone is not helpful if we can't rely on the power, let alone use it as a sustainable source of energy.

Act: *How can I help make industry more sustainable and equitable for my community?*

In this activity, you will use the data you collected from your investigation to examine energy equity in your community. How does energy use in industry affect the people in your community? Does it affect everyone equally? Who is most at risk? The answers to these questions will help you decide how you want to act to create a more sustainable and equitable energy future for your community.

1. Gather as a team.
2. Get out the information you recorded from your *Investigation of Industry in My Community*.
3. Discuss the following questions:
   a. What is the most common kind of industry in your community?
   b. What is the most common source of energy for industry? What is that energy used for?
   c. What information did you find out about the people who live nearby the industry in your community? Is there anything they have in common?
   d. How does industry in your community affect the people living there? Consider both the things that benefit your community and the things you might want to see changed.
   e. Who do you think is benefiting the most in your community? Who is most at risk?

4. As a team, discuss what kind of action you could take to make things better in your community. For example, you could:
    a. Find out who is in charge of **monitoring**, or watching over, how industry works in your community and share with them any concerns you have.
    b. Use the choices you make about what you buy to encourage companies to use sustainable energy sources.
    c. Share what you have learned with others, individually or in community meetings, so everyone can make more informed decisions.
5. Read Lincoln's thoughts about how you can attend community meetings to show that you care about issues related to sustainable energy. What meetings you could attend in your community?

Lincoln Says . . .

When I worked in city government, it was remarkable how much the decision-makers paid attention to the people who showed that *they* were paying attention. If you show up to a city council meeting and you say, "I'm worried about this in my community," you have made more of an impact than a thousand emails or a thousand phone calls. The fact that you're paying attention to a problem makes the decision-makers have to pay attention to the problem. That curiosity is, in fact, advocacy.

6. Get out your *Energy Source Cards*. What sustainable energy sources do you think could supply power to the industry in your community?
7. Get out your *Futures Mood Board* on your own. What hopes or concerns from this task to you want to add? Add them now.

Congratulations!

You have finished Part 6.

Find out More!

For additional resources and activities, please visit the *Energy!* StoryMap at http://bit.ly/3Kx41Jy.

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.

Advocate: Try to advance an idea or cause

Agriculture: The practice of growing crops or raising livestock

Chemical: A substance that can occur naturally or can be made

Community: A group of people who share something in common, such as a space or an identity

Construction: An industry in which people build things such as homes or bridges

Biomass: Wood and other plant or organic materials

Concern: Something that causes anxiousness, worry, or fear

Consumer: One that uses something up

Data: Facts and statistics that have been collected about a topic

Economic: About money, income, and the use of wealth

Energy: Anything that gives the ability to do work

Energy conservation: Using an item or process less or not at all in order to save energy

Energy efficiency: Items or processes that use less energy to do the same amount of work

Environmental: About the natural world

Equitable: Treating all people fairly

Ethical: Something that is fair

Feedstock: Any material can be turned into something else in an industrial process

Fossil fuel: A type of fuel that comes from the fossilized remains of plants and animals

Geothermal energy: Heat from the Earth that can be used to generate electricity

Grease hood: A duct that removes greasy vapors to the outside of a kitchen or building

Greenhouse gases: Gases such as carbon dioxide or methane that cause the atmosphere to get warmer

Harvest: The process of gathering crops when they are ready to be picked

Heat pump: A device that transfers heat from a colder area to a hotter area; it can be an energy-efficient way to keep a building at a comfortable temperature

Hope: Something that is desired, wished for, or wanted

Identity: The characteristics that make you you

Incandescent light bulb: An older kind of light bulb that has thin wire filaments and gives off heat

Industry: The process of making things that people need, want, or use

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

Innovation: A new idea or method of doing something

Kiln: An oven that heats up to burn or dry a material or item

Kilowatt-hour (kWh): A measure of electricity defined as a unit of energy, measured as 1 kilowatt of power expended for 1 hour

Light-emitting-diode (LED) light bulb: A modern kind of light bulb that uses less power and produces less heat than an incandescent light bulb

Low-carbon: An energy source that releases very little carbon dioxide gas into the atmosphere.

Manufacturing: The process of making something from raw materials

Mining: To remove something valuable from the ground, such as a mineral

Monitoring: Keeping track of, responsible for, or watching

Petroleum (oil): A liquid non-renewable resource that forms when living things die, are covered in layers of dirt and rock, and are compressed

Paleoanthropology: The study of ancient human-like organisms and their descendants

Perspectives: The different ways we think about the world around us

Power: The rate at which electricity is transferred along a circuit

Social: Relating to the interaction of people in a community

Solar energy: A renewable and low carbon resource that converts light energy from the sun into electricity using solar panels or uses the heat of the sun to heat water or other substances

Sustainable: An approach that balances different perspectives and can keep working for a long time

Technology: Materials and methods used to solve people's problems and fill their needs

Utility rate per kWh: The cost of 1 kilowatt of power expended for 1 hour

Watt: The unit of measurement for electric power

End Note

1. Ritchie, Hannah, and Max Roser. 2020. Global Greenhouse Gas Emissions by Sector. *OurWorldInData.org*. 2020. Retrieved from https://ourworldindata.org /emissions-by-sector