

Teacher Idea Kit for

# Assignment : Earth



## A Space Science Program For Grades 3-4

Presented by

ABBITT  
PLANETARIUM



*Funded in part by:*

**Langley**   
Federal Credit Union  
Spirit of community. Warmth of family.  
Pride of membership.

## **Assignment: Earth**

### **Suggested for Grades 3 - 4**

#### **Objectives**

After visiting the planetarium for Assignment: Earth, the student should be able to:

1. Discuss the relative size, position, and makeup of the Earth, Moon and Sun.
2. Explain the difference between revolution and rotation and how these motions cause our sequences of day and night, seasons, and phases of the moon.
3. Describe how the Sun and Moon cause the Earth's tides

#### **State Standards of Learning Objectives**

This planetarium presentation meets the following Virginia State SOL's:

Science: 3.8, 3.9, 3.11, 4.7

#### **Vocabulary**

planet:	A non-luminous body orbiting a star.
rotation:	The motion of an object around its axis. The time it takes for one rotation determines the length of a planet's day.
revolution:	The motion of an object around a central body. The time it takes for one revolution around the Sun determines a planet's year.
Earth:	The third planet from the Sun.
Moon:	A natural satellite of a planet. When capitalized, the Earth's natural satellite
Sun:	The yellow dwarf star located at the center of the solar system.
seasons:	A sequence of four distinct patterns of weather. The four seasons are winter, spring, summer, and autumn.
solar system:	The Sun and all objects which orbit it, including planets, dwarf planets, moons, asteroids, and comets.
day:	The time when the Sun's light shines on your part of the Earth.
night:	The time when your part of the Earth is facing away from the Sun.
orbit:	The path of an object around another object, such as the planets around the Sun.
satellite:	An object orbiting a planet. It can be natural, like a moon, or man-made.
ellipse:	An elongated or squashed circle.
phases:	The eight distinct shapes the moon goes through in a course of a month. These include New, Waxing Crescent, First Quarter, Waxing Gibbous, Full, Waning Gibbous, Last Quarter and Waning Crescent
tides:	The twice-daily rise and fall of the Earth's waters caused by the gravity of the Moon and the Sun.

#### **Background Material for Assignment: Earth**

Day and night; the seasons; the phases of the Moon; the tides; all of these phenomena are within each person's experience. And yet, the reasons why these cycles of nature occur are often difficult concepts to grasp. Students need to have these concepts reinforced in many ways. The experience of actually watching the Earth, Moon and Sun move and causing these various familiar changes is a powerful one. Without this understanding of our Earth-Moon-Sun system, students will have difficulty grasping more abstract concepts later.

This program makes the exploration of the Earth-Moon-Sun system fun and exciting by taking the point of view of an alien observer, trying to explain a strange new world to his fellows back home. Some historical background of the study of our planetary home is also included. Students will have the opportunity to really internalize the concepts of rotation, revolution, and tidal forces through the use of advanced video imagery, which makes the effects of these motions very clear to the viewer.

This amusing program is appropriate for third through fourth graders, and includes many visually exciting elements such as video clips of the planets and other objects in the solar system. The students will gain a new perspective on the planetary system they call home. A question and answer period is included to address specific questions from the students.

### **Concepts Covered During the Planetarium Visit**

1. All bodies in the solar system are experiencing both revolution and rotation. Revolution is the motion of an object around a central body, while rotation refers to an object's motion around an internal axis.
2. The 23-degree tilt of the Earth and the revolution of the Earth about the Sun cause the seasons. Winter occurs when our hemisphere is tilted away from the Sun, and summer occurs when we are tilted toward the Sun. The seasons are reversed in the Southern Hemisphere.
3. Sunlight shining on one-half of the Moon as it revolves around the Earth causes the phases of the Moon. This motion causes differing amounts of the daylight side of the Moon to be facing towards the Earth at various times during the Moon's 28-day cycle.
4. The Earth is truly unique in our solar system, being the only planet that has liquid water on its surface, an oxygen-based atmosphere, and living creatures. The Earth-Moon-Sun system can be used as a model to help understand phenomena seen on other worlds of our solar system.

### **Pre-Visit Activities**

We recommend that you conduct as many of these activities as possible with the class before your visit to the planetarium theater. Be sure to raise questions that can be left unanswered until the discussion period in the program.

1. Ask your students what motions the Earth goes through in space. Do they think any other objects in the solar system go through these motions? Ask them specifically about our Moon. Do we see the Moon rotate or revolve?
2. Have your students draw pictures of each season. What do they think causes the change in the weather during each season? What is the weather like during each season?
3. Ask the students to attend a local museum or astronomy club's observation session to see the Moon or the Sun. Call the Astronomy Department at 595-1900 Ext. 256 for information on observing times or clubs in your local area.

4. Have your students draw pictures of the Moon. See what phases they draw. Ask them why they drew the Moon in that shape. Why do they think the Moon changes shape? Show a video of men walking on the Moon. Find out what they believe the astronauts found when they went there.

5. Have your students make daily observations of the Sun or the Moon for a month or more. Please note that the sun should NEVER be observed with the naked eye, as this can cause PERMANENT eye damage. To safely view the Sun, use a telescope with an appropriate endcap solar filter, or you can view the unmagnified Sun through a piece of #14 arc welders glass (available at local hardware stores). Call the Virginia Living Museum at the number listed above for more information on safe solar viewing. What changes do you see in your object during the month? How can you explain the changes you saw?

### **Post-Visit Activities**

We recommend that you conduct at least one of these activities with your class following their visit to the planetarium theater.

1. Plan an eclipse party! Call the Astronomy Department at 595-1900 x256 for the date and time of the next solar or lunar eclipse and suggestions on the best way to view it. If your eclipse is a solar one, find out where it is total. Learn about that country. Try to watch the totality of the eclipse on television or on the internet!

2. Study one of the other bodies in the solar system. Would this planet or moon make a good place for humans to try to land and build a base? Why or why not?

3. Learn about the life and accomplishments of an early astronomer like Galileo, Isaac Newton, Ptolemy, or Aristotle. Write a short scene about what these astronomers might say to each other if they had met!

4. Design a spacecraft to travel to the Sun. What kind of equipment would you include? What experiments would you have it perform? What would it look like? How will it have enough power to complete its mission? Remember that more weight means more fuel.

### **Recommended Books and Web Sites**

*NASA Mission to Planet Earth:* <http://earth.nasa.gov>

*All About the Sun:* <http://quest.arc.nasa.gov/ltc/soho/index2.html>

*Exploring Space: A Golden Guide* by Mark R. Chartrand, Golden Press, New York, 1991

*Floating Home* by David Getz, Henry Holt and Company, 1997

*Abbott Planetarium:* <http://www.thevlm.org>

