

BATTLE CREEK AREA

Mathematics &  
Science Center

Student Journal

3PS2

# Light and Sound



A Third Grade Unit  
supporting the  
Michigan Science K-7 Content Expectations

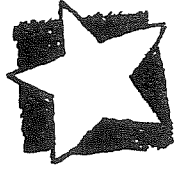
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Date: \_\_\_\_\_

A C T I V I T Y

**No Light! No Sight!**



**1**

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Write or draw your observations with the flashlight and materials.

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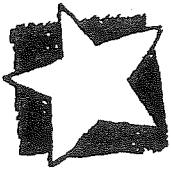
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A C T I V I T Y

**No Light! No Sight! (cont.)**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**1**

| Position of Lid | Closed Lid | Lid Slightly Raised | Lid Open |
|-----------------|------------|---------------------|----------|
| Observation     |            |                     |          |

Describe the object in your box.

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

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Write a statement that tells what you observed from your box observations. Use your observations from the chart to support your answer.

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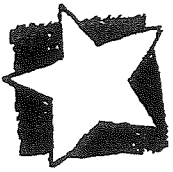
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A C T I V I T Y

**Our Eyes In the Bright Light and  
Darkness**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**2** .....

Make a data table below. Record your observations of your partner's eyes in the classroom, after being in a darkened room, and in a very bright area or room.

**Observations of the Eye in Light and Dark**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

JOURNAL  
**Our Eyes In the Bright Light and  
Darkness (cont.)**



**2**

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Write a conclusion from your observations and class data about how eyes react to light and dark.

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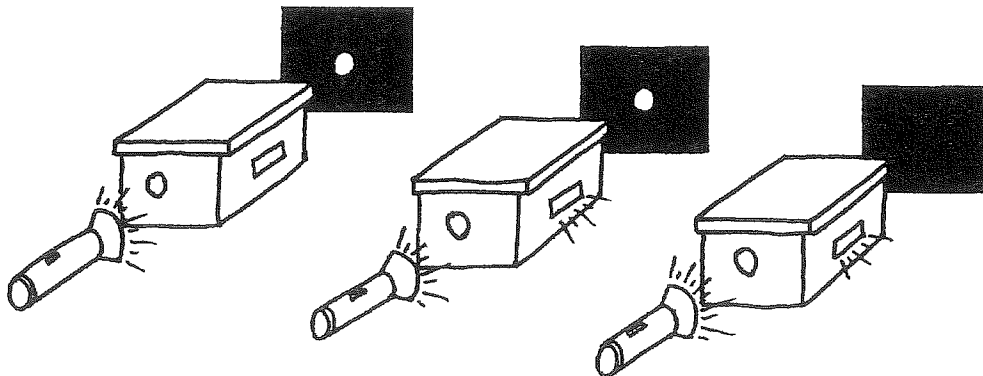
ACTIVITY  
**How Does Light Travel?**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**3**

1. Look at the pictures. Predict what you will see when the light from the flashlight shines into one end of the box. Circle your prediction.



2. Explain your prediction to the members of your group.
3. Shine the flashlight into one end of the box.
4. Hold a piece of black paper a few centimeters from the box at the opposite end from the flashlight.
5. Discuss and record your observations.

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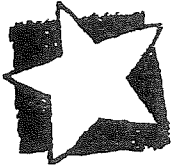
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Name: \_\_\_\_\_

A C T I V I T Y  
How Does Light Travel? (cont.)



Date: \_\_\_\_\_

3

6. Place the black paper a few centimeters from the slit on the side of the box and shine the flashlight through the hole at the end of the box.

7. Discuss and record your observations.

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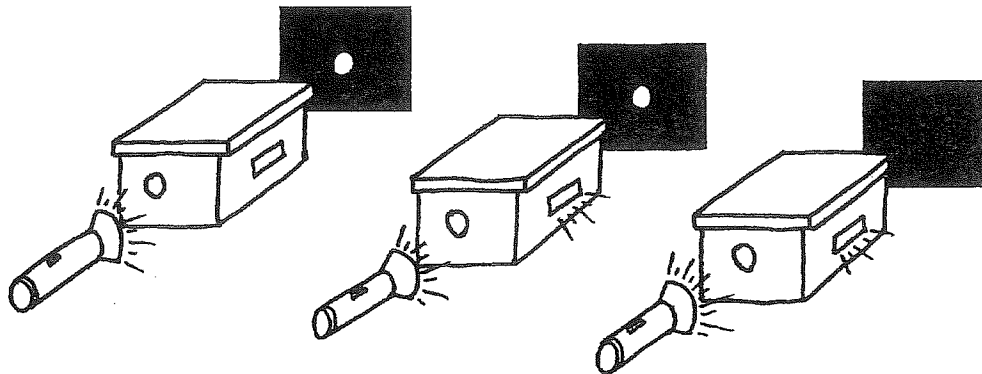
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8. What did you actually see? Circle your answer.







Name: \_\_\_\_\_

Date: \_\_\_\_\_

**3** .....

1. Predict what will happen when you shine a light toward the hole in the end card.

Draw the path of the light from the flashlight.

2. Predict what would happen if one card is moved to one side.

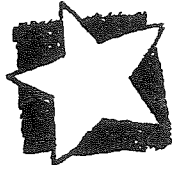
Draw what you observed.

