

Exhibit Exploration Guide

Grade
5

Learning World Key

Energy Factory = EF

Water Works = WW

Grow U = GU

Mind Zone = MZ

Idea Lab = IL

Lower Atrium = LA



Ohio's Learning Standards for Science

5.PS.1: The amount of change in movement of an object is based on the mass of the object and the amount of force exerted. Movement can be measured by speed. The speed of an object is calculated by determining the distance (d) traveled in a period of time (t). Any change in speed or direction of an object requires a force and is affected by the mass of the object and the amount of force applied. **EF, IL, LA**

5.PS.2: Light and sound are forms of energy that behave in predictable ways. Light travels and maintains its direction until it interacts with an object or moves from one medium to another and then it can be reflected, refracted or absorbed. Sound is produced by vibrating objects and requires a medium through which to travel. The rate of vibration is related to the pitch of the sound. **EF, WW, MZ**

Ohio's Learning Standards for Social Studies

History: Early Civilizations

Early Indian civilizations (Maya, Inca, Aztec, Mississippian) existed in the Western Hemisphere prior to the arrival of Europeans. These civilizations had developed unique governments, social structures, religions, technologies, and agricultural practices. **GU**

History: Historical Thinking and Skills

Events can be arranged in order of occurrence using the conventions of B.C. and A.D. or B.C.E. and C.E.



Exhibit Exploration Guide



Energy Factory

Spinning Blackboard

1. When the speed is increased, more sand flies off the wheel.

Turntable

No answer needed.

Heat Shield

1. B
2. B
3. Answers will vary. Window A would be better for a colder environment, because it transmits more heat into the home. Window B would be better for a warmer environment, because more of the heat is reflected away from the home.

Water Works

Periscope

1. Answers will vary

Grow U

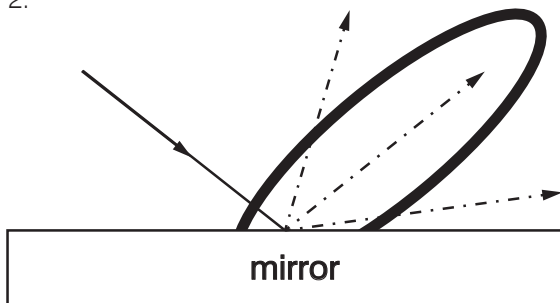
Corn

1. & 2. Corn is nourishing/nutritious and easy to store.
3. 8,000 BC

Mind Zone

Pepper's Ghost

1. B Light reflects (bounces) off Pepper's statue and the angled glass into your eyes.
- 2.



Mirror Mystique

1.



Freeze Frame

1. You can make a spot on the wall that doesn't glow by blocking the light from the flash. If the light doesn't land on the wall, the wall won't be able to absorb the light and glow.
2. Answers will vary.

Idea Lab

Marble Run

1. Answers will vary.
2. A
3. A (If the marbles in both paths took the same amount of time to make it to the bottom, marble A traveled a greater distance in the same amount of time, so it would be faster).

Lower Atrium

Tennis Ball Launcher

1. Compressed air
2. In the second scenario, the bowling ball reaches a faster speed because it was falling for a longer time. The second bowling ball has more energy to transfer to the compressed air, which would in turn have more energy to transfer to the tennis ball, launching it up higher.



Energy Factory

Spinning Blackboard (5.PS.1)

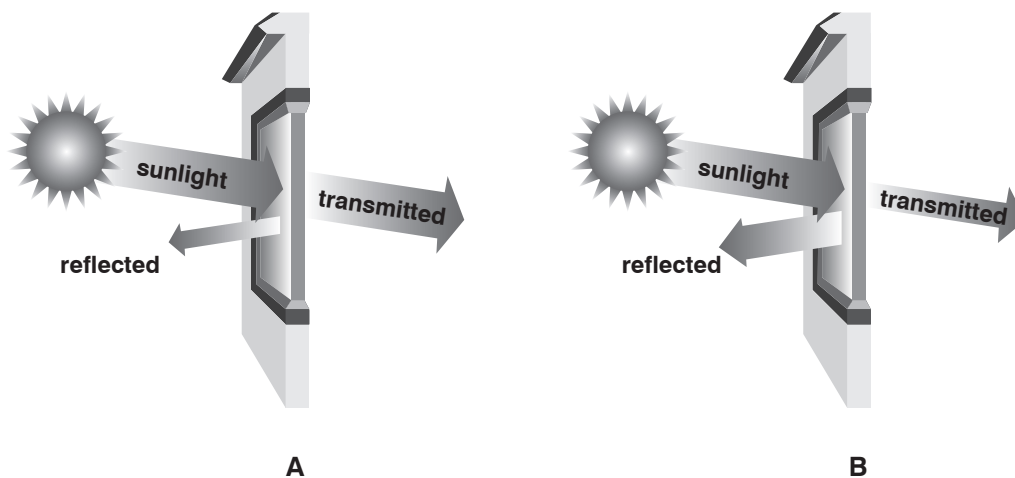
1. Set the spinning blackboard to a low speed, put some sand on the disk, and draw a design.
2. Now set the spinning blackboard to a high speed. What happened to the sand when the speed increased?

