

Science Grade 1

Sunshine and Shadows

Description: Students will use science inquiry skills to explore sunlight and shadows. They will learn what they need to make shadows, how to change and move shadows, and how shadows move outside as a result of the changing relative position in the sky.

Standards Aligned With This Unit

CT State Science Standards:

Content Standard:

- 1.1 An object's motion can be described by tracing and measuring its position over time.

Expected Performances:

- A11. Describe the apparent movement of the sun across the sky and the changes in the length and direction of the shadows during the day.

Grade Level Expectations (1st Grade):

- 1.1 Changes in the sun's position throughout the day can be measured by observing changes in shadows outdoors. Shadows occur when light is blocked by an object. An object's shadow appears opposite the light source. Shadow lengths depend on the position of the light source.
- 1.4 Observations can be expressed in words, pictures or numbers. Measurements add accuracy to observations.
- 1.4 Metric rulers are used to measure length, height or distance in centimeters and meters; customary rulers measure length, height or distance in inches, feet or yards.

Science Integration:

Science Inquiry: Students in this unit use base knowledge to **make inferences** about manipulating shadows. They will also make **predictions** and **record data**. They will use their observations to decide whether or not their guesses were correct, and **measure** their results.

Science Literacy: In this unit students will read fiction and non-fiction texts related to the unit. They should be encouraged to identify the main idea (**A1 Literacy Standard**) of the text, and to make connections (**C1 Literacy Standard**) with what they have learned about in class and other texts. The teacher can also question the students about why the author included specific sections in the book (**B2 Literacy Standard**).

Science Numeracy: The students will be using math skills such as identify quantities as equivalent or nonequivalent (**CT Math Standard 1.3**), describing, naming and interpreting direction and position of objects (**CT Math Standard 3.2**), using standard units of measure to communicate measurement in a universal manner (**CT Math Standard 3.3**), organizing data in tables and graphs and make comparisons of the data (**CT Math Standard 4.2**), and determining the likelihood of certain events through simple experiments and observations of games (**CT Math Standard 4.3**).

Unwrapped Conceptual Ideas:

- You need a light source, a surface, and an object to create a shadow.
- You can change a shadows size by manipulating the distance between the object and the light.
- You can change a shadows length by manipulating the angle between the surface and the light.
- You can change a shadows position by manipulating the position of the light source or the position of the object.
- Shadows naturally change position during the day since the sun's relative position in the sky changes.

Unwrapped Major Skills:

- Student will be able to create shadows.

- Students will be able to manipulate the length of a shadow.
- Students will be able to manipulate the size of a shadow.
- Students will be able to manipulate the position of a shadow.
- Students will be able to make inferences about the time of day based on the relative position of the sun.

Common Misconceptions:

- All objects cast shadows.
- When you shine a light on a solid object it always casts a shadow.

Instructional Strategies That Work:

Letting students lead the discussion with the teacher acting as a guide, allowing students to experiment and then demonstrate their findings, bringing students outside and allowing them to experience the effects of sunlight and shadows, allowing students to work together cooperatively, encouraging students to record data and use math skills to quantify data.

Vocabulary Words:

Light, shadow, surface, object, opaque, transparent, measure, length, centimeter, inch, sundial, “relative position”

Connections to Literature:

Nothing Sticks Like a Shadow, Ann Tompert
Me and My Shadows, Elizabeth Adams

Overview of Lessons:

Lesson One: Students will determine what is needed to make a shadow.

Lesson Two: Students will determine the necessary order for the surface, shadow, and object to create a shadow.

Lesson Three: Students determine that not all objects cast shadows.

Lesson Four: Students learn to manipulate the position of shadows.

Lesson Five: Students learn to why shadows move outside.

Lesson Six: Students use their knowledge of how shadows move outside to make sundials.

Lesson Seven: Students learn to manipulate the size of shadows.

Lesson Eight: Students will learn to manipulate the length of shadows.

Lesson Nine: Students will learn to manipulate the light source so that the shadow disappears.

Lesson Ten: Students will experiment with making shadows with two light sources.

Culminating Activity: Students will play “Shadow Simon Says”, a game which will allow the teacher to assess their understanding of all the concepts they have learned in this unit.