

Forms of Energy

SC.3.P.10.1: Identify some basic forms of energy such as light, heat, sound, electrical, and mechanical.

SC.3.P.10.2: Recognize that energy has the ability to cause motion or create change.

SC.3.P.10.3: Demonstrate that light travels in a straight line until it strikes an object or travels from one medium to another.

SC.3.P.10.4: Demonstrate that light can be reflected, refracted, and absorbed.

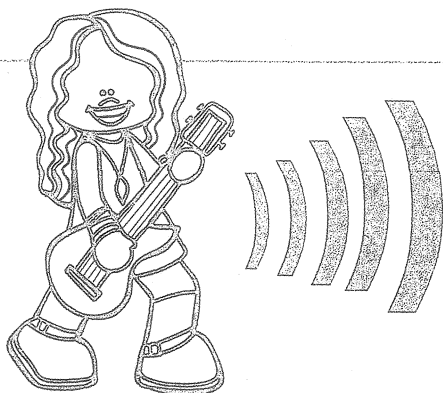
3rd grade forms of energy

Approved
11/16/23
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Sound Energy

What's your favorite kind of music? When you listen to music, you are listening to sound energy. Sound energy is made when matter vibrates or moves back and forth quickly. When you hear a guitar, you can feel the strings vibrate.

All sound is made by matter vibrating. Once an object starts vibrating, it shakes the air around it and this makes waves in the air. These waves, called sound waves, carry sound through the air and to your ear.

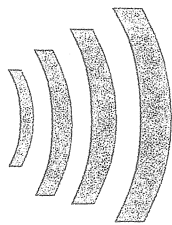


Sound travels through solids. Have you ever heard a dog barking outside? That sound can travel through the walls and windows of your house. Sound travels fastest through solids.

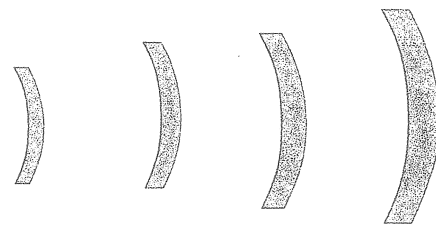
Sound travels through liquids. Have you ever been underwater when a friend jumps in the pool? Even though it is muffled, you can still hear under water. Sound travels through water in waves just like it does through the air.

Sound travels through gasses. Solids travel slowest through the air. A purring kitten makes sound waves that travel through the air to your ears.

A pitch is how high or how low a sound is. A sound with a high pitch is made by an object vibrating quickly. The sound waves are close together. Usually, smaller objects have a higher pitch. On the other hand, a low pitch is made by objects vibrating slowly. The slow sound waves move farther apart.



A high pitch is made by sound waves vibrating quickly and close together.



A low pitch is made by sound waves vibrating slowly and further apart.

1. How is sound energy made? _____

2. What makes sound waves?

- a. matter vibrating shaking the air
- b. straight lines of light
- c. moving particles
- d. reflections off of mirrors

3. True or false

_____ Sound travels faster through solids than liquids.

_____ All sound is made by vibrating matter.

_____ Sound travels the fastest through air.

_____ Sound travels through water in circles just like it does through air.

_____ Waves carry sound through the air to your ear.

4. What is pitch? _____

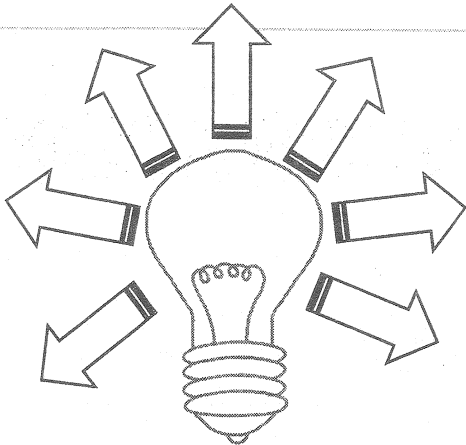
5. Fill in the blank. Sound with high pitches is made by an object vibrating _____, and low pitches are made by an object vibrating _____.

6. Name 2 examples of sound energy. _____

Light Energy

Light energy is energy you can see. Just like with sound energy, light energy travels in waves. The light waves travel away from the source of the light in all directions. They travel in straight lines and when they hit an object, you can see the object.