3. I think light travels in a straight path because:

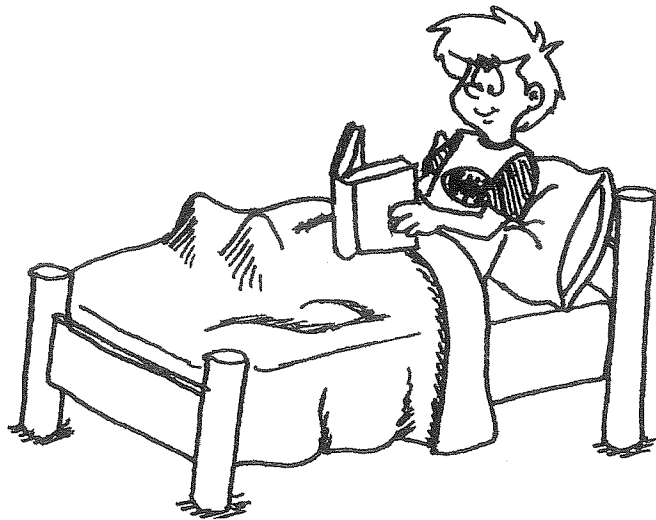
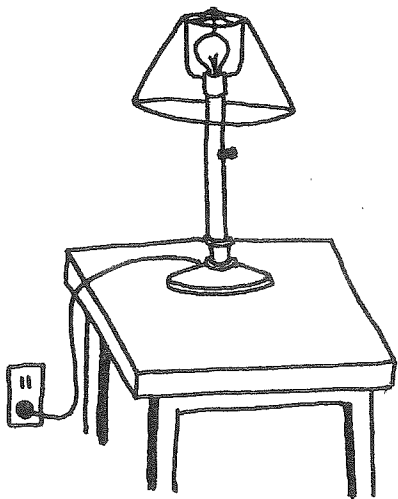
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\_\_\_\_\_

Name: \_\_\_\_\_

Date: \_\_\_\_\_



1. Jack is snug in bed at night, reading his favorite book. He is having trouble seeing the words on the page. Look at the picture and draw where you would place the lamp to help Jack see his book better.



2. Explain why your placing of the lamp is better than where Jack had the lamp.

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A C T I V I T Y

**Finding Evidence That Light Travels  
In a Straight Path**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**4**

1. Write and draw your observations with the comb, flashlight, and mirror.

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Draw how you used your materials and what you observed.

2. Write the class statement based on the observations of each team.

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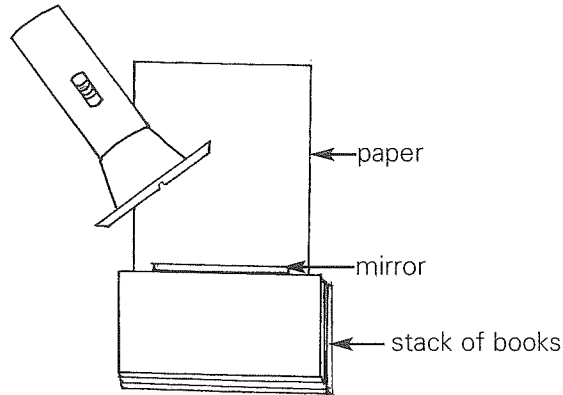
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Date: \_\_\_\_\_

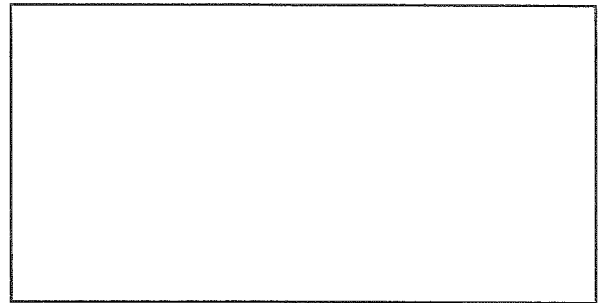


1. Use the illustration below to set up your materials.



2. Turn on the flashlight and observe the path of light in three different positions of the light. (straight in front, angle to left, and angle to right)

3. Draw the path of the light from the flashlight and mirror on the white and black paper.



| Flashlight Position                             | 4. Draw and write your observations: |
|---|--------------------------------------|
| Position 1:<br>(straight in front<br>of mirror) |                                      |
| Position 2:<br>(angle to mirror, left)          |                                      |
| Position 3:<br>(angle to mirror, right )        |                                      |



A C T I V I T Y

**Can You See the Light?**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**5**

1. Turn on the flashlight. Place each of the four types of material in front of the flashlight. Which materials let light pass through?

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Which materials stop light from passing through?

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Which material reflects light?

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2. List four objects that fit in each of these categories.

**Data Table**

| Lets most light through | Lets a little light through | Blocks and absorbs light | Blocks and reflects light |
|-------------------------|-----------------------------|--------------------------|---------------------------|
|                         |                             |                          |                           |
|                         |                             |                          |                           |
|                         |                             |                          |                           |
|                         |                             |                          |                           |
|                         |                             |                          |                           |

Name: \_\_\_\_\_

Date: \_\_\_\_\_



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1. If you wanted to make a box with two different types of materials that block light, which materials would you use? Circle your answer.

- a. construction paper and wax paper
- b. a plastic bag and aluminum foil
- c. construction paper and aluminum foil
- d. wax paper and a plastic bag

2. You have a very old and breakable object that you want to share, but you don't want others to be able to touch it. What materials could you use to put the object in that would protect this object and allow others to see it? Use the Data Table on the activity page for ideas.

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3. Why would you pick these materials?

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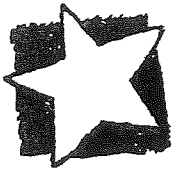
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A C T I V I T Y

**How Are Shadows Made?**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**6**

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Draw and write how you made shadows using the different material.

