Energy Efficiency World Teacher's Guide

Site Overview

Along with parents, teachers can play a key role in helping kids learn to use energy wisely. This section contains the resources you need to put this website to work for your class. We've included content standards-based information and experiments, plus worksheets to help you assess students' understanding of key science and energy concepts.

- Site Overview
- Electricity FAQs
- Experiment Tips
- Student Worksheets
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Energy Efficiency World uses information, experiments, games, and activities to teach students the many forms of energy, how to use it efficiently, and how wise energy use helps the environment.

This site is geared for a range of interests and reading levels and can be used by students in elementary and middle school. (Students can click on highlighted vocabulary words to access pop-up definitions.) Nonreaders will need adult assistance to play the games.

The site features four main areas:

- **Games**—Interactive games simulates home energy wasters, introduce renewable energy resources, and let kids calculate the cost savings from various energy-efficient behaviors.

- **For Kids**—Key science and energy content is organized into thematic sections. Each section is self-contained and includes relevant experiments and hands-on activities.

- **For Parents**—Tips describe how to get the most out of this site with your kids. These include handy checklists for home use, and links to useful energy websites.

- **For Teachers**—You're in this area now! This contains tools and tips for educators.

Other helpful features include **Tell Me More**, a section for students doing reports and research; an a **Energy Saver Certificate** that students can use to track their progress through the site; a handy **Glossary**; and a page of **Links** to related energy websites.

Electricity FAQs (Frequently Asked Questions)

1. How do power plants make electricity?
2. Why is it important for people in the United States to save electricity and other forms of energy? Aren't we just a relatively small part of a large planet?
3. What kind of a difference does replacing a regular light bulb with an energy-saving bulb really make?
4. Which type of renewable energy is currently most relied on in the United States?
5. What's the difference between global warming and the greenhouse effect?
6. Since global warming is already in effect, isn't it too late to make a difference through energy efficiency and conservation measures?
7. How can planting trees help counter the effects of global warming?
8. We don't have a hybrid vehicle, and can't afford to buy one right now. So, since my parents need to drive to work and drive me to school, it seems like reducing the amount of gas we use isn't really possible, is it?
9. Is it true that cars could run on cow manure?
10. I have heard that landfills can be a source of energy. How does that work?
11. What are the "three R's" of energy conservation?
12. How is energy measured?
13. What are some good ways to save energy at school?

1. How do power plants make energy?
Various energy sources are used to turn turbines. The spinning turbine shafts turn electromagnets that are surrounded by heavy coils of copper wire inside generators. This creates a magnetic field, which causes the electrons in the copper wire to move from atom to atom.

2. Why is it important for people in the United States to save energy? Aren't we just a relatively small part of a large plant?
Although Americans make up only 5 percent of the world's population, we use about 25 percent of the world's energy! And we consume about 15 times more energy per person than does a citizen of a typical third world country.

3. What kind of a difference does replacing a regular light bulb with an energy-saving bulb really make?
Replacing one incandescent light bulb with an energy-saving compact fluorescent bulb prevents 1,000 pounds of carbon dioxide from being emitted to the atmosphere from power plants, and saves $67 dollars in energy costs over the bulb's lifetime.

4. Which type of renewable energy is currently most relied on in the United States?
Hydropower. In 2004, it accounted for 7 percent of all the electricity generated in the United States, and 75 percent of all renewable energy.

5. What's the difference between global warming and the greenhouse effect?
The *greenhouse effect* is created because certain gases sent into our atmosphere, such as carbon dioxide, allow radiation from the sun to pass through the earth's atmosphere, but

prevent a portion of the infrared radiation from the earth's surface and lower atmosphere from escaping into outer space. This process occurs naturally; without it our planet's temperatures would be about 60 degrees cooler! Life as we know it simply would not exist without the natural greenhouse effect. However, *global warming* is happening because the greenhouse effect has become intensified primarily by the burning of fossil fuels, which adds more carbon dioxide and other gases to the atmosphere and increases the warming process.

6. Since global warming is already in effect, isn't it too late to make a difference through energy efficiency and conservation measures?
No! If we get serious about energy-saving practices, we can lower our energy costs by several hundred dollars per household per year and reduce greenhouse gas emissions to below where they were in 1990.