Unlike sound waves that can travel through solids, light waves can travel through gas and liquid but not solid matter.



Light waves travel in all directions.

Light and Color

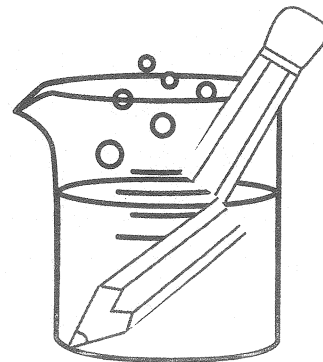
Light is made up of all the colors of the rainbow. When light hits an object, some colors are absorbed, or taken in by the object, while other colors are reflected. The reflected colors bounce back to your eyes. You see only reflected colors. Dark colors like black and navy blue absorb more energy from sunlight than light colors do.

Reflection

Reflection is the bouncing of light off of a surface. Light waves travel in a straight line but when it hits an object, it changes direction. Light reflects off of smooth surfaces. How light reflects off an object affects the colors we see. When you look at a mirror, you can see your reflection because of the way the light waves bounce off the mirror.

Refraction

Light waves travel through different mediums at different speeds. Light waves travel faster through air than through water. You can see this when you place a straw in a glass of water. The straw looks broken because the light refracts, or bends, as it passes from air to water.



Refracted light makes the pencil look broken.

1. What is light energy? _____

2. How are sound energy and light energy similar?
 - a. both are made by vibrations
 - b. both travel in waves
 - c. both travel from heat to cold objects
 - d. both refract
3. How are light waves different from sound waves?
 - a. they can travel through solids, liquids, and gases
 - b. they can only travel through gases and liquids
 - c. they can only travel through solids
 - d. they can only travel through solids and liquids
4. How does light travel?
 - a. in curved lines
 - b. in zig zag lines
 - c. in straight lines
 - d. in circular lines
5. What is the difference between reflection and refraction? _____

6. Why does a pencil in water appear to be broken?
 - a. light travels through air faster than water
 - b. light bounces off the mirror
 - c. light curves around the water
 - d. light cannot pass through water
7. Light is made up of all the colors of the rainbow. Why do we see only some colors when light hits an object? _____

8. Name 2 examples of light energy. _____

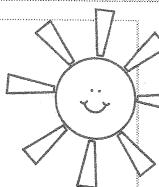
Heat Energy

Think back about when you learned about matter. All matter is made up of tiny, moving particles. Those moving particles have energy.

Particles with more heat energy move faster. Heat is the energy that moves between objects of different temperatures. Warm objects have more heat energy than cool objects. For example, hot chocolate has more heat energy than chocolate milk. Heat energy moves from warmer objects to cooler objects. When you drink hot chocolate, your mouth feels warm. The heat from the hot chocolate moves from the hot chocolate to your mouth.

Creating heat energy

Heat energy can stem from different kinds of energy. For example, when you build a fire in a fireplace, chemical energy changes into heat energy as the wood burns. Also, have you ever rubbed your hands together really fast? The mechanical energy changes into heat energy and your hands begin to feel warm. When you cook a pizza in the oven, the electrical energy from the oven changes into heat energy. Finally, light energy from the sun changes into heat energy and warms our Earth.

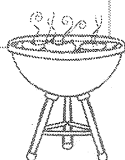


Heat vs. Hot

You may associate "heat" with meaning "hot", however, heat is a form of energy and hot refers to temperature. For example, we can agree that boiling water is hot – it has a lot of heat. Your pencil has heat too even though it doesn't feel hot. Ice also has heat even though it feels cold. In science, heat refers to the energy.

How does heat energy move?

Heat energy does not move in waves like it does with sound and light energy. Heat energy is an energy of moving particles. Heat energy moves through conduction, convection, and radiation.



1. **Conduction** is the movement or transfer of heat energy between two objects that are touching. For example, imagine putting a spoon in a bowl of hot soup. The heat is conducted from the soup, up the spoon, to your hand.

2. **Convection** is the transfer of heat within a liquid or gas. For example, when hot water is added to one end of the bathtub, eventually all the water in the tub becomes hotter. When convection occurs, heat is carried from one place to another by a gas or solid.