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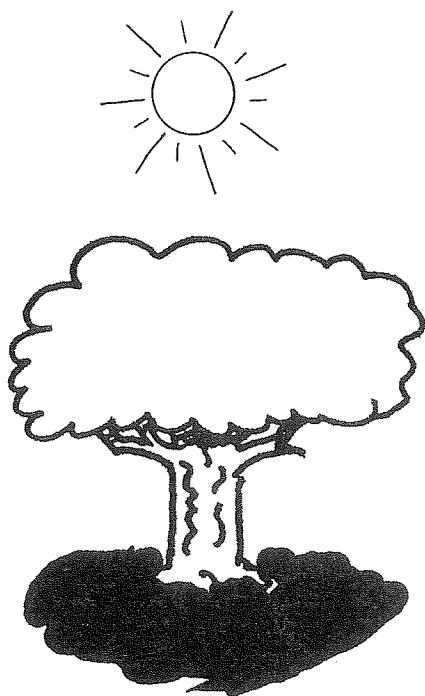
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Name: \_\_\_\_\_

Date: \_\_\_\_\_



1. What is the light source in the picture?  
Draw the path of the light from the source to the tree.

2. Explain how the shadow of the tree was made.

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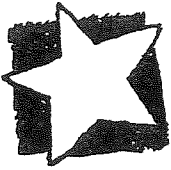
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A C T I V I T Y

**What Can You Learn From a Shadow?**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

7

**Data Table**

| Time of Day | Length of Shadow (cm) | Shape of Shadow | Direction of Shadow |
|-------------|-----------------------|-----------------|---------------------|
| Morning     |                       |                 |                     |
| Noon        |                       |                 |                     |
| Afternoon   |                       |                 |                     |

Name: \_\_\_\_\_

Date: \_\_\_\_\_

JOURNAL  
What Can You Learn From a  
Shadow? (cont.)



7

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1. Use your data from your shadow chart to explain what time of day the shadow was the longest.

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2. Use your data from your shadow chart to explain what time of day the shadow was the shortest.

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3. Draw a shadow of the tree in the early morning.

4. Why do you think the shadow's shape and size changes at different times of the day?

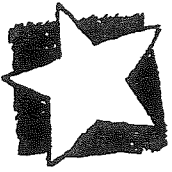
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A C T I V I T Y

**Who Can Make the Longest Shadow?**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**8**

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1. What question are you investigating?

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2. What do you think will happen?

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3. Make a data table to show your observations.

4. What did you find out?

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

A C T I V I T Y

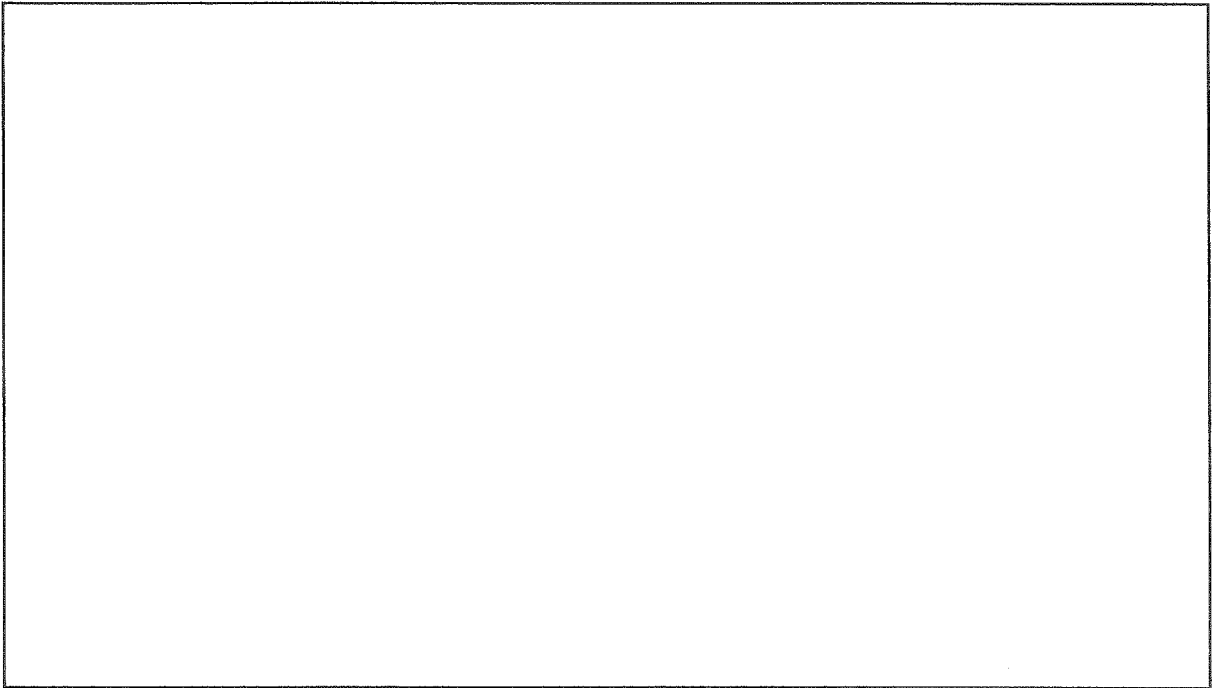
Can Light Be Bent?



9

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1. Draw your observation of the cup of water and pencil.