7. How can planting trees help counter the effects of global warming?
Trees take carbon dioxide out of the air and give back oxygen, thus helping reduce the excess of greenhouse gases hovering in the atmosphere and heating up the planet.

8. We don't have a hybrid vehicle, and can't afford to buy one right now. So, since my parents need to drive to work and drive me to school, it seems like reducing the amount of gas we use isn't really possible, is it?
Of course it's possible! There are numerous other ways to reduce gasoline usage short of switching to a hybrid or electric vehicle. Carpooling, biking, and walking are three excellent ways to significantly reduce gas usage, as are telecommuting for work and riding public transportation. Also, combining trips to school or work with routine errands cuts down significantly on miles traveled.

9. Is it true that cars could run on cow manure?
Yes! Manure can be made into a gas containing methane. (Methane is the same energy-rich gas found in natural gas.) Certain types of bacteria emit this gas as they consume the waste collected in special air-free tanks. The mixture of gases produced in this way, called bio gas, can then be used in some modified car engines instead of gasoline, or burned in a boiler to generate heat or electricity.

10. I have heard that landfills can be a source of energy. How does that work?
Just like manure, other types of organic waste emit methane as they decompose—or rot—in the landfill. Landfills can collect and treat the methane, and then sell it as a commercial fuel; or they can burn it to generate steam and electricity. Today, there are almost 400 gas energy landfill projects operating in the United States.

11. What are the "three R's" of energy conservation?
Reduce, reuse, and recycle. Some ways you can **reuse** items to **reduce** waste are to bring your lunch in a lunch box instead of a paper bag, use both sides of each sheet of paper, buy products in bulk, bring your old grocery bags to the store when you shop, and give away old toys and clothes. Encouraging your family and school to **recycle** cans, bottles, papers, and plastics is also an excellent way to conserve energy and natural resources.

12. How is energy measured?
There are many ways to measure energy. One of the basic measuring blocks for energy is called a "Btu," standing for British thermal unit. A Btu is the amount of heat energy it takes to raise the temperature of a pound of water by one degree Fahrenheit, at sea level. One Btu equals the heat generated by about one blue-tip kitchen match. One thousand Btu's is roughly equivalent to the energy your body receives from eating an average candy bar.

13. What are some good ways to save energy at school?
Make sure the lights and computers are turned off before recess, lunch, and after school; make sure books or furniture do not block the vents in your classroom; keep doors and windows closed when heating or air conditioning is running; turn off the water in the bathroom when you are finished using it; and report any water leaks you find to an adult.

Experiment Tips

Here you'll find guidance and tips for the science experiments and activities on this site:

- **What Energy Sources Do You Use?**
- **How Is a Pinwheel Like a Turbine?**
- **Build an Electrical Circuit**
- **Fun Tests**
- **The Energy Pie**
- **Pocket Your Energy Savings**
- **Make a Mini Greenhouse**
- **Bag It-Paper or Plastic?**

What Energy Sources Do You Use?

This activity appears in the section "Learn About Energy." This activity asks students to list energy-using items they use at home, and the energy sources that power these items.

Students' lists should look something like the first two columns below. (The third column is optional for more advanced students who wish to record the forms of energy that apply to each energy source on their list.)

Energy-Using Item	Energy Source	Forms of Energy
Example: space heater	*electricity*	*electrical, radiant*
Example: fireplace	*wood or natural gas*	*chemical, radiant*
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		

Extension:
Students may include items like bikes or skateboards that require human energy to go. This is a good opportunity to discuss how people need food energy for physical activity, growth, healing, thinking, and so on—making food the most important energy source on the planet!

How Is a Pinwheel Like a Turbine?

Materials:
Students will need the materials listed on the website:

- Plastic pinwheel on a stick
- Teakettle
- Hot plate or stove burner
- Oven mitt
- A printed copy of this activity
- A pencil to write your answers

Objective:
Students will witness various forms of energy transfer. When placing the blade of the pinwheel under a stream of running water, they will see the mechanical energy of water transferred to mechanical energy of the pinwheel. When heating the teakettle on the burner, students will see the electrical energy from the burner change to heat (radiant energy) that is transferred to water. When students hold the pinwheel blades in the path of the steam and the blades turn, they will see that the mechanical energy of moving steam is transferred to mechanical energy of the moving pinwheel blades.

