

# RAFT IDEAS

**Topics:** Shadows, Apparent Motion of the Sun, Observations, Measurement, Making comparisons

## Materials List

- ✓ Colored chalk
- ✓ Yardstick, meter stick, tape measure, or string for measuring
- ✓ Chart paper for a chart or graph or a notebook/journal

This activity can be used to teach:

Common Core Math:

- Measuring length (Grade 2, Measure/Data, 1, 4)
- Problem Solving & Reasoning (Math Practices Grades K-8)

Next Generation Science:

- Patterns of the sun / daylight (Grade 1, Earth & Space Science 1-1, 1-2)
- Daily change in shadows (Grade 5, Earth & Space Science 1-2)
- Earth Sun Moon System (Middle School, Earth & Space Science 1-1)
- Science & Eng. Practices (Grades 1-8)
- Cooperative learning and science as inquiry



# Shadow Play

Shadows are not like other things.



Head outside to see how the sun creates shadows that change as the sun's position changes during the school day.

## To introduce this activity

While the students are outdoors on a sunny day, call their attention to the shadows they are casting. Discuss how their shadows change as they turn and move about. How is the shadow like the child who cast it? How is it different?

## To Do and Notice

1. Begin by encouraging the children to observe the play yard during the course of a day. Can they identify a part of the play yard where the sun will hit the ground throughout the school day?
2. In the morning, go outside to the area identified. Have the children stand where a whole body shadow can be seen. Where does the sun need to be in relation to the student so that there is a shadow?
3. With chalk, draw around the child's shoes (feet). Be sure that you can tell which way the child is facing. Note where the sun is in the sky. (The teacher can do the drawing or it can be done by another student.)
4. With a second color of chalk, draw around the child's shadow. Note and record the time the shadow was made and the position of the sun in the sky.
5. After 2 – 3 hours have elapsed, have the child return to the chalk drawing of his/her shadow and place his/her feet in the "footsteps". Draw around the shadow with a third color chalk. Measure the length of the shadow and note changes in location, proportion, or shape. Has the sun "moved" since the last observation? Record your observations.
6. Repeat step 5 at least one more time.
7. Discuss your observations and record them on a chart or graph or in a journal.

## The Science Behind the Activity

Shadows are an every day experience for young learners and yet they are fascinating! What child hasn't noticed that his shadow changes in ways s/he can and cannot control? Helping children observe how their shadows change, sets the stage for other observations and discoveries – like using a simple sundial to tell time. During the course of a single day shadows will be shorter at mid day and longer in the morning

and afternoon. Over the course of several weeks or months the length and position of the shadow will be different when observed at the same time each day - noon shadows on June 21 are the shortest of any day during the year in the northern hemisphere. Even without knowing that the sun shifts 15 degrees per hour, children are able to observe and record the sun's changing position and how it affects their shadows. They are also able to observe how their shadows move in a clockwise direction (in the northern hemisphere) over time.

### **Taking it Further**

- This makes a fine activity for Ground Hog Day.
- There are many references to shadows in children's literature and popular culture. Read Robert Lewis Stevenson's poem: "*I Have a Little Shadow*" and have the children compare their experiences to those of the child in the poem. Note also songs like "*Me and My Shadow*".
- Older students could create a simple poem about their shadow observations individually or as a group.
- The moon can create shadows as well. A great "homework" or camp out activity would be to compare sun and moon shadows.
- Play a game of Shadow Tag. (Peter Pan and Wendy played this game.) The object of this game is for the child designated "IT" to step on another's shadow. When this happens, that child becomes "IT" and play continues. Players try to evade "IT" by changing directions and moving around. Play at different times of day and note how the game is different. How? Why?
- Make a simple sundial and tell time with a shadow. See RAFT Idea Sheets *Time for Shadows* and *View Binder Sundial*
- Further investigate the apparent motion of the sun with *Solar Path Across the Sky*.

### **Shadow Bibliography**

#### **Books**

- Alcorn, Jo Kynn [Light and Shadow](#)
- Alexander, Sharlene [The Elephant That Lost Its Shadow](#)
- Asch, Frank [Bear Shadow](#), [Moonbear's Shadow](#)
- Buila, Clyde R. [What Makes A Shadow?](#)
- Butler, Christina and Chapman, Jane [The Dark Dark Night](#)
- Cendrars, Blaise [Shadow](#) (translated and illustrated by Marcia Brown)
- Choroa, Kay [Shadow Night](#)
- Crews, Donald [Cloudy Day Sunny Day](#)
- Dorros, Arthur [Me and My Shadow](#)
- Freeman, Don [Gregory's Shadow](#)
- Hoban, Tana [Shadows and Reflections](#)
- Narahashi, Keiko [I Have a Friend](#)
- Swinburne, Stephen [Guess Whose Shadow?](#)
- Tompert, Ann [Nothing Sticks like a Shadow](#)
- Willard, Nancy [Shadow Story](#)

#### **Poetry**

- Moore, Lilian "Groundhog Day" in [The Random House Book of Poetry for Children](#) edited by Jack Prelutsky
- Silverstein, Shel "Shadow Race" in [A Light in the Attic](#)  
"Shadow Wash" in [Where the Sidewalk Ends](#)
- Stevenson, Robert Louis "My Shadow" in [A Child's Garden of Verses](#)

**Web Resources** (Visit [www.raft.net/raft-idea?isid=663](http://www.raft.net/raft-idea?isid=663) for more resources!)

- [www.sundials.org](http://www.sundials.org) - NASS North American Sundial Society – sundials – history & theory, making sundials, using sundials...