2. Write what the pencil looked like.

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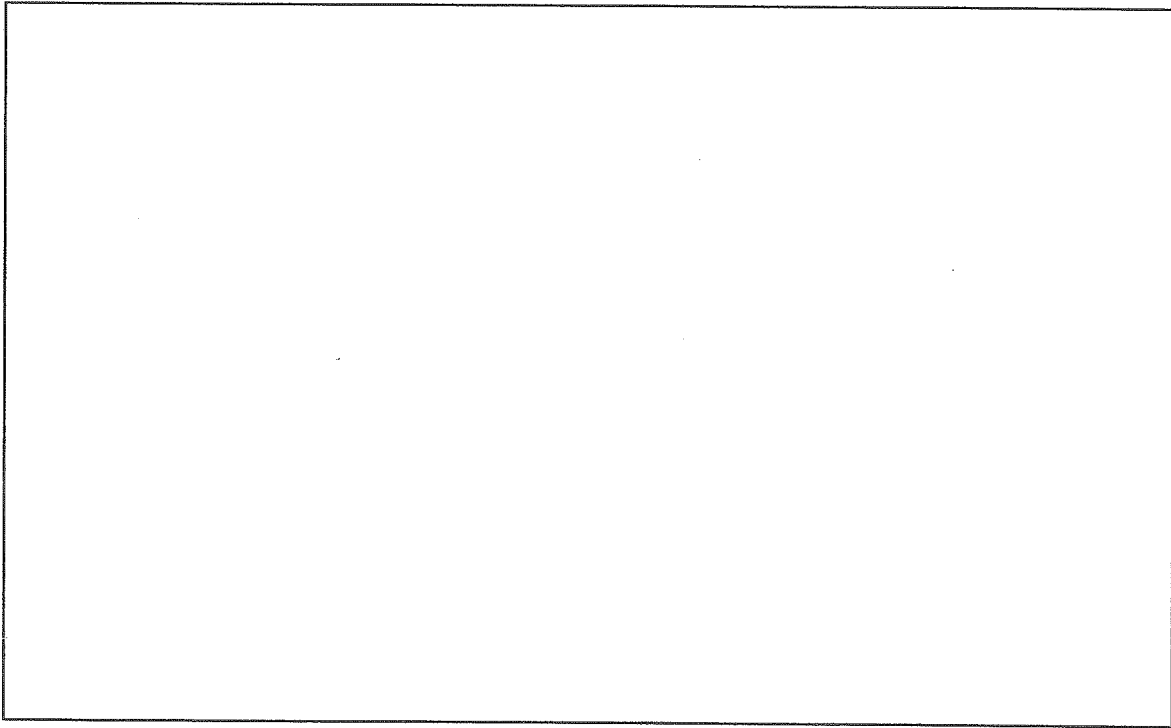


Name: \_\_\_\_\_

Date: \_\_\_\_\_

9

1. Draw and label a picture of how light is bent.



2. Write what is happening in your picture.

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

A C T I V I T Y  
**Sounds We Have Heard**



**10**

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1. Draw one object that you used to make a sound from the variety of material.

2. Describe the sound your object made.

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3. Write how you think the sound is made.

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A C T I V I T Y  
**Sounds We Have Heard (cont.)**

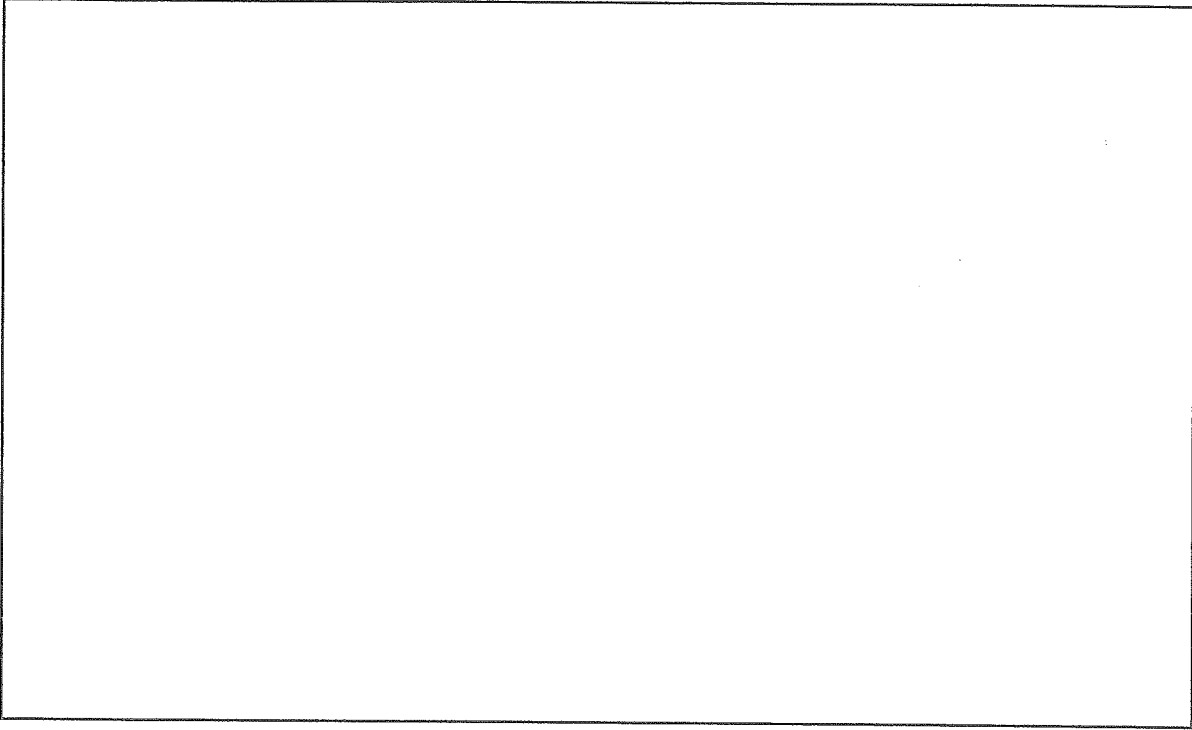
Name: \_\_\_\_\_

Date: \_\_\_\_\_

**10**

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4. Draw what you observed when the tuning fork was placed in the cup of water.