Safety First:

- Students should be supervised by an adult while doing this experiment.
- Students should use an oven mitt to protect their hand.

Getting It Across:
Have students read the information and follow the steps on the page. Explain that in this experiment, the energy source that was used to create the steam is whatever energy source is used to run the stovetop: probably electricity or natural gas. In power plants, the steam that is used to run generator turbines can be created from a variety of energy sources, including coal, oil, natural gas, and nuclear power. Even geothermal energy and biomass can be used to provide steam.

Questions and Answers:
1. Place the blades of a pinwheel under a stream of cold running water. What happens? (The blades turn.) What kind of energy transfer is taking place? (The mechanical energy of water is transferred to mechanical energy of pinwheel.)

2. Fill the teakettle about half full of water and place it on the burner. Turn the burner on. What kind of energy transfer takes place as the water heats up? (Electrical energy from the hot plate changes to heat, radiant energy that is transferred to water.)

3.What happens when you hold the pinwheel blades in the path of the steam when the kettle boils? (The blades turn.) What kind of energy transfer is taking place? (Mechanical energy of moving steam is transferred to mechanical energy of moving pinwheel blades.)

Build an Electrical Circuit

Materials:
Students will need the materials listed on the website:
- D-cell battery
- A 1.2-volt light bulb with matching base
- 2 pieces of insulated wire with 1 inch stripped on each end
- Masking tape
- A printed copy of this activity
- A pencil to write your answers

Objective:
Students will build a circuit and gain an understanding that in order for electricity to travel where we need it, there must be a complete circuit of electricity. Students should realize that a complete circuit is like a circle. Students will learn that electricity is produced at one place, travels around the circuit, and returns to the starting place.

Safety First:
- Students should be supervised by an adult while doing this experiment.
- A teacher or another adult should be responsible for stripping insulation.
- Explain to students that electricity can be dangerous if it is not handled correctly, and emphasize that they should never experiment with the electricity that comes from a wall outlet. It's much more powerful than the electricity made by small batteries and could seriously injure or even kill someone.

Experiment Tips:
Teachers should strip the wires ahead of time and make sure the batteries are fresh. Use tape to stick the wires to the ends of the battery.

Getting It Across:
Have students read the information and follow the steps on the page. Make sure they are able to identify the circuit electricity travels from the battery to the light bulb and back, and the circuit electricity travels from power plants to homes and back. They should be able to equate the wires in the experiment with power lines and electrical wiring in the electric distribution system.

Questions and Answers:
- Ask students to share their predictions and results after building a complete circuit from the battery to the light bulb and back again. Were the results the same? If not, why not? (Answers will vary. Be sure the experimental setup was not at fault.)
- Ask students to share their predictions and results of what happened when adding 10 or more light bulbs to the circuit. (Answers will vary.)
- What adjustments would you have to make to be sure that all the bulbs would light up? (You would have to add more batteries.)

Fun Tests

The Fun Tests activity includes two tests that students can do at home.

- The first test measures the water flow of their showerhead. If the shower fills a half-gallon milk carton in less than 10 seconds, it is using more water than an energy-efficient showerhead would use.
- The second test has students search for air leaks around doors, windows, and air conditioners and notify their parents of any leaks they find. This activity can be done at home or at school.

The Energy Pie

The Energy Pie activity asks students to guess at how much of home energy use goes to power various activities in a typical home. Encourage students to print the Energy Pie and label it with their guesses before they click the answer key.

- Lighting – 10%
- Heating and Cooling – 49%
- Refrigerator – 5%
- Water Heater – 13%
- Home Electronics – 7%
- Other Appliances – 16%

Pocket Your Energy Savings

The Pocket Your Energy Savings activity asks students to implement a home energy saving program for three months and track actual savings on energy bills. The objective of this activity is to make students aware that people pay for the energy they use, and that this usage can be reduced with some simple energy conservation measures.

Please note: If students have moved recently, this activity will not be successful. Also, some parents may be reluctant to send to school personal information such as that found on utility bills. Teachers will need to assess the possibilities for success with this activity before assigning it to all students.

Utility Bill Analysis:
Make sure students understand why they should compare the same three months of this year's and last year's bills—so they are comparing periods that have roughly the same weather patterns and family habits. Ask students to bring their utility bills to class so you can help them with the analysis part of the activity. Make sure students are comparing actual energy used, not dollar costs. Help them look for these totals, which will show up in kWh used.

