

## Station #1

### Materials needed:

- back (and front) of your Wave Behavior sheet
- pencil
- mirror
- index card cover

- 1) Stick your pencil through the hole of the index card.
- 2) Position the index card over your hand so you cannot see your hand or the tip of your pencil.
- 3) Position the mirror in front of your pencil so that you see **ONLY** the tip of your pencil in the reflection.
- 4) Using the back of your Wave Behavior sheet, try to draw a square with an X inside it by **ONLY LOOKING AT THE MIRROR**—so it should look correct in the mirror.
- 5) Use your “Wave Behavior” sheet to record your first attempt/observations.
- 6) Now, try to write your name by **ONLY LOOKING AT THE MIRROR**—again it should look correct **IN THE MIRROR**. Record your attempt/observations.
- 7) Answer the following questions on your Wave Behavior sheet.
  - a. What is frustrating about this exploration? Why do you think you experience this frustration?
  - b. Were you able to work around this frustration? If yes, how?
  - c. How might this experience explain reflections in daily life situations?
- 8) Discuss with your group about your experiences with this station.
- 9) Now try this: Using a flashlight and mirror(s)
  - a. Try to shine the light on the ceiling using a mirror.
  - b. Try to shine the light back at you.
  - c. Hold the light facing the back of the room try to use the mirrors to shine the light toward the cabinets/side wall.
  - d. What else can you accomplish by using more than 1 mirror? Be creative! See what you and your group can do!

**\*\*Extra time? Try the Flip-Flopped Messages (retrieve from Mrs. Wheeler)—Read the instructions and try to complete using a mirror!\*\***

## Station #2- Extra Challenges

### **Arrow Challenge**

On an index card, draw an arrow.

Place the card behind a clear cup filled with water.

What do you observe?

### **“Magnifying” Challenge**

Using the newspaper clipping, write down observations using the following circumstances:

- 1) Naked eye
- 2) Hand Lens
- 3) Behind of cup of water

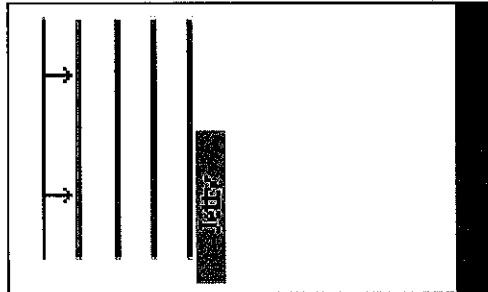
### **“Magic” Coin Challenge**

Do the following steps at your station:

1. Put the coin in the bowl.
2. Walk backwards just until you cannot see the coin in the bowl any more.
3. Have someone pour water slowly into the bowl (not moving the coin).
4. Watch the bowl from where you are standing. Do you notice anything? Can you see the coin now?

Other examples:

#1-Look at the picture of incoming ocean waves approaching a jetty (a pier in the ocean formed from rocks, stones, etc... to help protect a harbor from incoming waves).



- a. Will the jetty block ocean waves entirely?
- b. Can the waves get around the jetty? If so, how?
- c. Make a sketch of how the waves behave when they hit the edge.
- d. How does this example relate to the hole-punched paper and flashlight?  
(Think of light waves)
- e. How does this example relate to the hand in front of face/talking with partner activity? (think of sound waves)

#2- Your friend is on the other side of a wall. She calls to you. You can hear her but cannot see her.

- a. What medium(s) is the sound traveling through?
- b. Explain why you can hear your friend.
- c. Draw a sketch of how the waves travel in this example.

### **Station #3**

#### **Materials:**

- Hole-Punched paper
- Flashlight/light source
- Wall/Construction paper

- 1) Working with your group members/partner(s), hold the hole-punched paper in front of the wall/construction paper (about 5 inches away from the flashlight).
- 2) Now, one group member will turn on the light source. Shine the light towards the wall through the hole-punched paper.
- 3) Look at the paper on the wall. Explain what you see. a) Can you see ALL the light from the flashlight hitting the paper/wall? Why/why not? b) Is the light more intense in a particular area than another? Why/why not? c) Does the light look fuzzy in any area? Why/why not? Draw a sketch of what you see.
- 4) Try moving the hole-punched paper more towards the light. Any differences? Record observations.
- 5) Try moving the hole-punched paper closer to the wall. Any differences? Record observations.
- 6) How is the light getting from the light source to the wall/paper?

#### **Now try this (if time):**

- 7) Face a partner. Have one partner place both hands (fingers should be straight and no openings in between fingers) in front of his/her mouth (about 2 inches).
- 8) That partner talks normally to the other partner. Can the non-speaking partner see the mouth? Can the non-speaking partner hear the speaking partner? What does it sound like? Answer questions and record observations.
- 9) Switch roles and repeat.
- 10) Now, try creating a circle opening with your hand(s) and repeat your talking (try to have the same decibel level as you did previously) to your partner. How does it sound? Is there a difference? Why? Explain. Record.
- 11) Think: if a flashlight were shining in your eyes, you could the light with your hand or a piece of paper. A) What happens to when you try to stop sound with your hand or a piece a paper? B) How is this Station #3 activity similar to this example?
- 12) See folder for more activities!

## Station #4

### Materials:

- Various colors of unifix cubes
- Shoebox with two holes
- Colored paddles/filters
- Flashlight (or a light source)

- 1) Observe the colors of the unifix cubes. Record the colors on your activity page under “normal conditions.”
- 2) Next, put ALL the cubes in the shoe box and replace the cover.
- 3) Place **two** of the **same** colored paddles/filters on top of the top hole (be sure it is through the middle portion of the paddle). Turn on flashlight and place on top of colored paddles—shining the light through the paddles into the box.
- 4) Take turns looking through the side hole. What color(s) are the unifix cubes? Record your observations—be sure to write under the correct color filter and what the color of the cubes are now—can you tell a difference? Do some look darker? Lighter? Do some colors look the same? Are you able to see the same colors as you did “Under Normal Conditions?”
- 5) Change the filter color and repeat steps #3-#5.
- 6) Why do you think the color of the cubes change? (record on back or where you have room)
- 7) Think about yelling into a pillow how is this activity with the cubes and yelling into a pillow are similar. Record your responses (on back or where you have room)

**\*\*Extra time?—**On the circular part of the paddle, you should see different “textures.” Try to look through each texture. What do you see? Why? Explain. Is it easier/more difficult to see through a particular section? Color? Why?