

Grade: 1
Program Title: Round and Round
Quarter: 3
Number of hours: 2

Performance Expectation 1-ESS1-1: Use observations of the sun, moon, and stars to describe patterns that can be predicted. 1-ESS1-2: Make observations at different times of year to relate the amount of daylight to the time of year.		
Science and Engineering Practices	Disciplinary Core Ideas	Cross Cutting Concepts
Analyzing and Interpreting Data Planning and Carrying Out Investigations <hr style="border-top: 1px dashed black;"/> <i>Connections to Nature of Science</i> Scientific Knowledge is Based on Empirical Evidence	ESS1.A The Universe and its Stars ESS1.B The Earth and the Solar System	Patterns <hr style="border-top: 1px dashed black;"/> <i>Connections to Nature of Science</i> Scientific Knowledge Assumes an Order and Consistency in Natural Systems
Maryland College and Career-Ready Standards (MD-CCRS)		
ELA/Literacy	W.1.7 Participate in shared research and writing projects (e.g., explore a number of “how-to” books on a given topic and use them to write a sequence of instructions). W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.	
Mathematics	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically.	

Program Title:	Round and Round
Lesson Objective(s)	<ul style="list-style-type: none"> • Students will use modeling to understand that the Earth is round. • Students will make observations of the night sky to identify patterns in the stars.
Resources/Materials	Planetarium, clipboards with worksheets

Engagement (5 - 10 min): Activities capture the students' attention, connect their thinking to the situation, and help them access prior and current knowledge. Students may experience a new phenomenon or reflect on an anchor phenomenon.

The presenter will ask: "What is the shape of the Earth?" Students will be asked to provide evidence to support their claim. Presenter can claim that the Earth is flat, since that's how the presenter observes it when they look out at the Earth.

Exploration (45 min): Activities allow students to investigate initial ideas and solutions in meaningful contexts.

Part 1: Four students will be selected to represent different geographic locations on a merry-go-round model of the Earth. All remaining students will represent "aliens" making observations of the Earth from Outer Space. A light representing the Sun will shine on the model. Changes in the relative positions of students, light, and shadow will be noted as the sphere rotates. Students on the model and students in their seats will compare and contrast their observations in terms of day/night/ability to see stars in the sky. Students will observe images of a ship sailing across the ocean and hear a story of a man who made the same observations and concluded that his friends had sunk into the ocean. Students will view images of the Earth, a spinning top, and a carousel. They will be asked to consider which object rotates at the fastest speed.

Part 2: Earth Tilts Toward the Sun (Seasons). Students will observe the path of the Sun for each major season (winter/spring/summer/autumn) and count the hours of sunlight experienced for our current latitude on Earth.

Explanation (part of 45 min. Exploration): Students develop an explanation for the concept and practices. Teacher's descriptions and definitions help clarify and modify students' understanding of the lesson.

Part 1: Students will describe that the rotating Earth causes the day/night cycle. The Sun and stars are always there, but your position on Earth determines whether you are experiencing day/night. Students will explain that the Sun's light makes it too bright to see stars during the day. Students will determine that a ship on the horizon appears to sink because it follows the curve of the Earth, providing evidence that the Earth is round. They will learn that in order for the Earth to make a complete rotation in 24 hours, we are moving at a speed of about 800 miles per hour here in PG County!

Part 2: Earth Tilts Toward the Sun (Seasons). Students will describe how the fewer hours of sunlight in the winter leads to colder days, and that the longer hours of daylight in the summer leads to warmer days.

Elaboration (45 min): Activities provide students with opportunities to expand and apply their understanding of the concepts within new context and situations.

Students will use the planetarium projector to observe and record the moon's phases over a two month period by matching the moon they see in the sky to pictures of different moon phases on their worksheet. Students will determine that the moon changes in a repeatable, predictable pattern.

Evaluation (5 min): Students analyze their understanding of the concepts, and teachers have the opportunity to assess student learning.

Verbal responses will be evaluated throughout the program to assess understanding of concepts and allow reinforcement by adjustments to the program as needed. Formal evaluation can be made by the classroom teachers of the student worksheets and by using the materials provided in the post-visit packet.

Modifications and Accommodations:

Refer to the PGCPs UDL website to identify specific strategies or technologies to address specific needs of individual students: <http://www1.pgcp.org/udl>

- Advanced Learners
 - Allow students to assist others as mentors
- English Language Learners
 - Allow students to sit next to someone bilingual who can translate and assist them as appropriate
 - Have students provide oral responses to their questions
 - Provide picture clues
- Students with Disabilities
 - Group students with mixed abilities so that other students can serve as mentors