

LETTER TO PARENTS



Cut here to paste onto school letterhead before making copies.

Dear Parents,

We are starting a new science unit on matter and energy. We will be developing the idea that matter is the stuff from which all common and familiar objects and materials are made. Energy is usually defined as the ability to do work. In this unit we will come to know energy as the causal agent behind every action or activity. We will explore sources of energy, such as the Sun, batteries, fuels, and food and identify forms of energy, such as electricity, heat, light, sound, and moving masses.

The two attributes that we will use to define matter are mass and volume. In order to communicate mass and volume effectively, we will learn to quantify mass and volume in grams and liters, the standard units in the metric system. In order to quantify heat energy effectively, we will learn to measure temperature in degrees Celsius, the standard unit in the metric system.

Our study of matter will extend to phase change, including melting, the change from solid to liquid, and evaporation, the change from liquid to gas. Your child is probably familiar with phase changes in water (ice to water to water vapor), but may appreciate for the first time that these processes apply to thousands of materials, ranging from oxygen to rock.

You can help your child by asking him or her to share the ideas we are working on so you can extend the ideas to matter and energy in your home. I will be sending home some simple assignments that should prove interesting for the whole family. These might stimulate some interesting conversation and possibly an investigation of your own that relates to the science work we are doing in class.

Sincerely,

INSTRUCTION CARD FOR ENERGY STATION 1

SOLAR CELL

MATERIALS

- 1 Lamp
- 1 Solar cell
- 1 Motor with wires

DIRECTIONS

1. Turn on the lamp.
2. Connect the motor to the solar cell.
3. Record your observations on your notebook sheet.
4. Disconnect the solar cell from the motor and turn off the lamp.
5. Organize the materials for the next group.

INSTRUCTION CARD FOR ENERGY STATION 2

TONE GENERATOR

MATERIALS

- 1 Tone generator

DIRECTIONS

1. Figure out how to turn the tone generator on.
2. Use the volume and pitch knobs to adjust the tone generator.
3. Gently hold two fingers on the black paper of the speaker.
4. Record your observations on your notebook sheet.
5. Turn the tone generator off.
6. Organize the materials for the next group.

INSTRUCTION CARD FOR ENERGY STATION 3

MOTOR

MATERIALS

- 1 Motor with wires
- 1 AA-cell

DIRECTIONS

1. Figure out how to connect the battery to the motor.
2. Record your observations on your notebook sheet.
3. Disconnect the battery from the motor.
4. Organize the materials for the next group.

INSTRUCTION CARD FOR ENERGY STATION 4

CANDLE AND HAND RUBBING

MATERIALS

- 1 Candle
- 1 Container of gravel
- 4 Pairs of hands

DIRECTIONS FOR HAND RUBBING

- 1. First, everyone should rub their hands together quickly.
- 2. Record your observations on your notebook sheet.

DIRECTIONS FOR CANDLE

- 1. Ask your teacher to light the candle.
- 2. Observe the candle carefully. Don't put your hands near the flame.
- 3. Record your observations on your notebook sheet.
- 4. Blow out the candle and organize the materials for the next group.

FLASHLIGHT DEMONSTRATION

- What action did you observe?

- What kind of energy caused that action?

- What was the energy source?

- Where was the energy stored?

- What was the stored energy converted into?

- The energy in the _____
converted into _____ energy.

