

Heat Energy

Grade 2-3

Overview

The students will explore heat energy. They will make friction by rubbing things together and create wind using a lamp.

Objectives

- To help students understand that heat is a form of energy.
- To help students understand that rubbing two surfaces together produces heat energy.
- To help students understand that heat energy causes air to move, making wind.

Materials

For the presenter:

A variety of things that produce heat:

- a candle
- match
- electric frying pan
- lamp
- heater
- hair dryer
- 4 lamps for activity 2

For each group of 4 students:

- 1/2 tsp. of talc powder
- 4 snake patterns
- 4 pencils
- 4 pairs of scissors
- crayons or markers
- 2 balloons
- 2 pieces of sandpaper
- 1 tub



Getting Ready

Activity 1

Put all the things that produce heat energy on a table in front of the class. Write *heat energy* on the chalkboard.

Activity 2

Organize the materials for each group in a tub. Set up the four lamps on a table where you will be able to supervise the students when they are using them. The lamps need to be plugged in.

Activity 3

Use the same lamps as in Activity 2.

Procedures

Activity 1: Heat Energy

Use the questions and discussion below to spark the student's interest and get them thinking about heat energy. Start by plugging in the electric heater. Choose a student to come up and feel the heat coming from the heater (use **caution** around heat). Continue to share the different things you brought as you discuss heat energy.

Questions

“What do you feel? (*heat*) Where is the heat coming from? (*electricity, fire, etc.*) What is creating the heat?” (*energy in the form of electricity, energy in the form of fire, etc.*) Refer to the words *heat energy* on the chalkboard. “What is our main source of heat energy?” (*sun*) Write sun on the chalkboard. Use these same kinds of questions with each of the things you share. “What happens when you use heat energy?” (*the electric frying pan will cook meat, the hair dryer will make the water evaporate, etc.*)

Discussion

Most energy comes from the sun. Energy is what makes things happen. Energy sources release energy in the forms of heat, light, motion, sound and electricity. Heat is a form of energy that is used by all living things. On days when the sun is out, you can feel the sun's energy. The heat we use on earth comes from different sources: the sun, fire, friction, nuclear energy.

Activity 2: Friction Makes Heat

1. Tell the students that their group will get a tub of materials. They are going to use them to explore heat energy. As they do the experiments, they should be thinking about the source of energy or where the energy is coming from. Also, what happens when the energy is released, what comes from the energy you started with. Example: "I started with the motion of my hands rubbing together (*energy source*) and I ended up with heat (*form of energy produced*).
2. Before handing out the tubs of materials, show the students what is in each tub. Explain that you will all be doing the experiments together. It is important that they are listening, following directions and taking turns in their groups.
3. Hand out the tubs. Have students place the tub in the middle of their table area.
4. Ask: "Do you know what friction is?" Write the word *friction* on the board.
5. This is friction - demonstrate rubbing your hand together.
6. "Rub your hands together. What do you feel? (*heat*) What is your source of energy? (*my hands rubbing together*) What form of energy was created when you rubbed your hands together? (*heat*) Whenever you rub two objects together it produces heat."
7. "Let's try and see if we can produce heat by rubbing other things together. Take out the two pieces of sandpaper. Take turns with your group and see if the paper produces heat. What did your team discover? What was the source of energy that you used? (*movement of hands*)? What form of energy was produced when you rubbed the sandpaper together? (*heat*) Was it different than using just your hands?"

Try the same thing with two balloons and see what happens. First, you will need to blow up your two balloons. Then rub the two balloons together. "What do you think will happen? What would cause one of the balloons to pop? (*It gets so hot, one balloon starts to melt and pops*)"



Activity 3: Heat makes Wind

1. Turn on lamps. Tell students to be very careful because the light bulbs will get hot. The light needs to be hot for this experiment to work. It should be hot enough by the time the snakes are ready. Explain to the students that they will take turns coming up to the table to use the lamp for heat.
2. Color and cut out the snake pattern.
3. Balance the head of the snake on the point of your pencil.
4. Taking turns, have 4 students come up to the table. Make sure you are supervising the students so no one gets burned. Hold your pencil with the balanced snake just above the bulb. **BE VERY CAREFUL!!!!!!!!!!** Watch to see what happens. Why does the snake start to turn? What is the energy source that is making it move? (**heat**) It creates what form of energy? (**motion**)

Discussion

The snake started to spin because the hot light bulb warmed the air around it. Hot air rises and thus creates a wind. The wind causes the snake to turn. Wind is created the same way by the sun. The sun heats the earth, which in turn heats the air above it. The warm air rises and cooler air moves in and takes its place. This movement is **wind**.

When the students have returned to their desks, tell them you want to experiment with heat one more way. Ask a volunteer from each group to bring up their powder. Ask: "What will happen if you sprinkle a small amount on the light? (**it should fly up**) The powder is carried up by the warm air. Let one person from each group try it at a time.

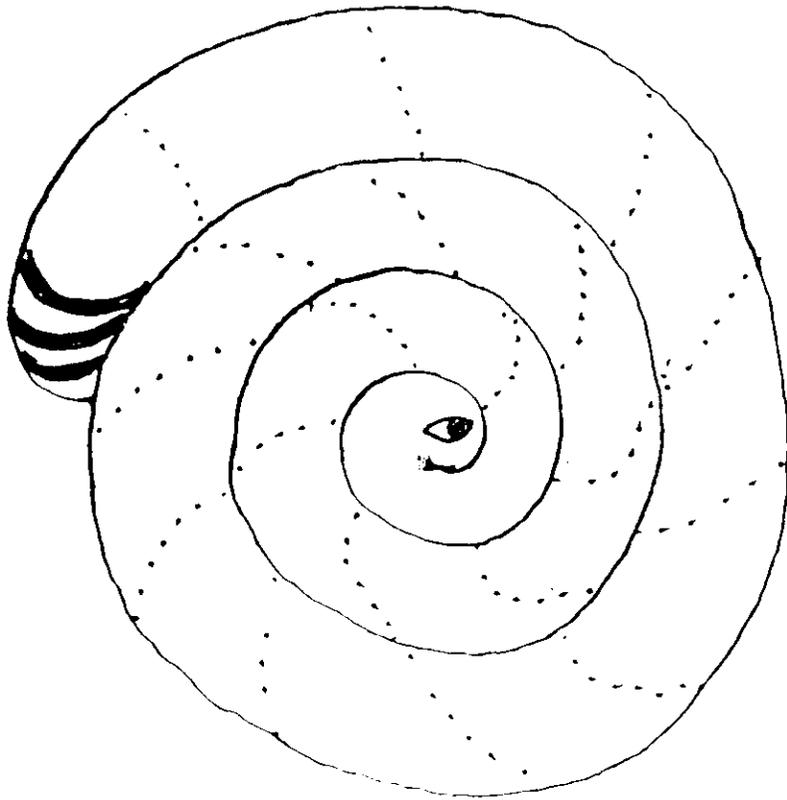


Closure

Tell the students: "Whisper to your neighbor the name of one source of energy. Show your neighbor what friction is. Tell your neighbor what form of energy friction creates."

Clean Up

Have students hand in tubs.



Snake