5. Explain why you think the tuning fork caused the water to splash.

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Name: \_\_\_\_\_



Date: \_\_\_\_\_

10

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1. How would you describe the sound of the tuning fork?

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2. Describe what the tuning forks felt like when they made a sound.

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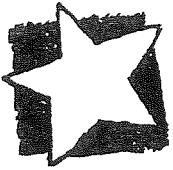
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A C T I V I T Y

**Vibrations We Can See and Feel**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**11**

1. Describe what you feel when you lightly place your lips against the wax paper and hum.

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2. Write what you think is happening to make the wax paper and comb move.

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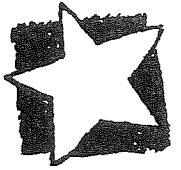
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Name: \_\_\_\_\_

A C T I V I T Y  
**Vibrations We Can See and Feel**  
(cont.)



Date: \_\_\_\_\_

11

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1. Write what you hear and see when you pluck the ruler that is long.

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2. Write what you hear and see when you pluck the ruler that is short.

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3. Predict what you would hear if you plucked a ruler that was longer than your classroom ruler.

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Tell what evidence you have that makes you think that.

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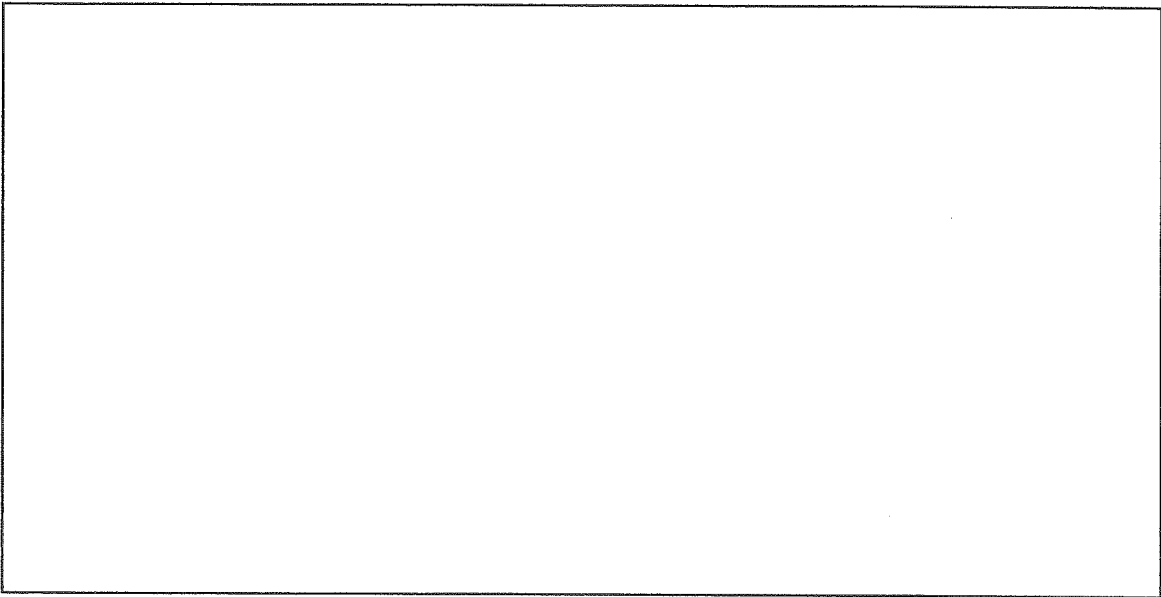
Name: \_\_\_\_\_

Date: \_\_\_\_\_

# 12

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1. Draw a picture of your rubber band guitar. Label the rubber band that produces the lowest note, highest note, and middle note.



2. Explain how the rubber band produced sound when you plucked it.

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3. Explain why you think the rubber bands produce different sounds.

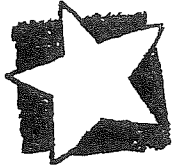
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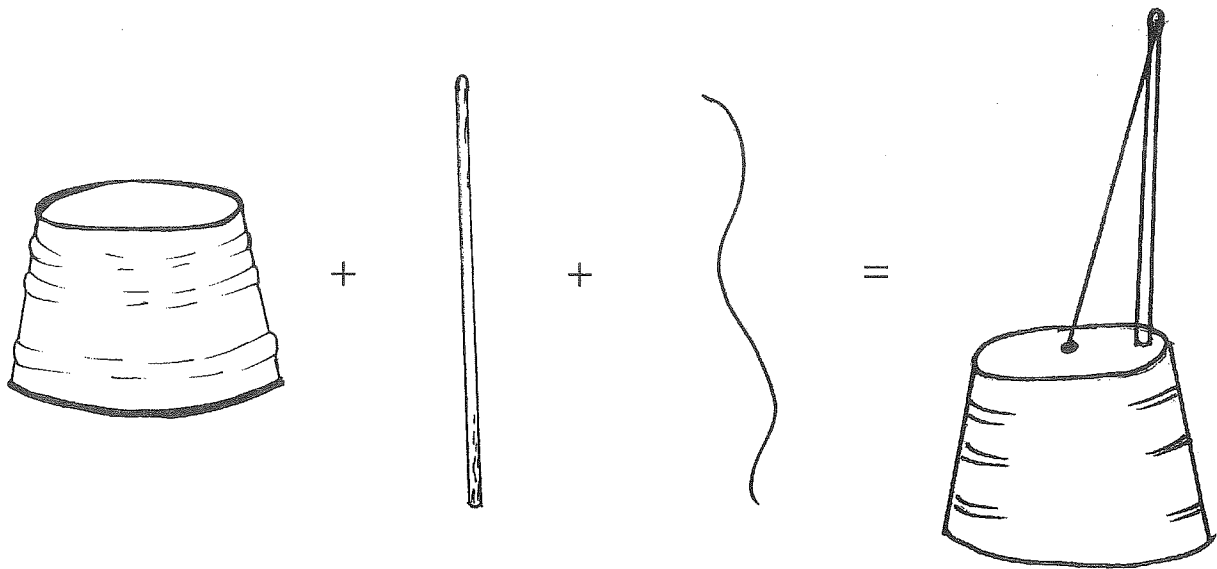
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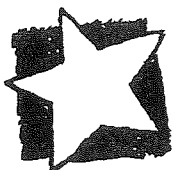
Date: \_\_\_\_\_