STORED-ENERGY SOURCES

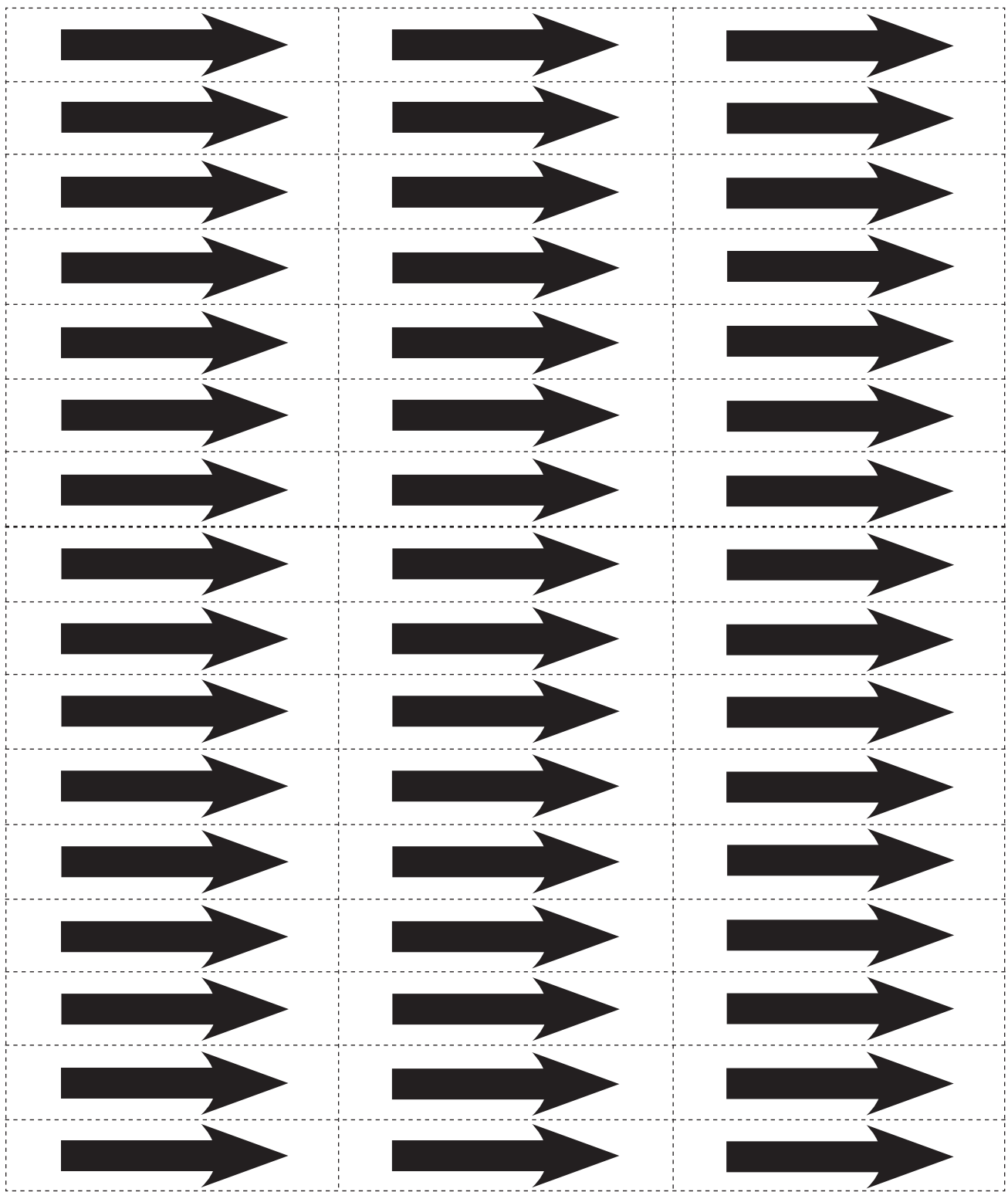
STORED-ENERGY SOURCE SUN	STORED-ENERGY SOURCE SUN
STORED-ENERGY SOURCE GASOLINE	STORED-ENERGY SOURCE GASOLINE
STORED-ENERGY SOURCE BATTERY	STORED-ENERGY SOURCE BATTERY
STORED-ENERGY SOURCE CANDLE	STORED-ENERGY SOURCE CANDLE
STORED-ENERGY SOURCE APPLE	STORED-ENERGY SOURCE APPLE
STORED-ENERGY SOURCE WOOD	STORED-ENERGY SOURCE WOOD

ENERGY ACTIONS

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<p>ACTION</p> <p>LIGHT</p>	<p>ACTION</p> <p>LIGHT</p>
<p>ACTION</p> <p>MACHINE MOTION</p>	<p>ACTION</p> <p>MACHINE MOTION</p>
<p>ACTION</p> <p>MUSCLE MOVEMENT</p>	<p>ACTION</p> <p>MUSCLE MOVEMENT</p>
<p>ACTION</p> <p>CHEMICALS</p>	<p>ACTION</p> <p>CHEMICALS</p>
<p>ACTION</p> <p>HEAT</p>	<p>ACTION</p> <p>HEAT</p>
<p>ACTION</p> <p>ELECTRICITY</p>	<p>ACTION</p> <p>ELECTRICITY</p>

ENERGY-CARD ARROWS



DEMO ENERGY CARDS

STORED-ENERGY SOURCE

BATTERY

ACTION

LIGHT



HOW DOES ENERGY TRAVEL?

