Georgia Department of Education

2nd GRADE

GRADE LEVEL OVERVIEW

Enhancement Activities/Strategies for Gifted/High Ability Learners: Sample Science Learning Plan

Big Idea/ Topic
Shadows

Standard Alignment
S2E2. Obtain, evaluate, and communicate information to develop an understanding of the patterns of the sun and the moon and the sun's effect on Earth. a. Plan and carry out an investigation to determine the effect of the position of the sun in relation to a fixed object on Earth at various times of the day. b. Design and build a structure that demonstrates how shadows change throughout the day. c. Represent data in tables and/or graphs of the length of the day and night to recognize the change in seasons. d. Use data from personal observations to describe, illustrate, and predict how the appearance of the moon changes over time in a pattern. (Clarification statement: Students are not required to know the names of the phases of the moon or understand the tilt of the Earth.) **S2P1. Obtain, evaluate, and communicate information about the properties of matter and changes that occur in objects.** a. Construct an explanation for how structures made from small pieces (linking cubes, building blocks) can be disassembled and then rearranged to make new and different structures.

Advanced Research
• Have students explore how changes in light and shadow are used to convey different emotions and set the scene in animated movies. Khan Academy's Pixar in Box unit on The Art of Lighting includes interviews with Pixar filmmakers, virtual activities that help students understand lighting techniques, and experiments students can do at school or home to try out different lighting techniques. • Have students explore how the Sun and shadows were involved in early time-telling devices. Encourage students to explore how time-telling devices have changed over time to help them appreciate modern conveniences. Have students create a "Time Timeline" to show what they learned. Challenge students to imagine a time-telling device of the future and add

it to their timeline as well. The following video links may be helpful resources for students to use in their information gathering: The British Museum's Young Explorers: A Brief History of Telling Time, TedEd's The History of Keeping Time, and It's Okay to Be Smart's A Brief History of (Keeping) Time.

- As students learn about Earth's rotation around the Sun, many will begin to wonder if the Moon rotates too. This activity allows students to explore the moon's rotation by building and testing a model outside. Students are often curious and have many questions about the moon. Have students select a research question from this Moon Menu to explore. Students can share what they learned in "Moon Minute" presentations that open your digital or face-to-face science class each day or by recording a video in Flipgrid or SeeSaw that allows students to respond to one another's posts.

Communication

- Have students communicate some of their observations about shadows over the course of this unit by writing their own shadow poems. Using the poem "My Shadow" by Robert Louis Stevenson as a mentor text and U.S. National Poet Laureate Jack Prelutsky's step-by-step poetry writing techniques, students will explore synonyms, adjectives, and rhyming patterns as they create and share their own shadow poems. This activity can be found in Session 5 of this lesson plan.
- Have students watch the "Night Light" episode of *Peep and the Big Wide World*. Students will write explanations for how the characters in the episode were able to manipulate their shadows. This link will create a force copy of a Google Doc with images and questions that can be shared with students digitally.

Critical Thinking and Critical Problem-Solving Skills

- Encourage students to look for patterns in shadows that are created by having them design a paper plate sundial. Place a paper plate on the ground in a sunny place. Put a lump of clay or in the center of a plate, and stick an unsharpened pencil in the center of the clay. (You may need to add a heavy rock on the plate as well to ensure it stays in the same location).Tilt the pencil so that it leans slightly toward the north (about 20 degrees). Use a pencil or line to draw a line along the shadow. Record the time the data was collected at the end of the line. Return to your sundial exactly one hour later and repeat the process. Continue to visit your sundial every hour. You should have a series of lines extending from the center of the sundial like spokes on a wheel. Have students draw a model of their sundial in their science journals and describe what patterns they notice. Then have students draw a model of a clock on the page beside their sundial. Challenge students to compare the clock

and the sundial to make a list of any characteristics that the two have in common. This Sci Show Kids episode may be helpful to show students before they build their sundial. This Crash Course Kids video may be helpful to show students after they have completed the project and completed their journal entries.

- One way to challenge students' thinking and see what students know and understand about a topic is to have them write analogies comparing two seemingly different objects. Review what nouns are, and have each student call out a noun as you make a long list for students to use as a reference. Do a few examples with students for practice using items on the list. For example, "A tree is like a bicycle because you can climb on both of them," "A light bulb is like a football because you can hold both in your hand," or "A lightbulb is like an egg because they both break easily." Have students write an analogy for each of the following, comparing them on an item on the class-generated list: the Sun, the Moon, Earth, a shadow, and light.

Creative Thinking and Creative Problem-Solving Skills

- Provide each student with a flashlight and set up a Shadow Studio that students can use to try these challenges: building a Skyscraper City with LEGO and investigating how to make the skyscraper's shadow shorter or taller; shining light on action figures to change the mood of a movie scene, designing shadow puppets and writing a puppet show, using your hands to create animal shadows, using pipe cleaners to create moving shadows, and changing the color of light to see its effect on shadow colors. To create a Shadow Studio, tape two pieces of white foam board together to create an L-shape (or cut one of the sides off a tri-fold board). Put a piece of white butcher paper on surface of the table or floor, then set up the L-shaped board to create an open room with a white floor and two white walls. (Students who are doing this task at home can easily set up a studio by using an empty corner of a room with light-colored walls and putting white paper on the floor.)
- Have students complete a change matrix to see what they understand about the impact of the Sun and Moon. This activity helps guide students' flexible thinking and improves creative thinking skills.
- "Be the Thing" is a creative thinking strategy that requires students to understand and apply personification. Students will use fluent thinking to generate many responses and original thinking to place themselves in the role of an object. (Drapeau, *Sparking Student Creativity*, 2014) For this activity, challenge students to place themselves first in the role of a shadow and, for a second round, in the role of the Sun. Have students brainstorm what it would be like to "be the thing." Have them answer the questions "How do you feel?," "What are your thoughts?," and "What will you do?" This can also be used a pre-writing technique where students use their brainstormed ideas to write a story that includes a shadow that comes to life or a Sun with human characteristics.

Awareness of Self—Student's Well-being
• As students conduct investigations during this unit, they may make mistakes that can lead to feelings of frustration. Gifted students are often perfectionists by nature, so it is important for us to help young students learn that they if your best effort is given, it is okay if things are not perfect. This article gives some tips teachers can use to help students see that making mistakes is a valuable part of the learning process.