# **Energy Discussion Guide (for use during or after reading)**

1. What is energy? Describe the different jobs energy can do. (What Can Energy Do?, p. 6-7)
   1. Energy makes things move and do work. It is all around us! Energy can be used to set objects in motion by pushing or pulling. In addition, energy can cause things to change form. For example, heating water causes it to boil and change form into steam.
2. What happens to the energy stored in plants and animals when they die? (Where Does Energy Come From?, p. 8-9)
   1. When plants and animals die, worms and other small living things break them down into matter which releases nutrients in the soil that help new plants grow. This helps continue plant and animal life cycles.
3. Describe the different forms of energy by explaining what they are, where they come from, and/or how they are used. (Forms of Energy, p. 10-13)
   1. Heat energy can be used to run our homes, power machines, melt materials, and even make electricity. Heat can be made by building fires and mixing chemicals. You can also feel heat energy coming from the sun.
   2. Light energy can also come from the sun. In addition, light energy can come from objects such as computer screens or lamps.
   3. Sound energy travels in waves. You can hear sound energy.
   4. Motion is a form of energy! Energy in use is considered kinetic energy.
   5. Electricity is also energy. It is used to power nearly all appliances and electronics. Electricity also exists in nature and can take the form of lightning.
   6. Chemical energy is stored within the molecules of a chemical and is used inside your body. Chemical energy comes from the food you eat! Chemical energy can also be used to make transportation possible. Burning fuels usually releases chemical energy.
4. What is the difference between kinetic energy and potential energy? (Stored Energy, p. 14-15)
   1. Kinetic energy is the energy of motion. Potential energy is energy that is stored in an object or system. Potential energy can be converted into kinetic energy.
5. Give an example to illustrate the concept that energy can be changed but it cannot be destroyed. (Changing Energy, p. 16-17)
   1. Energy cannot be created or destroyed. Instead, energy moves and changes forms. For example, heat energy can cause an ice cube (a solid) to melt into water (a liquid). Continuing to apply heat energy can cause that liquid to evaporate into water vapor (a gas).
6. Why are coal, oil, and natural gas considered nonrenewable resources? (Fossil Fuels, p. 20-21)
   1. Nonrenewable resources cannot be replenished once they are used up. Coal, oil, and natural gas are finite resources. Once we use up Earth’s supply, we cannot create more, therefore they are considered nonrenewable.
7. What are renewable resources? Provide at least two examples. (Renewable Resources, p. 22-23)
   1. Renewable resources are natural resources that can be replaced after they have been used. For example, wind and moving water are considered renewable resources because they can be used to convert energy and are not going to run out.
8. Provide an example of an environmental problem caused by burning fossil fuels. (The Effects of Energy Use, p. 24-25)
   1. Burning fossil fuels causes pollution because it releases dirt and other wastes that harm the environment. In addition, burning fossil fuels releases gas into the air that traps the sun’s heat in Earth’s atmosphere. Scientists believe this buildup of gas is causing Earth to warm.
9. Describe ways in which the text suggests individuals, scientists, and societies can reduce their energy use. (Reducing Energy Use, p. 26-27).
   1. According to the text, people can be more aware of their energy use. Turning off unused electric appliances or lights can reduce energy use. People can also consider driving less by biking or taking public transportation instead.
10. Who was James Joule and what impacts did he have on science? (Who’s Who: James Joule, p. 32-35)
    1. James Joule was a scientist and a brewer. He studied how different kinds of energy are related. Eventually his work showing how electricity produces heat became known as Joule’s law.