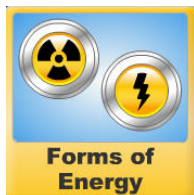
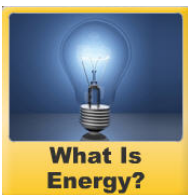


Energy Makes It Happen

What is a Fun-damental?

Each Fun-damental is designed to introduce your younger students to some of the basic ideas about one particular area of science. The activities in the Fun-damental provide essential background knowledge that students need before they move on to the more difficult concepts that are presented in other parts of **Discovery Education Science**. In *Energy Makes It Happen*, students are introduced to energy and its uses, forms of energy, and how energy changes from one form to another.

All Fun-damental activities encourage active exploration. Students should try different choices and combinations within each activity. Some responses will be correct, and the student will receive an explanation of why the response is correct. Some responses will not be correct, and the student will receive an explanation of why the response is incorrect. In online activity learning, incorrect responses are often more valuable for learning than correct responses. The Fun-damental can be used by individuals, small groups, or as a whole-class demonstration.



The home page offers two choices: *What Is Energy?* in which students examine what energy is and how it gets used, and *Forms of Energy* in which students look at the different forms of energy and how energy sometimes changes from one form to another.

The **Home** button at the top of the screen will always bring students back to this home page. Clicking the **speaker** button at any time will activate the text reader to read the text on that screen.



What Is Energy?

How the Fun-damental Works

The first part of the *Energy Makes It Happen* Fun-damental is *What Is Energy?* In this part, students do activities designed to familiarize them with the following content objectives:

- Energy is something used to make something move, make it move differently, or to change its position.
- Energy is also something used to change matter in some way.

What Is Energy? explains what is meant by “energy” by showing students a series of four interactive screens. On each screen, students are asked to click on something in the illustration to demonstrate one use of energy. These four uses of energy make up a working definition of energy.



On the first screen, students click on a girl’s foot to kick a soccer ball. This demonstrates that energy is needed to make an object move. On the second screen, students click on a drumstick that strikes a drum. This demonstrates that energy vibrates matter to make sound. On the third screen, students click on a tennis racket to hit a moving tennis ball. This demonstrates that energy is needed to change the movement of an object that is already moving. On the fourth screen, students click on a stove burner to melt a pan of chocolate. This demonstrates that energy can be used to change matter.

(*Note:* In this Fun-damental, in order to concentrate on forms of energy and on a simple introduction to energy changing forms, we discuss energy without making use of the concepts of force and work. Energy is really a description of what a force can do. The girl kicking the soccer ball does work. She uses her own kinetic energy to apply a force to the soccer ball, which makes it move. That gives the ball kinetic energy.)

Student Worksheets

Check In: What Is Energy?

The *Check In: What Is Energy?* worksheet is an excellent way for your students to remain on task and to record useful, relevant information. You should print out the Check In worksheet and provide it to your students before they attempt to do the Fun-damental. Have your students read the focus questions next to the notebook icons, as well as the Overview and Think About This sections.

In this activity, students are asked to record examples of specific activities that use energy in one of four ways. You should call students' attention to the table in their *Check In: What Is Energy?* worksheet before they do the activity so that they do not need to go back and repeat it in order to fill in the table. Students will need this information to answer questions on their Check Out worksheet.

Check Out: What Is Energy?

Here are examples of possible student responses to the questions on the *Check Out: What Is Energy?* worksheet:

1. What is energy? *Energy is something you can use to move objects or change the way they are moving. Energy can also change matter.*
2. Describe four ways in which energy is used. *Students should provide the uses listed in the table on their Check In worksheet. Energy is needed to move an object (kicking the soccer ball). Energy causes things to vibrate to make sound (hitting the drum). Energy changes how an object moves (hitting the moving tennis ball). Energy changes matter (melting the chocolate).*
3. Give an example of energy being used to change matter. *Melting chocolate or melting ice are two examples of thermal energy changing matter.*
4. Let's say you are riding a bike on flat pavement. You are going slow and want to go faster. How do you use energy to make the bike go faster? *To make the bike go faster, you add energy by pushing on the pedals to turn the wheels.*

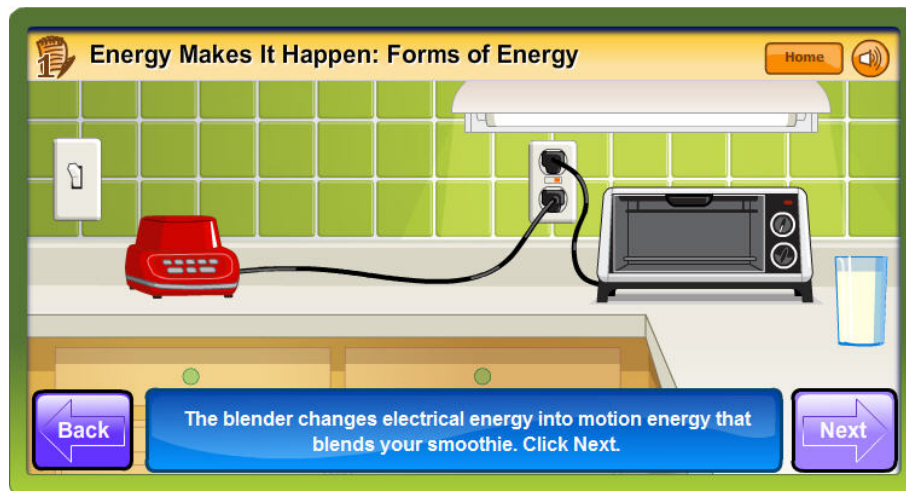
Forms of Energy

The second part of the *Energy Makes It Happen* Fundamental is called *Forms of Energy*. In this part, students do activities designed to familiarize them with the following content objectives:

- Forms of energy include light, motion, sound, thermal, and electricity.
- Some energy is stored in matter. Nuclear and chemical energy are forms of stored energy.
- Some forms of energy can be sensed, such as seeing or feeling motion, seeing light, hearing sound, or feeling heat from thermal energy.
- Other forms of energy, such as nuclear radiation, are invisible, but we can see the things they do.
- Stored energy is not sensed until it becomes a different type of energy.

In the first part of *Forms of Energy*, students look at different forms of energy. Introductory screens remind students that they are already familiar with different forms of energy, such as motion energy, electricity, sound, and thermal energy. (*Note: Thermal energy is often confused with heat. Heat is the transfer of thermal energy from one object to another. When a person uses thermal energy to "heat up" material in an object, that*

means he or she is transferring thermal energy to that material. Adding thermal energy increases the object's temperature.)



In the activity, students take a trip to the kitchen to make lunch using different forms of energy. They turn on a light switch to change electrical energy into light energy so that they can see. They use a blender to change electrical energy into motion energy to make a smoothie. They use a toaster oven to change electrical energy into thermal energy to warm up a piece of leftover pizza. Finally, students are reminded that food itself is a form of stored energy. Food is chemical energy your body uses as fuel to provide your body systems with the energy they need to function.



In the second part of *Forms of Energy*, students examine which of the five human senses are useful in detecting different forms of energy. On each of four screens, students click on icons for each of the five senses, looking for the sense or senses useful in detecting that type of energy (light, sound, thermal, and motion energy). In each case, one sense is clearly the best for detecting that form of energy. However, be sure that your students click on all of the sense icons so that they are reminded of second or third senses that

might also be used to detect that form of energy. For example, you hear sound. But you can sometimes see how a thing making the sound vibrates or you can feel it vibrate. Your students may wonder why the nose doesn't sense energy from the pizza. If this question comes up, it may be a good stopping point for you to have a discussion. Students may confuse sensing energy with sensing odor. Odor is not energy. Odor is caused by molecules in the air being sensed by the nose.

Several screens follow the last activity in *Forms of Energy*. These screens remind students that some forms of energy are dangerous and often invisible, such as electricity, nuclear energy, and even some forms of solar energy, such as the ultraviolet rays that cause sunburn.

Student Worksheets

Check In: Forms of Energy

The *Check In: Forms of Energy* worksheet is an excellent way for your students to remain on task and to record useful, relevant information. You should print out the Check In worksheet and provide it to your students before they attempt to do the Fun-damental. Have your students read the focus questions next to the notebook icons, as well as the Overview and Think About This sections.

Check Out: Forms of Energy

Here are examples of possible student responses to the questions on the *Check Out: Forms of Energy* worksheet:

1. Name four forms of energy. *Light, motion, sound, thermal, chemical, nuclear, and electrical*
2. Give an example of motion energy. What is moving? What makes it move?
Student answers will vary. A kicked football is an example of something moving. The person who kicked the ball with his or her foot added energy to make the ball move.
3. Name the different forms of energy that are involved in making a grilled cheese sandwich. How is each form of energy used in making the sandwich? *Motion energy is used to make the sandwich out of bread, butter, and cheese. Thermal energy from the stove's burner heats up the pan. Thermal energy from the pan grills the bread and melts the cheese to make the sandwich. Motion energy is used to remove the sandwich from the pan and put it on a plate to serve.*
4. Which of your senses do you use to detect light energy? *Seeing or the sense of sight*
5. Which of your senses do you use to detect sound energy? *Hearing and sometimes touch*

6. A book falls off a desk behind your back. Describe two ways that you are able to sense energy from that book falling and hitting the floor. *You hear the sound energy released when the book hits the floor. You probably feel the vibration from the book hitting the floor as well.*

In the Classroom

As a Teacher Demonstration

Using a teaching station computer with projection device, you can use the Fun-damental to demonstrate basic principles to the entire class. For example, use the first activity in *Forms of Energy* to start a class discussion about the different forms of energy in the kitchen and how energy changes from one form to another. Ask students for other examples of energy in the kitchen. For example, a gas burner on the stove releases thermal energy by burning natural gas, which is a form of stored chemical energy. Distribute the Check In worksheet before any demonstration and use it to guide student participation. When you finish, pass out the Check Out worksheet and ask students to work in pairs as they complete it.

With Small Groups

Students can also use the Fun-damental in small groups. Have the groups complete the Check In and Check Out sheets as a team. When they finish, have each group summarize its findings in a chart in the front of the room. When all groups have finished the activities, have the class discuss the chart. Then review the answers to the Check Out sheet.

Students Working Alone or in Pairs

If students work alone or in pairs with the Fun-damental, make sure that they have the Check In worksheets and that they understand how the Fun-damental works. You might introduce the topics, such as uses of energy and forms of energy, with the entire class before individuals begin their work at the computer. When students finish each part of the Fun-damental, have them complete the appropriate Check Out sheet. Tell them ahead of time that they can use their Check In worksheets to do that.