Results:
In some cases students may find that even though their household energy use went down for the months they saved energy compared to those months in the prior year, their bills went up due to increased energy costs. Some students may find that despite their energy conservation efforts they were not able to reduce household energy use compared to last year. Solving this mystery will take some detective work:

- Have students think carefully about the activities in their home that might have contributed to this. For example, if students had more people living in their home or visiting in the current year period, this means more energy was used to run dishwashers, clothes washers and dryers, and water heaters for hot showers. If people were away on vacation, less energy would have been used.
- If the current year period was a lot hotter or colder than the prior year period, this means more energy was used to run the heat or air conditioning for longer periods of time or at higher settings.
- Or, if the household added some new appliances (such as a second refrigerator or freezer) in the current year, this will also increase energy use.

Make a Mini Greenhouse

Materials:
Students will need the materials listed on the website:
- Two large glass bottles or jars of the same size
- One piece of plastic wrap (or a recycled plastic bag)
- One rubber band
- Four ice cubes, all the same size

- Optional: two thermometers that will fit inside the bottles
- A printout of this experiment
- A pencil

Objective:
This experiment will help students understand how the greenhouse effect works. Students will learn that the greenhouse effect is the rise in temperature that the earth experiences because certain gases in the atmosphere trap heat energy from the sun. The students should understand that the plastic wrap holds the heat in the bottle just as the clear greenhouse gases trap heat in the earth's atmosphere.

Getting It Across:
Have students read the information and follow the steps on the page. Students may assume that the uncovered bottle will let in more sunlight, thus predicting that temperatures will be higher and the ice will melt faster in this bottle. Allow this type of prediction without correcting it, as students will learn otherwise during the course of the experiment.

Questions and Answers:
Discuss students' predictions and why they were correct or not correct.

- Did one bottle of ice melt faster than the other? Why? (The covered bottle of ice should have melted faster than the uncovered bottle because the plastic traps the heat inside the bottle.)
- How are your observations related to the transfer of radiant energy? (Radiant energy from the sun was transferred to the ice through the plastic.)
- How are your observations related to the greenhouse effect? (The plastic wrap over the top of the bottle is like the layer of greenhouse gases in our atmosphere that are trapping heat from the sun.)

Analysis:
When fossil fuels are burned to produce energy, gases such as carbon dioxide, methane, and ozone are released into the atmosphere. Without these gases, heat would escape back into space. These gases act like a thin film, or greenhouse, that keeps heat from the sun inside our atmosphere. As human activity has added more greenhouse gases to our atmosphere, the earth's climate has become gradually warmer, resulting in "global warming." Global warming can cause glaciers to melt, increasing sea levels. It can cause extreme weather, droughts, and floods. It can alter plant and animal habitats, forcing animals to move or die out. Hotter and colder temperatures, and then the need for more energy use, will also affect humans.

So no matter what resources your energy comes from, using energy efficiently at home, at school, and on the road is a very good way to reduce greenhouse gases and help our planet stay healthy.

Bag It-Paper or Plastic?

This activity appears in the section "Help the Environment."

The purpose of this activity is to help students understand the many ways that energy is involved in manufacturing grocery bags, and to motivate them to reuse and recycle these bags. Encourage students to follow the instructions and write down all the ways they think energy might be used to make each type of bag before they click on the answers.

Extension:
This activity could be the springboard for a class discussion of how energy is used in other types of manufacturing, or (for older students) for research projects on energy use in various industries.

Activity:
When the grocery clerk asks you "Paper or plastic?" do you think about the energy that was used to make those bags?

- About 700 paper bags can be made from one 15-year-old tree. A large grocery store can use that many bags before lunch! Trees are considered a renewable resource if they are replanted regularly, but it still takes energy to make those bags.
- Plastic bags start out as either oil or natural gas. Oil and natural gas are fossil fuels that are nonrenewable energy resources.

Take out a paper and pencil (remember to use both sides of the paper!) and write down all the ways you can think of that energy is used to make a paper bag. For example, logging trees to make paper bags uses big machinery that runs on fossil fuels. Then do the same for plastic bags.