3. **Radiation** is the transfer of heat without matter. For example, the heat from the sun travels through the emptiness of space. Another example is a heat lamp. Even if the air is cold, the heat energy from a warm lamp can warm the food directly.

Name _____ Heat Energy

1. What is heat energy? _____

2. Which objects have more heat energy?

- a. cool
- b. warm
- c. both cool and warm
- d. freezing

3. How does heat energy move?

- a. through liquids
- b. zig zag lines
- c. from warm to cool objects
- d. from cool to warm objects

4. True or False. Heat energy is created from other forms of energy, such as chemical or mechanical energy. _____

5. True or False. Hot is the same as heat. _____

6. How is heat energy movement different from light and sound energy movement?

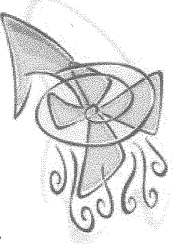
7. Match

- | | |
|------------------|---|
| _____ conduction | a. Transfer of heat without matter. |
| _____ convection | b. Transfer of heat between 2 touching objects. |
| _____ radiation | c. Transfer of heat within a liquid or gas |

8. Name 2 examples of heat energy. _____

Converting Energy to Motion

Cross-Curricular Focus: Physical Science



You use energy every day. Energy is the ability to cause change. Any time you move, you are using energy. When you bounce a ball or ride a bike, you use energy from your body to make the ball or the bike move. When your parents cook food for you to eat, they use heat energy to change the food from raw to cooked.

Not all energy is used as soon as you get it. Sometimes energy is **stored** to be used later. Stored energy can be chemical energy stored in a battery, or in your body. It can also be potential energy based on what position something is in. A ball at the top of a hill has potential energy because of its position. A soccer player standing ready to kick a ball has potential energy, too.

Energy of **motion** is also called kinetic energy. Potential energy **converts**, or changes into, kinetic energy when the thing or person begins to move. When the ball starts rolling down hill, or the soccer player kicks the ball, kinetic energy is now working. Energy often changes forms. When you switch on your light, electricity converts into light. When you eat, chemical energy from your food converts into thermal and mechanical energy that allows you to do work. When you switch on a cell phone, chemical energy from its battery converts into sound energy and light energy.

Name: _____

Answer the following questions based on the reading passage. Don't forget to go back to the passage whenever necessary to find or confirm your answers.

1) What is energy? _____

2) Energy that is based on a person or item's position is called _____

3) What is another name for energy of motion? _____

4) What is another way to say *changes into*? _____

5) What is kinetic energy? _____

Dear Mr. [Name],

I am writing to you regarding the [Project Name] which is currently in progress. We have received your feedback and are pleased to hear that you are satisfied with the results. The project has been completed and all the necessary documents are attached for your review.

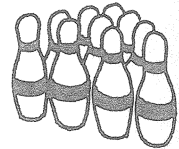
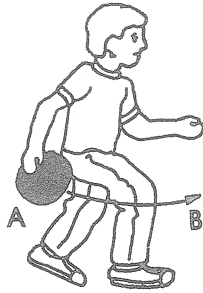
We have also received your request for a meeting to discuss the next steps. We are happy to accommodate this and will be in touch with you soon to schedule a convenient time. In the meantime, please let us know if there are any other questions or concerns you may have.

Thank you for your cooperation and support throughout the project. We look forward to continuing our collaboration and achieving our common goals. Please do not hesitate to contact us if you need any further assistance.

Sincerely,
[Signature]

Energy in Motion

Name _____



"Mom, how can I knock down more pins?" Matt asked. "You are bowling straight enough, Matt. Try rolling the ball faster, or try using a heavier ball," his mom replied.

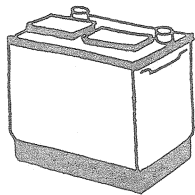
The bowling ball is doing work by knocking over the pins. The ball has kinetic energy. **Kinetic energy** is the energy of motion.

If the ball had more kinetic energy, it could do more work and knock down more pins. If you increase the mass of the ball or its speed, you would increase its kinetic energy.

