

Exhibit Exploration Guide

Grade
3

Learning World Key

Energy Factory = EF

Water Works = WW

Grow U = GU

Idea Lab = IL

Mind Zone = MZ



Ohio's Learning Standards for Science

3.ESS.1: Earth's nonliving resources have specific properties. Soil is composed of pieces of rock, organic material, water and air and has characteristics that can be measured and observed. **EF, GU, WW**

3.ESS.2: Earth's resources can be used for energy. Renewable energy resources, such as wind, water or solar energy, can be replenished within a short amount of time by natural processes. Nonrenewable energy is a finite resource, such as natural gas, coal or oil, which cannot be replenished in a short amount of time. **EF**

3.ESS.3: Some of Earth's resources are limited. Some of Earth's resources become limited due to overuse and/or contamination. Reducing resource use, decreasing waste and/or pollution, recycling and reusing can help conserve these resources. **EF**

3.LS.2: Individuals of the same kind of organism differ in their inherited traits. These differences give some individuals an advantage in surviving and/or reproducing. Plants and animals have physical features that are associated with the environments where they live. Plants and animals have certain physical or behavioral characteristics that influence their chances of surviving in particular environments. **GU**

3.PS.2: Matter exists in different states, each of which has different properties. The most recognizable states of matter are solids, liquids and gases. Shape and compressibility are properties that can distinguish between the states of matter. One way to change matter from one state to another is by heating or cooling. **WW**

3.PS.3: Heat, electrical energy, light, sound and magnetic energy are forms of energy. There are many different forms of energy. Energy is the ability to cause motion or create change. **MZ, IL, EF**



Exhibit Exploration Guide

Grade
3

Energy Factory

Ball Refinery

1. Answers will vary.
2. The refinery is sorting the balls by their size.
3. Answers will vary.

Info Glider

1. Tiny sea animals and plants
2. Millions of years
3. Answers will vary, including: Use less heat and air conditioning, turn electronics off when not in use, and use public transportation, rideshare, walk, or bike to get around.

Follow the Sun

1. Answers will vary.
2. Answers will vary.
3. The solar panel will collect the most energy when it moves to follow the lights.

Giant Radar Magnet, Ring Launcher, Floating in Copper, Falling Magnets, and Magnet Cloud

1. Answers will vary.
2. Answers will vary.

PV Panel Power

1. Answers will vary.
2. Answers will vary.
3. Answers will vary.
4. A solar panel works better on a sunny day because on a cloudy day there is less light energy to reach the panel.

Water Works

Erosion and Deposition

1. Answers will vary.
2. Answers will vary.

The Wet Stuff

1. Freezing rain

Clouds: Nature's Skyscrapers

1. Gas

Grow U

Water Drainage

1. Clay, silt, sand
2. Sand
3. Clay

Soil Monoliths

1. Answers will vary.
2. Answers will vary, including: Descriptors may include rocky, sandy, rough, coarse, smooth, reddish brown, yellowish brown, or gray.

That Stings!

1. The barb

Mind Zone

Rhythm Machine

1. The mallet/hammer moves to hit the instrument to make a sound. The instrument vibrates to make a sound.

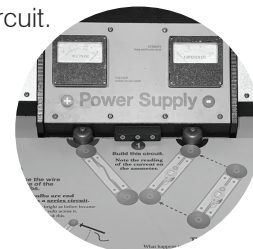
Freeze Frame

1. To make a spot on the wall that doesn't glow, you can block the flash from hitting the wall or cast a shadow on the wall.
2. Answers will vary.

Idea Lab

Circuit table

1. Answers will vary, including: The circuit should include the power source, a light bulb, and at least one other block, all connected in a closed circuit.
2. Answers will vary, including: The circuit should include power source, a fan, and at least one other block, all closed circuit.



Air cars

1. Answers will vary, including: The energy to move the car came from the compressed air that was stored in the bottle. The energy to move the car came from the person who turned the crank to store the energy in the car.
2. Answers will vary, including: To make the car travel farther, the crank more, store more energy in the car, or change the weight of the car by using a different frame.

Flying Things

1. Answers will vary, including: The energy moves the flying thing up the wind tube from the fan blowing the air, or from electrical energy powering the fan.
2. Answers will vary.



Energy Factory

Ball Refinery (3.ESS.1)

Earth's resources have specific properties and characteristics. We can use these characteristics to sort things into different groups. At the ball refinery, the balls represent some of Earth's resources.

1. Think of some characteristics of the balls, like size, color, weight or texture. Pick one characteristic and sort them into groups in front of you. Draw what your groups look like:

2. Now put some of the balls into the ball refinery. How is the refinery sorting the balls?

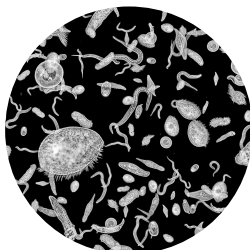
3. Did you and the refinery sort the balls by the same characteristics? Were your groups similar or different?

Info Glider (3.ESS.2 and 3.ESS.3)

1. Circle the picture that shows where petroleum oil comes from.



ancient trees



tiny sea animals and plants



dinosaurs

2. How long does it take for petroleum oil to form from once-living things? (circle one)

10 years

thousands of years

millions of years

billions of years

3. What is one way you can reduce energy usage? Write or draw a picture.



Exhibit Exploration Guide

Grade
3

Energy Factory

Follow the Sun (3.ESS.2)

Solar panels collect energy from the sun so we can use it in the form of electricity.