- What action did you observe?

- Where did the energy come from?

- Where did the energy go?

- What carried the energy?

- The energy in _____
moved through the _____
and ended up _____.

INSTRUCTION CARD FOR ENERGY TRANSFER 1

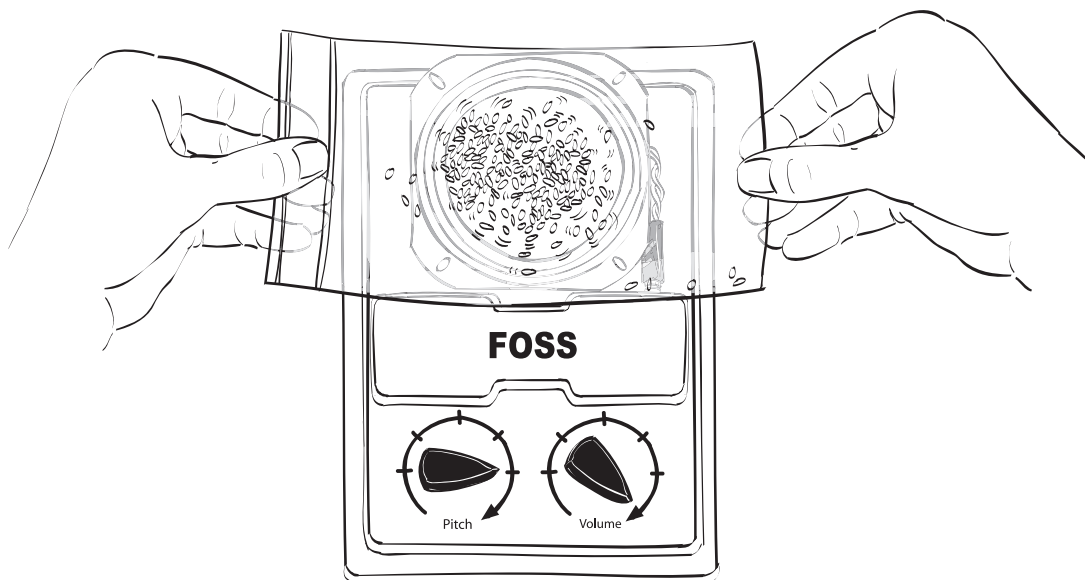
TONE GENERATOR

MATERIALS

- 1 Tone generator
- 1 Bag of rice

DIRECTIONS

- 1. Turn on the tone generator.
- 2. Adjust the pitch and volume for the most speaker movement.
- 3. Hold the bag of rice flat above the speaker.
- 4. Record your observations on your notebook sheet.
- 5. Turn off the tone generator.
- 6. Return the materials to the basin for the next group.