Paper Bags:
Here are some of the energy-using steps involved in making paper bags from trees and transporting them to the grocery store:

- Logging trees uses big machinery that runs on fossil fuel.
- Building roads to get to those trees uses fossil fuels, as do the machines needed to drag the trees out of the forest.
- The mill uses energy to heat and dry the logs and to chip them into small pieces. They are cooked with lots of heat and pressure to make pulp—that takes energy, too.
- The pulp is washed with thousands of gallons of water, which takes energy to pump and deliver and dispose of.
- Once the paper is made, it takes energy to cut and print and make into bags at the bag factory.
- It takes energy to deliver the bags to the store.
- If you throw paper bags away, it takes energy to deliver them to the dump or landfill.

Plastic Bags:

Here are some of the energy-using steps involved in making plastic bags from oil and transporting them to the grocery store:

- Oil needs to be pumped from the ground with large fuel-burning machinery.
- The oil is then delivered by truck or pipeline to a refining facility. It takes energy to build the pipeline and to drive the truck
- The refining facility, which usually runs on electricity, makes the oil into pellets.
- A component of oil called polyethylene is used to make plastic bags. A machine heats the polyethylene to a very high temperature—this takes heat energy.
- Other energy-using machines cut the bags, cut holes for handles, and print things on the bags.
- Then trucks use energy to deliver the bags to warehouses and stores.
- If you throw plastic bags away, it takes energy to get them to the dump or landfill.

Student Worksheets

- Learn About Energy
- Use Energy Efficiently
- Help the Environment
- Want to Know More?
- Answer Key for All Worksheets

These worksheets review the key science principles from the main thematic sections of *Energy Efficiency World*. They are designed to print on one page each for your convenience. Here are some ideas for how to use them with your class:

- For younger students, use the questions to orally review basic information with the whole group.

- For older students, use as a pre/post-test to assess student understanding of key facts and principles before and after visiting specific sections of *Energy Efficiency World*.

- Put students into small groups and assign each group several questions; ask them to use the website to find the answers in the sections shown.

- After all students have completed all sections of the website and you have reviewed the worksheets, organize the class like a game show. Contestants can continue to answer questions until they get one incorrect, at which point a new contestant takes their place.

Energy Efficiency World
Student Worksheet #1

LEARN ABOUT ENERGY

Name:_____**Date:**_____

1. Energy is the ability to _____

2. List at least three forms of energy.

   _____

   _____

   _____

3. Nuclear energy is energy contained in the center of an _____.

4. Give a real-life example of how energy can be transformed, or changed, from one form to another:_____

   _____

5. A nonrenewable resource is a resource that

   _____

6. Give an example of a renewable resource.

   _____

7. Very little of the electricity people use is produced by generators in power plants. (True or False?) _____

Energy Efficiency World

Student Worksheet #2

USE ENERGY EFFICIENTLY

Name:_____**Date:**_____

1. Energy efficiency means changing or moving the _____ matter with the _____ amount of energy.

2. Why is energy efficiency important?

   _____

   _____

3. List two ways to conserve (use less) energy.

   _____

   _____

4. Draw a picture of someone using energy efficiently in their home.

5. What are two types of new appliances that might feature the ENERGY STAR label, which helps people find super-efficient models?

   _____

   _____

Energy Efficiency World

Student Worksheet #3

HELP THE ENVIRONMENT

Name:_____**Date:**_____

1. The earth has an unlimited amount of fossil fuels and humans are using them very slowly. (True or False?) _____

2. Renewable energy sources are sometimes called "green _____" because they help keep _____.

3. The greenhouse effect is caused by gases acting like a thin layer that keeps heat from the sun inside our _____.

4. How do trees help our environment?

   _____

   _____

5. Recycling helps the environment by reducing trash, saving space in our landfills, and saving energy. List three common items that you can recycle.

   _____

   _____

   _____

6. Draw a picture demonstrating a way that you can reduce waste and reuse items. (Use a separate piece of paper.)

Energy Efficiency World

Student Worksheet #4

WANT TO KNOW MORE?

Name:_____**Date:**_____

1. Most of the electricity used in the world is generated from _____ that burn _____ to heat water and make steam.

2. List the three forms of fossil fuels and give a brief description of each:

   _____

   _____

   _____

3. The type of energy that is steam (or hot water that has been converted to steam) and that comes from deep inside the earth is called _____.

