

## 3<sup>rd</sup> Grade Earth Science Unit

### Patterns of the Sky and Weather

#### Teacher Background Information – for teacher content knowledge only, NOT student learning goals

The universe is not random, it moves in regular predictable ways.

The location of the stars and the patterns they make do not change. In the daytime, they are still in the overhead sky in the same patterns, as we would see them as if it were night. However, their positions change in the sky because of the daily rotation of the earth, which makes it appear as if the stars and their patterns are moving across the sky from east to west.

As earth revolves around the sun over the course of a year, different star patterns appear at night as we look in the direction away from the sun, and others become invisible as they appear in the direction of the sun.

#### Instructional Implications:

Understandings should be confined to finding patterns; therefore, the emphasis should be on observing, describing, and recording. Attempting to explain through the use of models is not developmentally appropriate! The teacher's role is to guide students to observe changes, including cyclic changes. By observing day and night sky regularly, children will learn to identify sequences of changes and look for patterns in these changes. Students need to observe movement of an object's shadow during the course of a day and the position of the sun and moon to find patterns in these movements. Students or teachers can draw the moon's shape on a class calendar or in a journal and then determine the pattern over weeks. Students need to collect weather data (charts, tables, graphs) over time to observe changes and patterns. Children should talk about and draw what they see and think.

#### Big Idea

Predictable patterns can be observed in the sky.

#### Essential Question

What patterns do you notice in the day and night sky?

What patterns do you notice in our weather?

#### AAAS Benchmarks/National and Science Education Standards

The Universe: Gravity

- The patterns of stars in the sky stay the same, although they appear to move across the sky nightly, and different stars can be seen in different seasons. 4A/E1

The Universe: Solar System

- Telescopes magnify the appearance of some distant objects in the sky, including the moon and the planets. The number of stars that can be seen through telescopes is dramatically greater than can be seen by the unaided eye. 4A/E2\*
- A large light source at a great distance looks like a small light source that is much closer.
- The sun can be seen only in the daytime, but the moon can be seen sometimes at night and sometimes during the day. The sun, moon, and stars all appear to move slowly across the sky. 4A/2
- The moon looks a little different each day but looks the same about every four weeks. 4A/3

Weather and Climate

- Air is a material that surrounds us and takes up space and whose movement we feel as wind. 4B/E4\*
- The weather is always changing and can be described by measurable quantities such as temperature, wind direction and speed, and precipitation. Large masses of air with certain properties move across the surface of the earth. The movement and interaction of these air masses is used to forecast the weather. 4B/E5\*\* (NSES)

Mathematical Representation

- Graphical displays of numbers make it possible to spot patterns 9C/3

### **Local Connections**

Native Alaskans used traditional stories to help make sense of the world around them. Sealaska Heritage Tlingit Curriculum has ties to this unit.

NOAA (weather station)- Tom Ainsworth

### **Materials/Resources**

Planetarium in Marie Drake  
"Stargazers" Ch. 18 from Picture Perfect Science K-4  
Internet site to view moon  
FOSS Kit: Sun, Moon & Stars

### **Related Scientist or Career Path**

Starry Messenger: Galileo Galilei by Peter Sis

### **Student Difficulties and Misconceptions**

- Children usually have misconceptions about properties of light that allows us to see objects such as the moon.
- Children have difficulty understanding the concept that earth orbits the sun and that the sun is a star. These ideas are developmentally counter-intuitive.
- Young children have limited ability to understand solar system concepts through the use of models.
- Children often believe warmer and cooler weather patterns are caused by Earth's distance from the Sun.

### **Alaska GLE's**

#### **Earth Science Content Standard**

The student demonstrates an understanding of the theories regarding the origin and evolution of the universe by

[3] SD4.1 recognizing that objects appear smaller the farther away they are

[4] SD4.1 recognizing that stars are like the sun but are so far away that they look like points of light

[3] SD4.2 recognizing that objects have properties, locations, and movements that can be observed and described

[3] SD4.3 recognizing and using appropriate instruments of magnification (e.g., binoculars and telescopes) (L)

The student demonstrates an understanding of cycles influenced by energy from the Sun and by the Earth's position and motion in our solar system by

[3] SD3.1 Using recorded weather patterns (e.g. temperature, cloud cover, or precipitation) to make reasonable predictions

[4] SD3.1 Recognizing changes to length of day over time and its relationship to seasons

#### **Nature and History of Science Standard**

The student demonstrates an understanding of the dynamic relationship among scientific, cultural, social, and personal perspectives by

[3] SF1.1 –SF3.1 exploring local or traditional stories that explain a natural event (L) Cross-referenced with SA3.1

### **ASSESSMENTS**

Vol. 2, Probe #25: Objects in the Sky  
Vol. 3, Probe #25: Where Do Stars Go?  
Vol. 3, Probe #24: Me and My Shadow