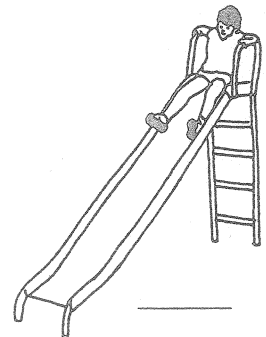
Just before Matt rolled the ball, he was standing still and not moving. Matt's body had stored energy that would turn into kinetic energy once he started swinging the ball. This stored energy is called **potential energy**.

- Write **P** next to the pictures that show potential energy and **K** next to the pictures that show kinetic energy.









- Look back at the picture of Matt getting ready to bowl.
 1. At what point will the ball have the most potential energy? _____
 2. At what point will the ball have the most kinetic energy? _____
 3. At what point will the ball have the least kinetic energy? _____
 4. At what point will the ball have the least potential energy? _____

Challenge

A roller-coaster car with more people in it will travel much faster than an empty car. Why?

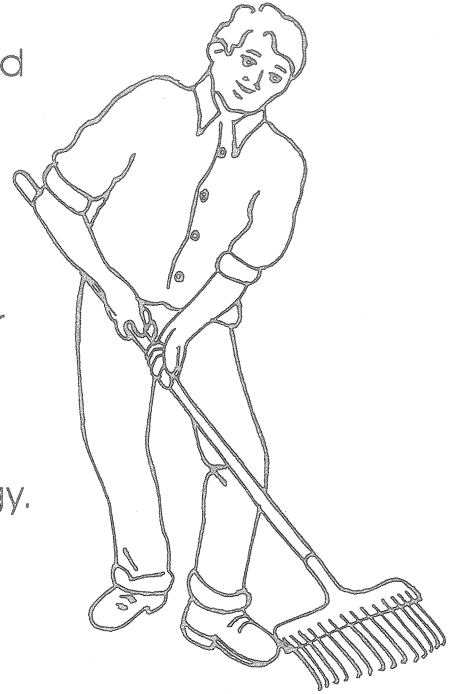
Energy

Name _____

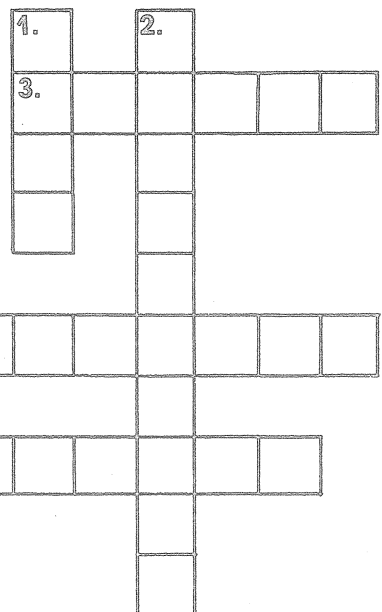
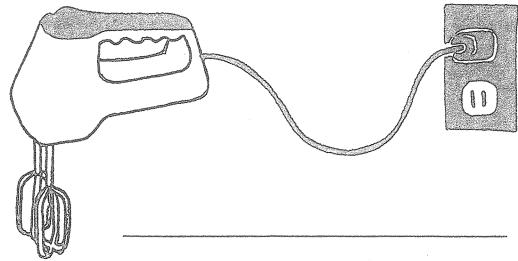
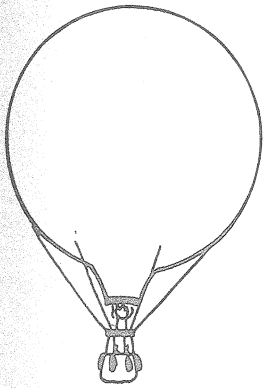
Do you feel tired after raking the lawn? You feel tired then because work takes a lot of energy. **Energy** is the ability to do work.

There are many forms of energy. Food contains **chemical energy**. Your television uses **electrical energy**. The furnace in your house gives you **heat energy**. The moving parts of your bicycle have another form of energy called **mechanical energy**. Anything that moves has mechanical energy.

Energy can be changed from one form to another. Your radio changes electrical energy into sound energy. Your parents' car may change chemical energy into heat energy, and the heat energy into mechanical energy.



• What kind of energy is being used to do work in each of these pictures?



• Complete the puzzle using the clues below.

1. A fire gives us _____ energy.
2. Anything that moves has _____ energy.
3. _____ is the ability to do work.
4. Energy can be _____ from one form into another form.
5. Food contains _____ energy.