**The Washtub Bass**

The washtub bass is a homemade instrument used in "jug bands" that play folk music. The washtub bass produces a low pitch sound from the vibrations of a string. Often a washboard as a percussion instrument, and a jug or bottle as a wind instrument, accompanies the washtub bass. In the early 1900's "jug bands" became popular around New Orleans and in the Appalachian mountains.



The washtub, placed upside down on the ground, with a long handle such as a broomstick, and a string attached to the center bottom of the tub and top of the broom handle, is all it takes to make a traditional washtub bass!



ACTIVITY  
**Vibrating Strings (cont.)**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

12

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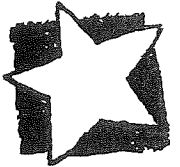
The player holds the handle of the broomstick and plucks the string to produce a vibration that plays a note. Increasing the tension of the string changes the pitch of the sound. The player pulls the string back to tighten the string and make a higher note.

Add a homemade drum, bottle flute, and a rubber band guitar and you have a homemade band!

Name: \_\_\_\_\_

Date: \_\_\_\_\_

ACTIVITY  
**Vibrating Strings (cont.)**



12

1. List the materials you used to make your washtub instrument.

2. Draw your instrument.

3. Write how your instrument makes sounds.

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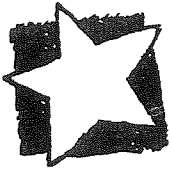
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Name: \_\_\_\_\_

Date: \_\_\_\_\_

12

1. Write how strings make sounds.

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2. Draw a picture of a stringed instrument. Label the parts of the instrument that will vibrate to produce a sound that has a high pitch and a low pitch.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

ACTIVITY  
Let's Get Drumming!

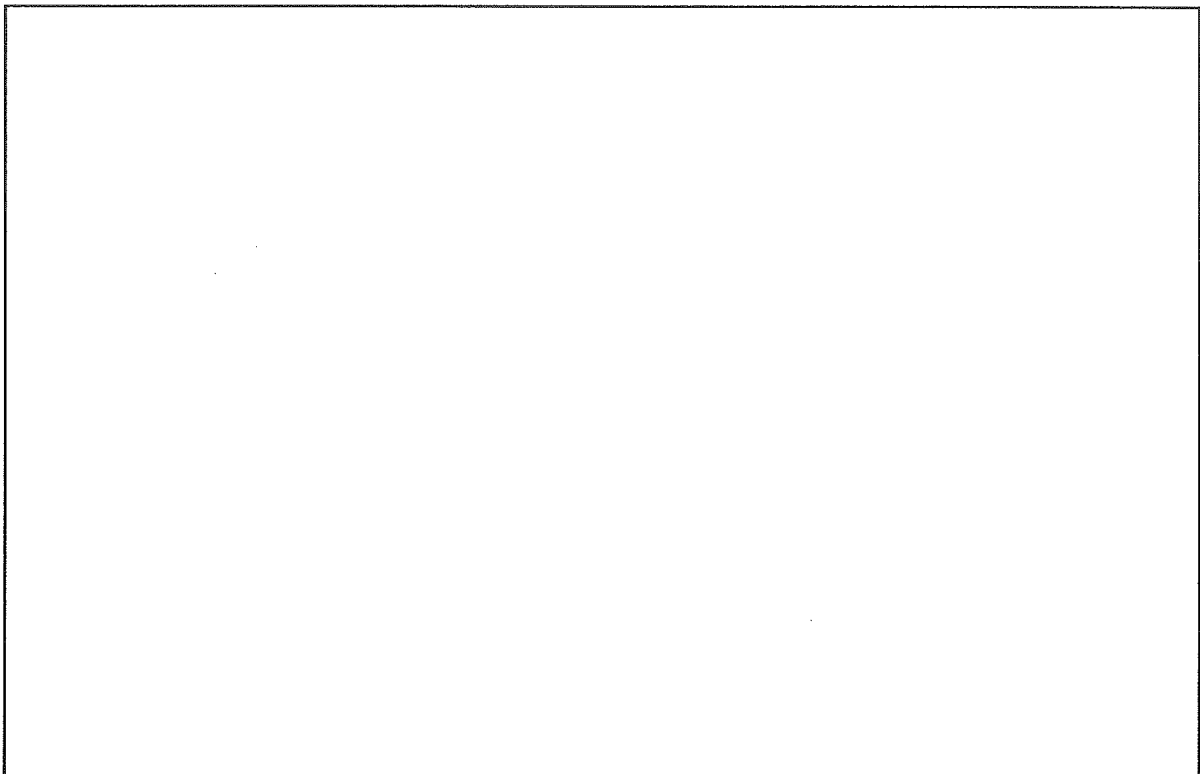


13

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1. List the materials you chose to build your drum.