Turntable (5.PS.1)

1. Can you get a disk to spin on the turntable?
When a disk goes from still to moving, unbalanced forces cause the change in motion.

Heat Shield (5.PS.2)

Some types of glass can reflect light and heat more than others. Look at the two types of glass in the Heat Shield exhibit and compare them to the two windows drawn below:

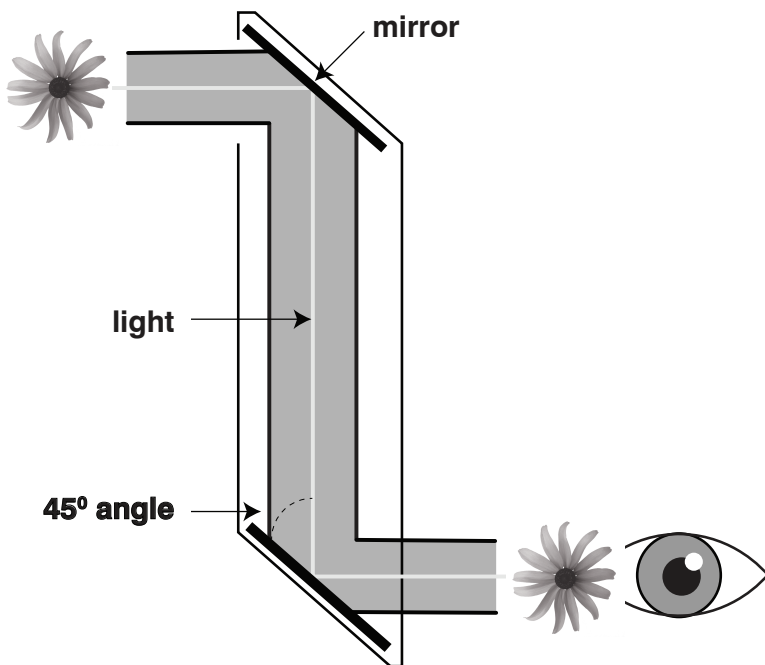


1. Which window (A or B) reflects more of the light away from the house? _____
2. Which window (A or B) is better in a hot, sunny climate, such as in Arizona? _____
3. Which window would you want to put in your home? Why? _____

Water Works

Periscope (5.PS.2)

Light travels in a straight line, so how can periscopes look around corners? Periscopes work because light reflects away from a surface at the same angle that light hits that surface. When we use a smooth, highly reflective surface like a mirror, we can make a new path for the light that goes straight to our eyes!



Draw what you can see when you look through the periscope.

Grow U

Corn (History: Early Civilizations and History: Historical Thinking and Skills)

What are two characteristics of corn (maize) that contributed to the success of the Mayan and Incan empires?

1. _____
2. _____

3. When did peoples native to modern Mexico first cultivate corn (maize)? (circle the best answer)

10,000 BC

8,000 BC

5,000 BC

1,000 AD



Mind Zone

Pepper's Ghost (5.PS.2)

Look in the doghouse, then ring the doorbell for a spooky surprise!

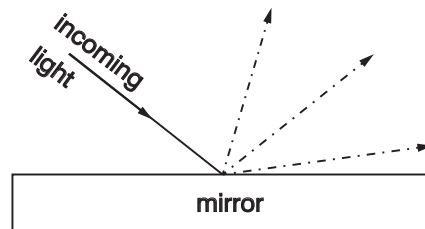
1. The statue of Pepper the dog is above the doorway to the doghouse.

How are you able to see Pepper when you look into the back of the doghouse? (Circle the best answer)

- Light gets transmitted (passed) through Pepper's statue.
- Light reflects (bounces) off Pepper's statue and the angled glass into your eyes.
- Pepper's statue moves places when the light turns on.

2. Light reflects off of surfaces at the same angle that the light hits the surface.

Look at the drawing below and pick the path (dotted line) that the light will take when it bounces off a mirror.



Mirror Mystique (5.PS.2)

Hold this paper in front of the mirror. **Circle** the shapes that look the **same** when reflected in the mirror.

Cross out the shapes that look different when reflected in the mirror.