INSTRUCTION CARD FOR ENERGY TRANSFER 2

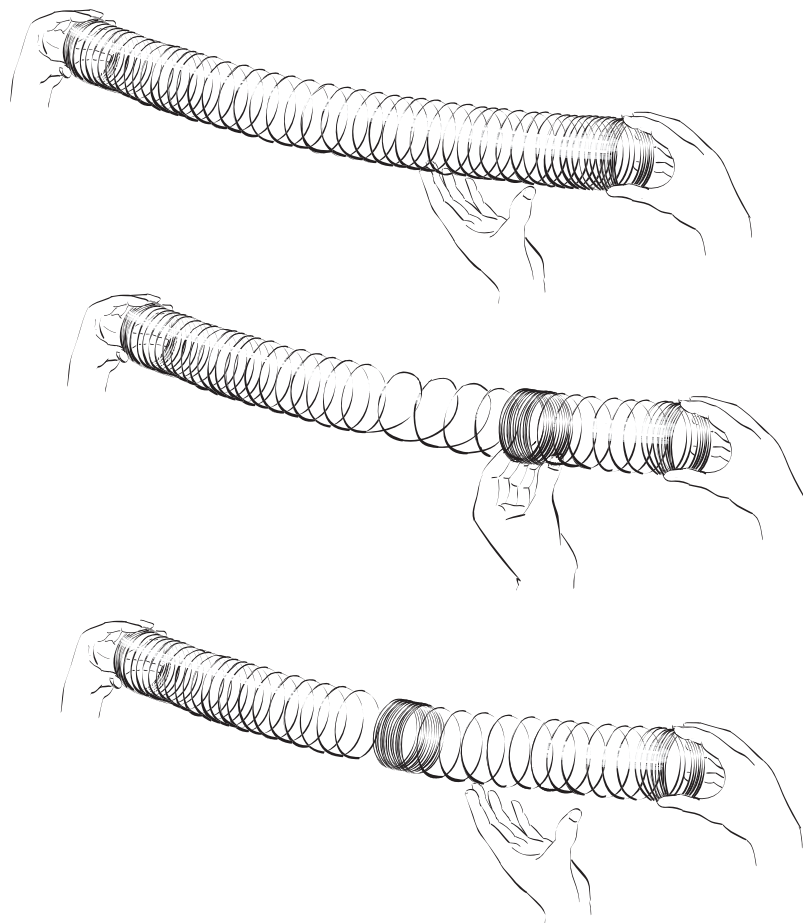
SPRING TOY

MATERIALS

- 1 Spring toy

DIRECTIONS

1. Two people hold the ends of the spring about 4 meters apart.
2. One holder gathers about 5 coils of spring together.
3. Release the coils. Observe what happens to the spring.
4. Record your observations on your notebook sheet.
5. Return the spring to the basin for the next group.



INSTRUCTION CARD FOR ENERGY TRANSFER 3

BOWLING

MATERIALS

- 1 Ball
- 6 Empty cans or bottles

DIRECTIONS

1. Set up the six bottles or cans in a triangle.
2. From 3 meters away, roll the ball at the cans.
3. Record your observations on your notebook sheet.
4. Return the materials to the basin for the next group.