2. Draw a picture of your drum. Label your picture to tell what part of the drum will vibrate to produce a sound.







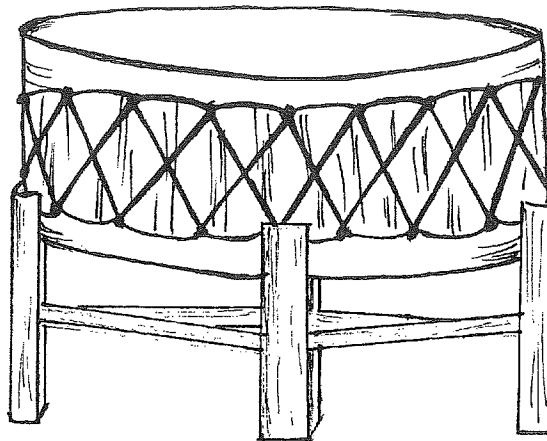
Name: \_\_\_\_\_

Date: \_\_\_\_\_

### The Native American Drum

The Native American drum was and continues to be the most important instrument in the Native American culture. Most tribes constructed their drums using a similar procedure. They used wood as the base of the drum and stretched animal skin (deer, antelope, and elk) as the drumhead. Most often, the Native American drum was a large drum, two to three feet in diameter. Great care was taken in decorating the drums with symbols and diagrams that had spiritual meaning to the tribes.

Native American people consider music as an important part of their culture. The beat of the drum is at the center of the tribal ceremonies. Drums were used to communicate the harvest, the hunt, celebrations and sadness, healing, and chanting. For hundreds of years, the basic design of the Native American drum has remained the same and is used today in the construction of modern drums for classical music, rock and roll, jazz, and many different music styles.



Name: \_\_\_\_\_

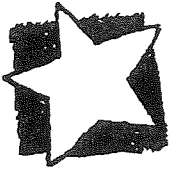


Date: \_\_\_\_\_

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Complete the chart below using what you have learned about how sounds are made from stringed instruments and drums. Predict how you think sounds are made from wind instruments based on what you know about how sounds are produced.

| Type of Instrument  | Picture | How the Sound is Made | How the Pitch is Changed |
|---------------------|---------|-----------------------|--------------------------|
| Stringed instrument |         |                       |                          |
| Drum                |         |                       |                          |
| Wind instrument     |         |                       |                          |



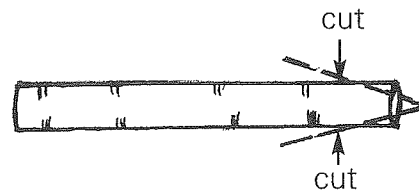
Name: \_\_\_\_\_

Date: \_\_\_\_\_

# 14

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1. Make your reed mouthpiece by cutting a small wedge on each side of the straw. Make the wedge one centimeter long.
2. Flatten the mouthpiece by pressing the cut ends between your thumb and pointer finger.



Press the cut ends  
between your thumb and  
pointer finger

3. Describe how you think your instrument will make a sound.

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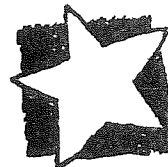
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Name: \_\_\_\_\_



Date: \_\_\_\_\_

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1. Draw and write about your favorite instrument that you have explored.

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2. Describe what produces the sound and how the pitch can be changed.

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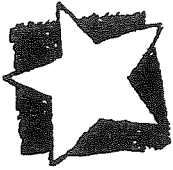
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A C T I V I T Y

**The Energy of Light: Measuring Changes in Temperature**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**15** .....

1. What was the temperature on the thermometer before you placed it in the folded fabric? \_\_\_\_\_

2. List the material you are testing:

3. Which material do you think will have the highest temperature? \_\_\_\_\_  
Explain why you think that.

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4. Do you think the material will have the same temperature? \_\_\_\_\_  
Explain why you think that.

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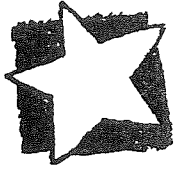
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Name: \_\_\_\_\_

Date: \_\_\_\_\_

A C T I V I T Y  
**The Energy of Light: Measuring  
Changes in Temperature (cont.)**



**15**

5. Record your data on the chart below:

| Material | Temperature of thermometer before placed in the material | Temperature of thermometer 20-30 minutes after placed in the material |
|----------|--|---|
| 1.       |  |   |
| 2.       |  |   |



Name: \_\_\_\_\_

Date: \_\_\_\_\_

**15**

Sally was shopping for new clothes for a trip to Florida. She found a dark blue shirt and a light pink shirt. Her mother told her to choose just one new shirt. Which shirt would be the best choice to wear in Florida? Tell why you chose that shirt.

\_\_\_\_\_

\_\_\_\_\_

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Name: \_\_\_\_\_

A C T I V I T Y  
The Energy of Sound



Date: \_\_\_\_\_

16

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Play each instrument. Write what part of the instrument produces the vibrations that make the sound of the instrument.