4. Three ways to generate electricity are:
   Hydropower: uses the power of falling _____.
   Ocean energy: uses the energy of the _____ waves and tides.
   Wind power: users the force of the_____ to spin turbines.

5. What are three types of alternative fuel vehicles?

   _____

   _____

   _____

6. What are some of the benefits of people-powered vehicles?

   _____

   _____

Worksheet Answer Keys

These one-page worksheet answer keys correspond to the student worksheets from the main thematic sections of *Energy Efficiency World*.

- Learn About Energy
- Use Energy Efficiently
- Help the Environment
- Want to Know More?

Energy Efficiency World

Student Worksheet #1 Answer Key

LEARN ABOUT ENERGY

1. Energy is the ability to change or move matter.

2. Students should list at least three of the following forms of energy: chemical, mechanical, radiant, electrical, and nuclear.

3. Nuclear energy is energy contained in the center of an ***atom***.

4. Answers will vary. Students may mention: riding a bicycle, sitting in the sun, eating, using a toaster, or using a car as real life examples of how energy can be transformed, or changed, from one form to another.

5. A nonrenewable resource is a resource that can be ***used up***.

6. Answers will vary. Students may give the following as examples of renewable resources: wood, wind, sunshine, geothermal energy, biomass, and water stored behind dams in lakes and reservoirs.

7. False: Most of the electricity we use is produced by generators in power plants.

Energy Efficiency World

Student Worksheet #2 Answer Key

USE ENERGY EFFICIENTLY

1. Energy efficiency means changing or moving the **most** matter with the **least** amount of energy.

2. Energy efficiency is important because it saves precious energy resources, helps the environment, and reduces families' energy costs.

3. Some ways to conserve energy are to turn out lights and take shorter showers. Students may or may not be able to distinguish between conserving energy, which means using less, and energy efficiency, which means using less energy while getting more service from your appliances.

4. Pictures will vary. Students may include any of the following examples, or others:
    - Using a compact fluorescent light bulbs
    - Using an energy-efficient showerhead
    - Turning off lights/appliances when not in use
    - Closing refrigerator door
    - Keeping air conditioner at 76-78 degrees F
    - Turning down heat
    - Using window coverings wisely
    - Shutting the door
    - Washing full loads of dishes or clothes
    - Fixing a leak
    -

5. Appliances that might feature the ENERGY STAR label (which helps you find super-efficient models) could include a refrigerator/freezer, a dishwasher, a clothes washer, a furnace, an air conditioner, a computer, a television, a VCR, a ceiling fan, light bulbs, and light fixtures.

Energy Efficiency World

Student Worksheet #3 Answer Key

HELP THE ENVIRONMENT

1. False: the earth does not have an unlimited amount of fossil fuels and humans are using them too fast.

2. Renewable energy sources are sometimes called “green power” because they help keep our planet healthy.

3. The greenhouse effect is caused by gases acting like a thin layer that keeps heat from the sun inside our atmosphere.

4. Trees help our environment by absorbing carbon dioxide from the atmosphere.

5. Aluminum, glass, and paper are three common items that you can recycle.

6. Drawings will vary and may include: bringing lunch box to school, using both sides of paper, buying bulk products, bringing your own bags to the store, and giving away old toys and books instead of throwing them away.

Energy Efficiency World

Student Worksheet #4 Answer Key

WANT TO KNOW MORE?

1. Most of the electricity used in the world is generated from power plants that burn fossil fuels to heat water and make steam.

2. Three forms of fossil fuels are: coal, which is a hard, black, rock-like substance made up of carbon, hydrogen, oxygen, nitrogen, and sulfur; oil, which is a liquid fossil fuel that is sometimes called petroleum; and natural gas, which is primarily made up of a gas called methane.

3. Geothermal is the type of energy that is steam (or hot water that has been converted to steam) that comes from deep inside the earth.

4. Hydropower uses the power of falling water. Ocean energy uses the energy of the ocean's waves and tides. Wind power uses the force of the wind to spin turbines.

5. Battery electric vehicles, hybrid electric vehicles, natural gas vehicles, fuel-cell vehicles, biodiesel vehicles, and people-powered vehicles are some alternative fuel vehicles.

6. Some benefits of people-powered vehicles are that they produce no pollutants and help keep the environment healthy. They also contribute to personal health with exercise, helping people avoid obesity and heart disease. Finally, people are easy to fuel—all it takes is food!