



## Discovery Lab Pre-Visit Activities

### Forces of Nature

#### Grades K-2

*Thank you for booking your field trip to the Orlando Science Center! As a means of preparing your students for their Discovery Lab and enhancing their experience, we are providing you with these pre-visit materials to share with your class.*

#### **Discovery Lab Objective:**

Our planet, Earth, is full of wonder. It is a living sphere – continuously in motion and constantly changing as a result of the many forces of nature. This Discovery Lab will take you on a journey to discover some of these forces of nature. You will have the opportunity to delve into a vicious volcano, find out how our planet is changed during erosion, and explore the fast winds of a hurricane.

#### **Next Generation Sunshine State Standards:**

SC.K.N.1.1, SC.K.N.1.3, SC.K.N.1.4, SC.1.N.1.1, SC.1.E.5.4, SC.2.N.1.1, SC.2.N.1.2, SC.K.N.5.1, SC.1.E.5.2, SC.1.N.1.3, SC.1.E.6.3, SC.2.E.7.4, SC.2.E.7.5, SC.K.P.8.1, SC.2.P.13.3, SC.2.P.8.1, SC.2.P.8.3, SC.2.P.10.1, SC.K.P.12.1, SC.1.P.12.1, SC.1.P.8.1

#### **Common Core State Standards:**

LACC.K.RL.1.1; LACC.K.RL.2.4; LACC.K.W.1.2; LACC.K.W.3.8; LACC.K.SL.1.1; LACC.K.SL.1.2; LACC.K.SL.1.3; MACC.K.G.2.5; LACC.1.RL.1.1; LACC.1.RI.2.4; LACC.1.RI.4.10; LACC.1.W.3.7; LACC.1.W.3.8; LACC.1.SL.1.1; LACC.1.SL.1.2; LACC.1.SL.1.3; LACC.2.RI.2.4; LACC.2.RI.2.5; LACC.2.W.3.7; LACC.2.W.3.8; LACC.2.SL.1.1; LACC.2.SL.1.2; LACC.2.SL.1.3

#### **Key Vocabulary:**

- **Weathering:** the process in which rocks are broken down by the action of rain, frost, wind, and other elements of the weather.
- **Erosion:** the movement or transportation of broken-down material from one place to another.
- **Volcano:** mountain with a vent that connects to a reservoir (lake) of molten (melted and really hot) rock. When gas pressure under the surface of the earth and inside the volcano builds up enough, the volcano will erupt.
- **Wind:** moving air.
- **Hurricane:** a big storm up to 600 miles across that has strong winds spiraling inward and upward at speeds of 75 to 200 mph.
- **Gravity:** force that pulls things together.
- **Air resistance:** the force of air pushing against an object.
- **Sun:** the closest star to Earth and the center of our solar system.
- **Ultraviolet Rays:** an invisible form of radiation that comes from the Sun. Exposure to too much UV rays can cause sunburn and damage skin cells.

#### **Key Concepts:**

- The Earth's surface is continuously shaped slowly by the processes of weathering and erosion.
- Volcanoes can create fast changes to Earth's surface that can be damaging to nearby towns.

- Hurricanes are large swirling storms with winds greater than 74 mph that can cause fast changes to the Earth.
- Our Sun has continuously caused slow changes to the Earth since it formed about 5 billion years ago. The Sun's energy can have beneficial and harmful effects to the planet and its living things.
- Scientists design and build weather instruments that monitor wind speed, wind direction, and pressure to make forecasts for severe weather such as hurricanes.

### Discussion Topics:

- The Earth's surface is continuously shaped by the processes of weathering and erosion.  
*How is erosion different from weathering?*
- Hurricanes and volcanoes are natural processes on the Earth that can affect human's lives.  
*How can humans protect themselves from volcanoes and hurricanes?*
- The Sun provides us with all the energy we need to live on planet Earth.  
*What are some ways that the Sun's energy can be beneficial and harmful to us?*

### In Class Activities:

- This experiment is a fun and easy way to explore atmospheric pressure. You will need a candle, test tube, match, petri dish, water, a hex nut (to hold up the candle), and food coloring (optional). Position the candle in the hex nut then place it in the center of your Petri dish. Add water to fill the dish until the hex nut is covered. To make the water easier to see, add a drop of food coloring. Light the candle and then, carefully, in one motion, invert the test tube over the candle so that the bottom of the tube is completely under water but not completely touching the bottom of the pan. Watch as the candle goes out and the water rises. Why did the candle go out? *As the oxygen "burns up" from the lit candle, the flame goes out and the lack of air pressure allows the water to rise up in the tube. Why did the water rise? It's not just because the oxygen got used, but because the air inside the tube isn't pushing as hard as the air outside the tube. Remember that air pushes on stuff, always. This experiment created low pressure inside the test tube and the air pressure outside the test tube was higher. Try "Burning the Air" again. Do you come up with the same results? If the water doesn't rise well the second time: You may still have carbon dioxide in the test tube. Simply blow into it to get the invisible cloud of gas out. If the water doesn't rise well at all: Check to make sure your test tube isn't touching the floor of the Petri dish. If the tube rests on the bottom of the dish, water will not be able to flow up into the tube easily. A barometer is a scientific instrument used in meteorology to measure atmospheric pressure. By conducting this experiment, we can see the effects of atmospheric pressure, like using the barometer. The centers of storms are areas of relatively low air pressure, compared to pressures around the storm. High air pressure generally brings good weather. Keeping track of how the pressure is changing is important for forecasting the weather. A real barometer takes a while to work and the changes in the instrument can be very small and hard to see. This experiment still works with atmospheric pressure, but happens much faster.*
- This activity is a fun and enjoyable way for kids to learn about protecting themselves from the Sun's ultraviolet radiation. You will need a yellow ball or balloon which will represent the Sun and a music player (with some fun dancing music). Have the students make a large circle around the 'Sun'. Students pass the ball to each other as music plays. When the music stops, the student with the ball should say one of the sun facts about how to protect the skin and eyes from the sun. Some facts that students should know about protecting themselves from the Sun include:
  - I. Apply sunscreen to cover all exposed skin 15 minutes before going outside. Sunscreen should have a Sun Protection Factor (SPF) of at least 15 and provide

broad-spectrum protection from both ultraviolet A (UVA) and ultraviolet B (UVB) rays. Reapply every two hours.

2. Wear protective clothing (ie. long-sleeved shirt, pants, a hat, and sunglasses).
3. Seek shade when possible. The sun's UV rays are strongest between 10 a.m. and 4 p.m.
4. Do not burn. Sunburns significantly increase one's lifetime risk of developing skin cancer, especially for children.

**Additional Resources:**

<http://www.weather.gov/>

<http://www.weatherwizkids.com/>

<http://www.education.noaa.gov/>