

Investigation Five – Making a Sundial

Standard I

Students will understand that the shape of Earth and the moon are spherical and that Earth rotates on its axis to produce the appearance of the sun and moon moving through the sky.

Objective 2

Describe the movement of Earth and the moon and the apparent movement of other bodies through the sky.

Intended Learning Outcomes

1. Use science process and thinking skills
2. Manifest scientific concepts and principles
3. Understand science concepts and principles
4. Communicate effectively using science language and reasoning

Standard I

Objective 2

Background Information

Earth makes one complete rotation on its axis every 24 hours. During the 12 hours Earth faces the sun, the sun appears to move from the eastern horizon to the western horizon in a path across the sky. The sun is stationary with respect to the revolution of Earth. The sun's apparent movement is caused by Earth's rotation. A sundial can use the sun's shadow to measure time based on the position of the sun in the sky.

Pre-Assessment/Invitation to Learn

Ask students if their shadows are always the same length or in the same place. Is it always the same length and shape? Do they notice anything about the time of day and the location and shape of their shadow?

Instructional Procedure

1. Have the students answer the first question on page 7 of their journals.
2. Make sundials by folding a flap along the long edge of the triangle.
3. Mark the center of the paper plate.
4. Glue the triangle to paper plate with the point in the center and the wide end toward the outer edge of the plate.
5. Have students predict what will happen when they put their sundials in the sun.
6. Have them take their sundials outside or place on a windowsill exposed to the sun.
7. Have them mark the plate to show the position of the shadow.
8. Have students check their sundials two or three times during the day.
9. Tell them to draw the shadow cast by the sun on the dial each time.
10. Remind them NOT to move their sundials.
11. Have them glance at the sun and observe where the sun is each time.
12. Have students answer the second question on page 7 of their journals.

Materials

- Paper plates
- Triangles
- Pencils, crayons
- Tape
- Scissors, glue
- My Moon Book

Curriculum Extensions

Science -

- Point the sundial to the north and use it to tell time. (*ILO 1*)

Language Arts -

- Study other sundials used many years ago. (*Standard VII, Objective 3*)

Assessment Suggestions

- Response Questions:
 1. Do you always see the sun in the same place?
 2. Where is it at breakfast time?
 3. Where is it at lunch time?
 4. Where is it when you are having dinner?
 5. When it is cloudy, what happens to your shadow?
- Observational descriptions in student journals:
 1. This Surprised Me the Most (new idea)
 2. I Really Like How it Looks (art)
 3. I Thought This Would Be Hard (challenge)
 4. We Did a Great Job Together (cooperative effort)
- Check for accuracy on page 7 of their journals

Resources

Web sites:

- www.NASA.org
- www.earthsky.com
- www.sciencecourt.com
- www.askjeeves.com

Books:

- *The Magic School Bus Inside the Earth* by Joanna Cole. Scholastic Inc., 1989
- *On the Day You Were Born* by Debra Frasier. Hartcourt Brace & Co. 1991
- *Our Planet Earth* by Claire Llewellyn. Scholastic, Inc., 1997
- *You're Aboard Spaceship Earth* by Patricia Lauber. Harper Trophy, 1996

Homework & Family Connections

- Send home directions of how to make sundials. Students can show their family members how to make sundials.
- At one of the Web sites above, go to “sundials” to see when sundials were first made and all the different ways they were made.
- Students can show family members how sundials work.