INSTRUCTION CARD FOR ENERGY TRANSFER 4

BATTERY AND MOTOR

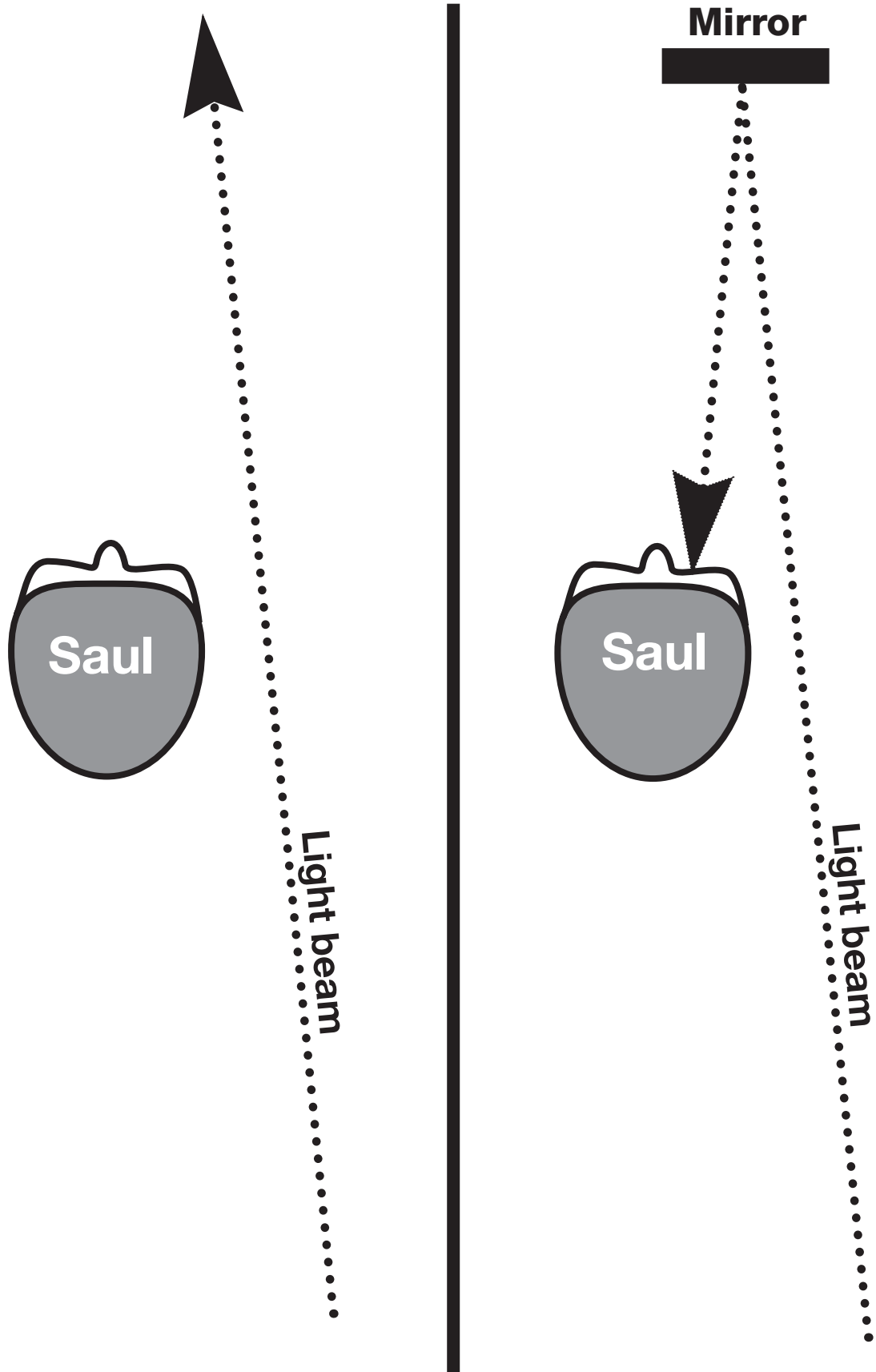
MATERIALS

- 1 Motor with wires
- 1 AA-cell

DIRECTIONS

- 1. Connect the battery and motor.
- 2. Observe what happens when the motor and battery are disconnected.
- 3. Record your observations on your notebook sheet.
- 4. Return the materials to the basin for the next group.

REARVIEW MIRROR



Name _____

Date _____

MATH EXTENSION—PROBLEM OF THE WEEK

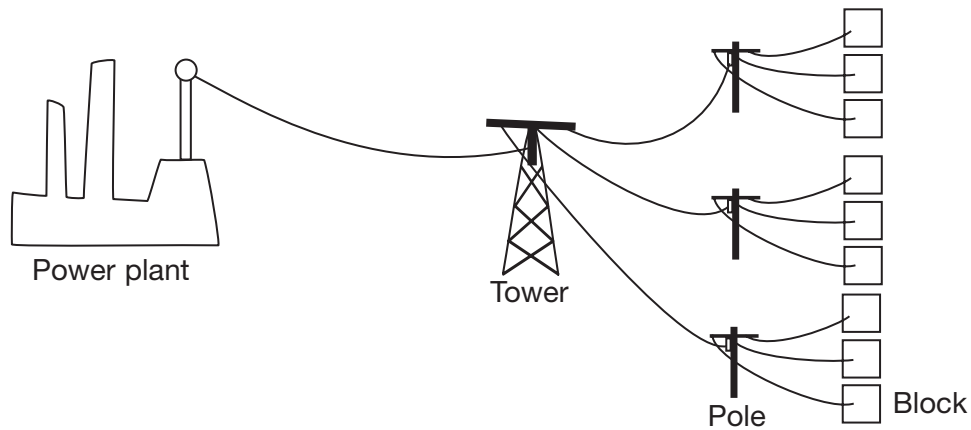
INVESTIGATION 1: ENERGY

Power plants generate electricity used by people in the city.

Electricity travels on wires from the power plant to towers.

One tower can supply electricity to three poles.

One pole can supply electricity to three blocks of houses.



1. A power plant supplies electricity to 5 towers.
 - How many poles can receive power?
 - How many blocks of houses can be served?

2. The city wants to put in 27 new blocks of houses. How many poles will they need?
How many towers will they need?

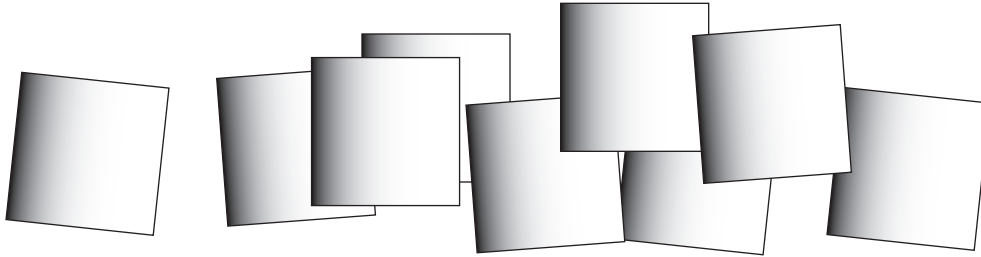
Name _____

Date _____

MATH EXTENSION—PROBLEM OF THE WEEK

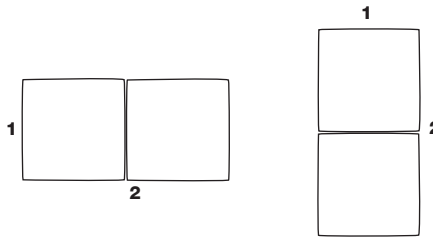
INVESTIGATION 2: LIGHT

Gabriela has nine **square** mirrors.



