

Great Science Adventures



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Lesson 1



Where is Earth in space?

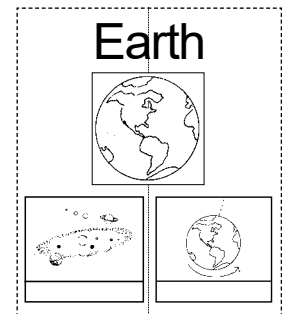
Lithosphere Concepts:

- Earth is located in the Milky Way Galaxy.
- It is the third planet from the Sun.
- Its revolution takes about 365.25 days, and its rotation takes about 24 hours.
- Earth is 7,926 miles (12,753 km) in diameter.
- Earth's structure consists of a solid metal inner core surrounded by a liquid metal outer core, a rocky mantle, and a thin, rocky crust.
- Earth is composed of many different elements, but some of the most common are iron, nickel, silicon, magnesium, aluminum, and oxygen.
- Earth is the only planet known to support life.

Vocabulary: Earth Sun planet *revolution *rotation

Read: *Lots of Science Library Book #1.*

Activities:




Planet Earth – Graphic Organizer



Focus Skills: communicating information recording data




Paper Handouts: 12" x 18" sheet of construction paper 2 sheets of 8.5" x 11" paper
a copy of Graphics 1A-E

Graphic Organizer: Use the 12" x 18" paper to make a Shutter Fold. Cut Graphic 1A on the dotted line and glue it to the top front of the Shutter Fold Project. Title it *Earth*. Fold the 8.5" x 11" paper in a Taco and cut off the end. Fold the Taco into a Hamburger and cut on the fold. Make two Matchbooks. Glue Graphic 1B on one and 1C on the other Matchbook. Label them *Earth in the Solar System* and *Earth rotates on its axis*, accordingly. On the top section inside each Matchbook:

 Draw the solar system and circle Earth. Write *365 days* under the drawing.

 Draw Earth on its axis, and write *24 hours* under the drawing.

  Write clue words about each Graphic: *third planet, solid, supports life, 365 days to orbit and rotates on axis, 24 hours, day and night.*

   Explain Earth's location in space. Describe its revolution and size. Explain the rotation of Earth and why it gives us day and night. Include the *Fascinating Physical Features of Earth* from the *Lots of Science Library Book #1* in your explanation. Illustrate as needed.

Glue these two Matchbooks to the middle of each front tab on the *Earth Shutter Fold Project*.

Label and color Graphics 1D and E. Glue them inside the Matchbooks from the previous activity on the *Earth Shutter Fold Project*.

Day and Night

Activity Materials: ball or globe flashlight

Activity: Hold the ball or globe at the top and bottom. Slowly rotate it in the same manner that Earth rotates on its axis. Ask a partner to hold a flashlight directly in line with the ball or globe, shining light on it. Explain how this activity illustrates day and night on Earth.

Earth and the Sun

Paper Handouts: scrap paper newspaper optional: crayons and yellow paint

Activity: Cut a circle 1/4" in diameter. Color it green and blue. Use newspaper to make a 22" in diameter circle. Paint it yellow. Place the two circles 4 3/4" (12.1 cm) apart. This is a scale model of the Sun and Earth.

Note: To complete the entire solar system, refer to the chart below.

Planet	Diameter of Circle	Distance from paper Sun
Mercury	1/8"	1 3/4" (4.4 cm)
Venus	1/4"	3 1/4" (8.3 cm)
Earth	1/4"	4 3/4" (12.1 cm)
Mars	1/4"	7" (17.8 cm)
Jupiter	2 3/4"	2' (61 cm)
Saturn	2 3/8"	3' 8" (111.8 cm)
Uranus	1"	7' 5" (226.1 cm)
Neptune	7/8"	11' 8" (355.6 cm)
Pluto	1/8"	15' 3" (464.8 cm)

Experiences, Investigations, and Research

Select one or more of the following activities for individual or group enrichment projects. Allow your students to determine the format in which they would like to report, share, or graphically present what they have discovered. This should be a creative investigation that utilizes your students' strengths.



1. Use a compass to observe the magnetic field of Earth. The needle of a compass will always point towards Earth's magnetic north pole.



2. Read *Journey to the Center of the Earth* by Jules Verne.



3. Compare and contrast a boiled egg to the Earth inside and out. How do the shapes differ? Compare Earth's crust to the egg's shell. Could the egg's yolk represent the Earth's inner and outer metal cores, and the egg white the mantle?



4. Estimate and graph what percentage you think Earth's crust, mantle and core would represent by volume. For example, Earth's crust is less than 1% of the total volume of Earth. Research the thickness of the mantle and the core, and use this information to estimate their volume percentages.



5. Use clay to model the concentric layers of Earth: inner core, outer core, mantle, and crust.



6. Using an Internet Search Engine, visit NASA Earth's Observatory, click on *The Blue Marble*. View images of Earth from space.



7. Using an Internet Search Engine, view images of The Milky Way Galaxy.

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Lesson 2



What are the physical features of Earth?

Lithosphere Concepts:

- Earth's surface is about 79% water and 21% land.
- Earth has a protective atmosphere surrounding it.
- Imaginary lines are used to locate positions on Earth's surface.
- Physical features of Earth's surface include mountains, valleys, volcanoes, plains, plateaus, canyons, and caves.