A **E** **D** **M**

Freeze Frame (5.PS.2) *Caution: flashing lights*

Light energy can be absorbed by objects. We usually notice this when objects sitting in light get warm. In the Freeze Frame room, the walls can absorb light energy and give off some of that energy again in the form of light.

1. How can you make a spot on the wall that **doesn't** glow?

2. In the space below, draw a design you can make on the wall:

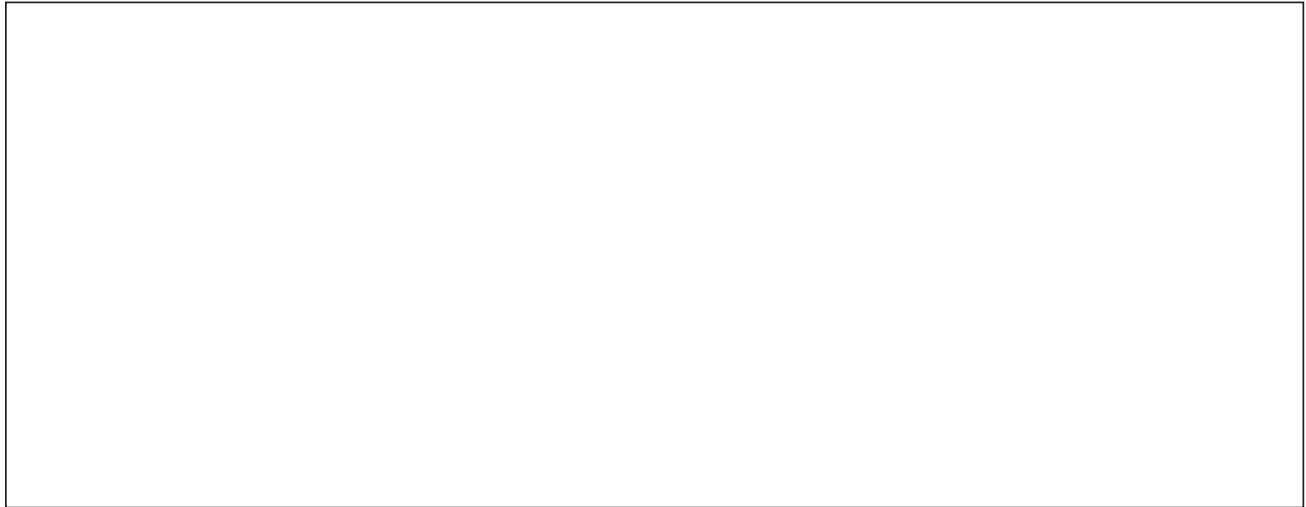
Exhibit Exploration Guide



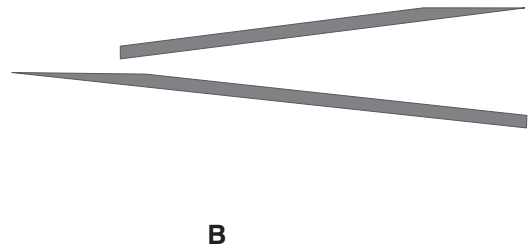
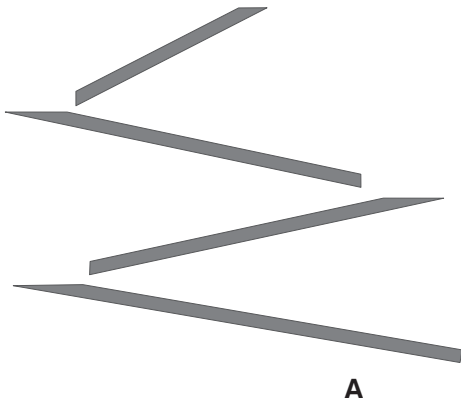
Idea Lab

Marble Run (5.PS.1)

1. Design and build a path for a marble. Try to design the path so that the marble moves as slowly as possible. Draw it here:



2. Look at the two marble paths drawn below. Which path has the marble traveling a greater distance? (A or B)



3. If the marbles in both paths took the same amount of time to make it to the bottom, which marble moved with a greater speed? (A or B)



Lower Atrium

Tennis Ball Launcher (5.PS.1)

Pull on the rope to lift the bowling ball,
then let go of the rope to launch the tennis ball in the air.

1. What force is pushing on the tennis ball to launch it into the air? (circle one)

gravity

compressed air

magnetism

pull

2. First, raise the bowling ball to the bottom of the metal screen and release it. Look how high the tennis ball goes.

3. Next, raise the bowling ball to the top of the metal screen and release it. Look how high the tennis ball goes.

Did you notice a difference in the height of the tennis ball launched? Why do you think this is?