1. Rubber band guitar:

\_\_\_\_\_

2. Drum:

\_\_\_\_\_

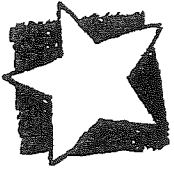
3. Straw horn:

\_\_\_\_\_

4. Tuning fork:

\_\_\_\_\_





Name: \_\_\_\_\_

Date: \_\_\_\_\_

**16**

- Making a cup phone line:

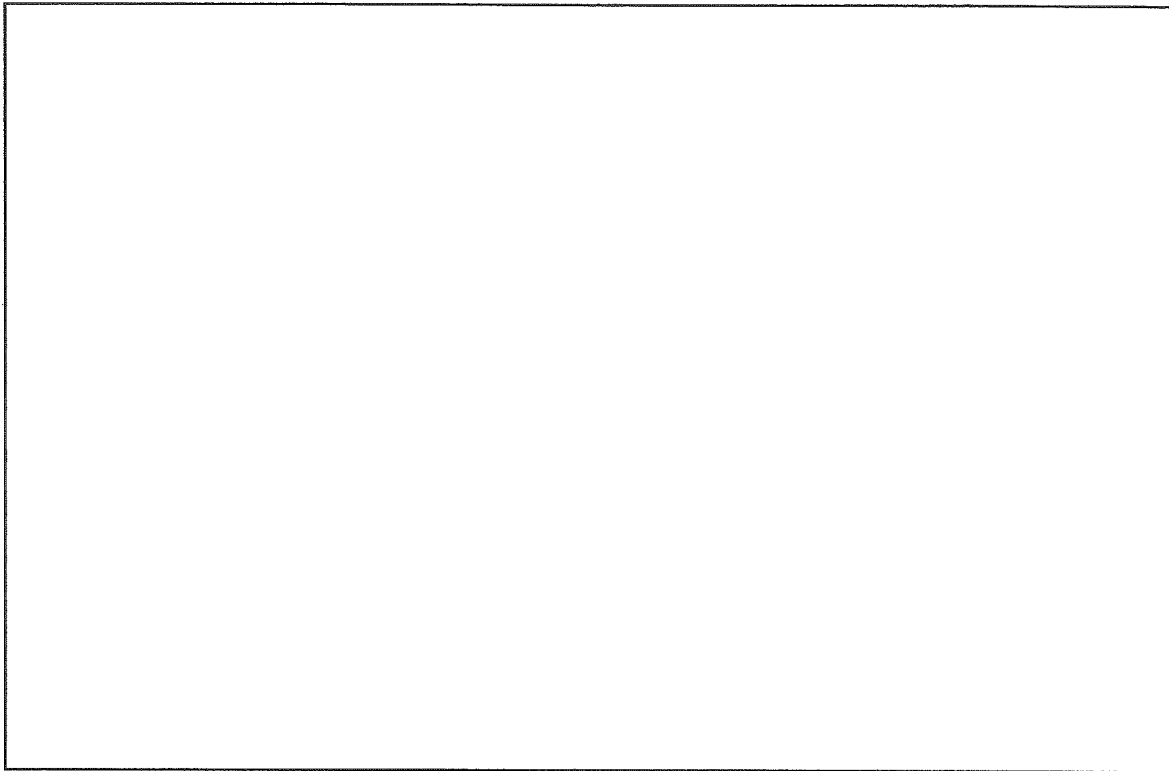
1. Use the thumbtack to punch a hole in the center of the bottom of each cup. Use a sharpened pencil to make the hole large enough for the string to go through.
2. Insert one end of the 2-meter long string through the bottom hole of one cup. Tie a paper clip to the end of the string that projects from the inner side of the cup.
3. Pull on the string so that the paper clip lies flat against the inside bottom of the cup.
4. Repeat steps 2 and 3 and secure a second cup and paper clip to the opposite end of the string.
5. Move the two cups apart so that the string is pulled tight. (Be careful not to pull so hard that the bottom of the cups tear apart!)
6. Try your two-way phone:
  - a. One student places the paper cup to his/her ear.
  - b. Another student whispers in the other cup.
  - c. Did you hear the message?
  - d. Trade places so all three students have the opportunity to whisper and listen.
7. Place a cup and paper clip at the end of the 2-meter piece of string.
8. Tie the free end to the middle of the two-cup line.
9. Can you have a three-party phone line? Ask one member to whisper and the other two members listen. Can you both hear the message?

Name: \_\_\_\_\_



Date: \_\_\_\_\_

1. Draw a picture of two people using a cup and string phone. Label the picture to show how the sound travels.



2. Write how sound energy travels from one cup to the other cup.

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## Key Terms

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**Celsius** - Celsius is a unit of measure for temperature where  $0^{\circ}\text{C}$  is the freezing temperature of water and  $100^{\circ}\text{C}$  is the boiling temperature of water.

**centimeter** – A centimeter is a metric unit of measure for length.

**evidence** - Evidence is an observation or information from data that gives support or proof of ideas and conclusions.

**light** - Light allows us to see objects. Light comes from different light sources, such as a lamp, a flashlight, and the sun.

**light absorption** - Light absorption is the light that is taken in by an object. Light absorption results in an increase in temperature.

**light energy** - Light energy is energy associated with light. Light energy can change things.

**light reflection** - Light reflection is the return of light rays from a surface.

**light source** - A light source is the starting point of light. A lamp, a flashlight, and the sun are some light sources.

**path of light** – The direction light travels is called the path of light. In uniform material such as air, glass, or water, light travels in a straight path.

**pitch** - Pitch is a property of sound that is produced through vibrations. Vibrations that are fast or close together produce a high pitch. Vibrations that are slow or farther apart produce a low pitch.

**shadow** – A shadow is a dark area that is formed when light is blocked by an object.

**sound** - Sound is produced by vibrating objects and vibrating columns of air.



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**sound energy** - Sound energy is energy associated with the vibrations that produce sound. Sound energy can change things.

**sound source** - A sound source is the vibration or vibrating object that produces the sound.

**straight path** - A straight path goes in one direction without any curves, bends, or angles.

**temperature** - Temperature is a measure of how hot or cold something is.

**thermometer** - A thermometer is the tool used to measure the temperature of something.

**variables** - Variables are the properties of things that can be changed in an investigation.

**vibrations** - Vibrations are regular back and forth movements of objects.