1. Pick one position for the solar panel, then turn on the lights.
What's the **highest score** you can get when the solar panel **doesn't move**?
2. Turn on the lights and move the solar panel to catch as much light as possible.
What's the **highest score** you can get when you **move** the solar panel with the lights?
3. How can you make sure the solar panel collects the most solar energy?

Giant Radar Magnet, Ring Launcher, Floating in Copper, Falling Magnets, and Magnet Cloud (3.PS.3)

1. Draw a picture of magnets at work in one of the exhibits:



2. How were you able to use a magnet to move another magnet or metal object?



Exhibit Exploration Guide

Grade
3

Energy Factory

PV Panel Power (3.ESS.2 and 3.PS.3)

1. Color in the area that was lit up before anyone blocked the solar panel.
2. Color in the area that was lit up when you were blocking the solar panel.

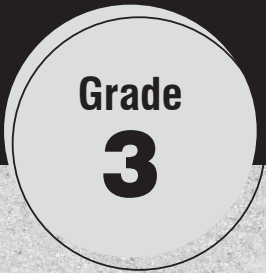


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<input type="radio"/>	81 - 99%
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3. In the solar panels below, draw in the area you blocked to get the lowest energy output.

Exhibit Exploration Guide



Water Works

Erosion and Deposition (3.PS.1)

1. At the erosion table, build a sandbar (a strip of land formed by sand gathering at the mouth of a river) a few inches in front of the water source. Then turn on the water source.

How many seconds does it take for the water to move through the sand? _____

Draw a picture of your sandbar before and after the water flows through it:

Before

A large empty rectangular box for drawing the sandbar before the water flows through it.

After

A large empty rectangular box for drawing the sandbar after the water flows through it.

The Wet Stuff (3.PS.2)

1. What is formed when liquid water freezes into a solid as it hits the ground? Circle one:

snow

freezing rain

hail

rain

Clouds: Nature's Skyscrapers (3.PS.2)

1. Clouds form when water vapor, which is a (pick one: gas/solid), cools and condenses into a liquid.

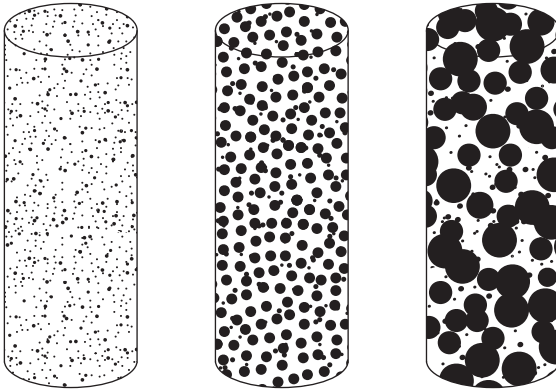


Grow U

Water Drainage (3.ESS.1)

1. Look at the drawing below. The different kinds of soil particles are characterized by different sizes.

Circle the silt. **Star** the sand. **Cross out** the clay.



2. Turn the Water Drainage wheel and **circle** which type of soil particle lets the water drain through it **most quickly**:

Sand

Silt

Clay

3. **Circle** which type of soil particle lets the water drain through it the **most slowly**:

Sand

Silt

Clay

Soil Monoliths (3.ESS.1)

1. Look at the soil monoliths and choose one. **Circle** the name of the monolith you chose:

Fulton

Ottokee

Tedrow

Latty

2. **Write 3 words** that describe the soil monolith you chose:

That Stings! (3.LS.2)

What structure on a bee's stinger helps keep the stinger stuck in the victim?



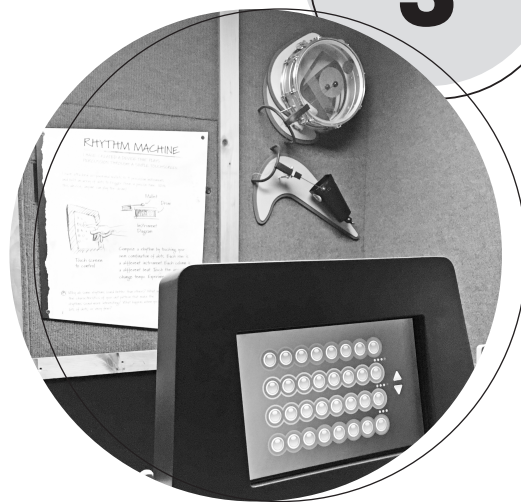
Exhibit Exploration Guide

Grade
3

Mind Zone

Rhythm Machine (3.PS.3)

1. Create a rhythm on the Rhythm Machine.
What is moving that makes the sound you hear?



Freeze Frame (3.PS.3) *Caution: Flashing Lights*

Light energy from a bright flash energizes the material in the wall, giving it enough energy to glow.

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:



Idea Lab

Circuit Table (3.PS.3)

1. Use the pieces to build a circuit that lights up a lightbulb. Draw the circuit below.

2. Use the pieces to build a circuit that spins a fan. Draw the circuit below.

Air Cars (3.PS.3)

Build a wooden air car with a bottle inside. Take the car to the air pump at the start of the track. Turn the crank. Hit the button to launch the car down the track.

1. Where did the energy come from to move the car?

2. What can you do to make the car travel farther?

Flying Things (3.PS.3)

Build a device at the wind table and send it up through the wind tube.

1. What energy source moved your device up the wind tube?

2. How high up the tube did your device travel? Describe with words or draw a picture.