How many different sizes of rectangles can she make using her mirrors? She can use any number of the nine mirrors to make a rectangle. (You can use square tiles to help you solve this problem.)

Note: These two rectangles have the same dimensions, so they count as one rectangle.



Record your rectangles and label the length and width.

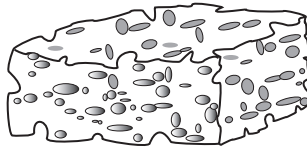
Name _____

Date _____

MATH EXTENSION—PROBLEM OF THE WEEK

INVESTIGATION 3: MATTER

A 1-gram sponge can soak up 5 g of water.



1. How many grams of water can a 40-g sponge soak up?
2. What is the mass of a sponge that can soak up 150 g of water?
3. How many grams of water can a 25-g sponge soak up?
4. If you have a 40-g sponge, how many soaks will it take to soak up a liter of water?

Name _____

Date _____

HOME/SCHOOL CONNECTION

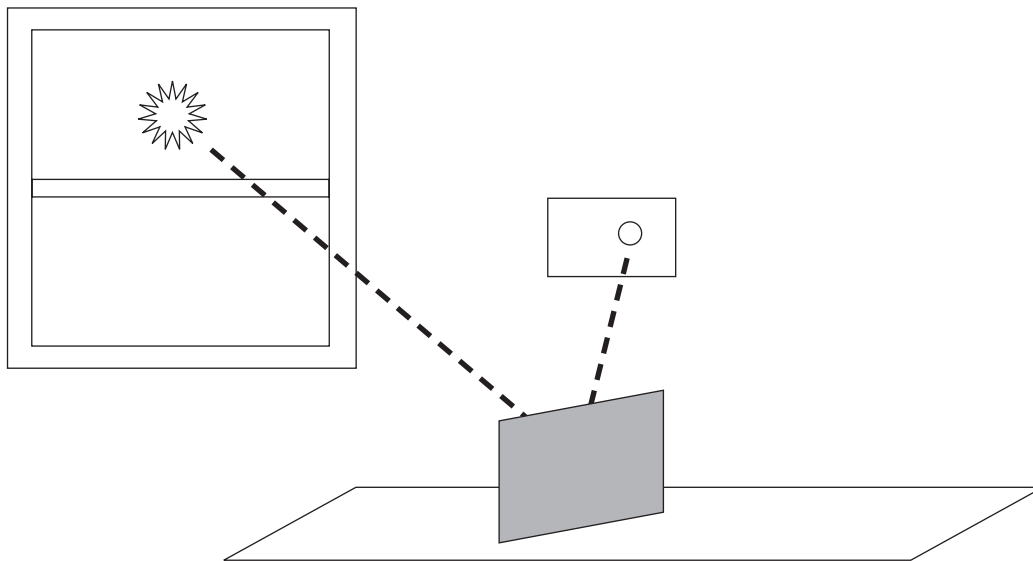
INVESTIGATION 2: LIGHT

Observe Earth Turning

The Sun seems to move across the sky because Earth is turning on its axis. You can use a mirror to observe the movement. Here's how.

Find a window where light from the Sun shines in. Position a mirror to reflect sunlight onto a wall. Tape a piece of paper there. Mark the center of the reflection of the Sun. Wait 10 minutes and mark the center of the reflection again. Did the reflection move? Why?

Safety Note. Never look directly at the Sun or reflect sunlight in a person's eyes. Both can damage eyes.



Name _____

Date _____

HOME/SCHOOL CONNECTION

INVESTIGATION 3: MATTER

Estimate Mass and Volume of Home Products

Find five packages of solid food, such as rice or cereal. Also find five liquid containers, such as fruit juice or dishwashing detergent. Estimate the mass of the solid products in grams and the volume of the liquid products in milliliters. Then check the labels to see how accurate your estimates are.

Solid products	Mass estimate	Mass from label
Liquid products	Volume estimate	Volume from label