Vocabulary: ocean continent *atmosphere

Read: *Lots of Science Library Book #2.*

Activities:



Land and Water – Graphic Organizer

Focus Skill: graphing

Paper Handouts: a copy of Graphics 2A-B *Earth Shutter Fold Project*

Graphic Organizer: Color and cut out Graphics 2A-B. Cut up on the middle dotted line in each circle. Insert the cut-up line from one circle into the other one, so the circles can be turned. Move the circles so that they show a graph indicating the percentage of water (blue) and land (green) on Earth's surface. When the circles are aligned properly, glue them together in place. Glue this graph on the front or back of the *Earth Shutter Fold Project*. Write, copy, or dictate an explanation of the graph, such as *Earth's surface is about 79% water and 21% land.*

Earth Map – Graphic Organizer

Focus Skill: recording data

Paper Handouts: a copy of Graphics 2C-D *Earth Shutter Fold Project*

Graphic Organizer: Glue Graphics 2C-D on the inside of the Earth Shutter Fold Project. Draw and label these lines: *equator, Tropic of Cancer, Tropic of Capricorn, and Prime Meridian.* Refer to *Lots of Science Library Book #2.*

Focus Skill: map reading

Paper Handouts: a copy of Graphic 2E

Shutter Fold Project




Earth



Graphic Organizer: Cut out Graphic 2E and fold it on the middle line so that the illustration of water is on the cover.

This represents the Pacific Ocean. Follow the directions








below for the inside and glue it to the appropriate place on the world map inside the *Earth Shutter Fold Project*.

-  Draw the cover picture on the inside and color it.
-  Copy information from the *Lots of Science Library Book* about the Pacific Ocean: *world's largest ocean*.
-  Write information about the cover picture.

Teacher's Note: The Graphics for all the Fascinating Facts activities are grouped together in the Graphic Pages.

Experiences, Investigations, and Research

Select one or more of the following activities for individual or group enrichment projects. Allow your students to determine the format in which they would like to report, share, or graphically present what they have discovered. This should be a creative investigation that utilizes your students' strengths.

-  1. Compare and contrast how maps and globes represent the surface of the Earth. Which is more realistic? Why?
-  2. Locate latitude and longitude lines on a map or a globe. Determine the longitude and latitude for your area.
-  3. Use a permanent marker to draw an equator on a beach ball, and label its "northern and southern hemispheres." Draw shapes on the ball to represent the seven continents. Label the continents and oceans. Toss the ball up in the air and catch it. Where are your hands? In which hemisphere? On which continent or ocean?
-  4. Make a graph to show what percentages of Earth's surface are covered in water and land (79% water and 21% land).
-  5. Write a story about Goldilocks traveling through the solar system looking for a planet that is "just right."
-  6. Using an Internet Search Engine, research how much water there is on and in the Earth.
-  7. Using an Internet Search Engine, investigate the Earth's atmosphere. List the five layers and report their differences.

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Lesson 3



What is the lithosphere?

Lithosphere Concepts:

- Lithosphere is Greek for “sphere of stone.” At one time the term lithosphere was used to refer to the mantle and crust.
- Today, lithosphere refers to the solid, cool, outermost layer of Earth; the crust and uppermost mantle.
- Under the continents, Earth’s crust is about 25 miles thick, and under the ocean floor it is about 5 miles thick.
- Earth’s crust is divided into gigantic sections called continental plates.
- These continental plates can move apart, collide, or slide sideways.
- Most scientists think that at one time all the continents were joined together, forming one massive land formation called Pangaea.

Teacher’s Note: An alternative assessment suggestion for this lesson is found on pages 64-65. If Graphics Pages are being consumed, first photocopy the assessment graphics that are needed.



Vocabulary: lithosphere continental plates *plate tectonics

Read: *Lots of Science Library Book #3.*

Activities:

The Continents – Graphic Organizer

Focus Skills: map reading applying new data

Paper Handouts: a copy of Graphic 3A optional: poster board or thin cardboard




Graphic Organizer: Cut out the continents in Graphic 3A. If desired, glue them on poster board or thin cardboard and cut them out again. Spend time experimenting with the shapes of the continents. Make the land formation Pangaea. Place the continents in their present locations.

Focus Skill: map reading

Paper Handouts: a copy of Graphic 3B *Earth Shutter Fold Project*

Graphic Organizer: Cut out Graphic 3B and fold on the middle line so that the illustration is on the cover. Follow the directions below and glue it to the appropriate place on the world map inside the *Earth Shutter Fold Project*.



-  Draw the cover picture on the inside and color it.
-  Copy information from the *Lots of Science Library Book* about the cover picture: **hot liquid rock forms new rock**.
-  Write information about the cover picture.

Experiences, Investigations, and Research

Select one or more of the following activities for individual or group enrichment projects. Allow your students to determine the format in which they would like to report, share, or graphically present what they have discovered. This should be a creative investigation that utilizes your students' strengths.



1. Investigate the history of the theory of plate tectonics. Include information on continental drift, sea floor spreading, subduction zones, and modern views on geodynamics.



2. Who, What, When, Where: Alfred Wegener, (1880-1930), Germany.



3. Using two stacks of towels, design a demonstration that illustrates the ways that plates move.



4. Research and draw the following: Pangaea dividing into Gondwannaland and Laurasia.



5. Compare and contrast the trenches and ridges found on the ocean floor.



6. Using an Internet Search Engine, investigate the physical features of Earth. Report your findings on Earth's features.



7. Using an Internet Search Engine, research the Grand Canyon and Continental Drift. What is the relationship between the canyon and the drift? Report orally on your findings.