

**Project FOCUS
Best Lessons
FOURTH GRADE**

Title of Lesson: Sundials

Theme: Physical Science

Unit Number: 4 **Unit Title:** Sound and Light

Performance Standard(s) Covered (enter codes):

S4P1

Enduring Standards (objectives of activity):

Habits of Mind

- Asks questions
- Uses numbers to quantify
- Works in a group
- Uses tools to measure and view
- Looks at how parts of things are needed
- Describes and compares using physical attributes
- Observes using senses
- Draws and describes observations

Content (key terms and topics covered):

Light, Shadow, Light Source, Ray, Beam, Time

Learning Activity (Description in Steps)

Abstract (limit 100 characters): By constructing a sundial, students learn about a light source and shadow formation

Details: First, you need to make an accurate sundial. According to an online source, to make an "accurate" sundial, the angle of the triangular dial should be the same as your latitude. Athens, GA is at a latitude of 33 degrees. Next, I drew a kite shape onto the posterboard that would (when folded in half) would have an angle of 33 degrees. Then, the kite shape was folded in half, and the two sides that would be touching the paper plate were folded out. (I did all the folding before the actual lesson was taught because the posterboard used can be difficult to fold). Finally, a created a semi-circle template that had the different times marked off at the correct angles. I searched online and found that the angles had to be adjusted according to latitude. Below are the correct numbers for a location around a latitude of 30 degrees.

Hours from noon	Angle from noon line
0	0
1	7.6
2	16.1
3	26.6
4	40.9
5	61.8

Each student is then given a paper plate and pre-made kite shaped "dial". Using a handout with a template with the angles for the times of the sundial, the students ticked off the angles for their times and drew lines radiating out from the center to these marks. Next they numbered their sundial. The students were also allowed to decorate their dials and paper plates. The dials were attached by taping or gluing the 2 small flaps of the triangle to the paper plate. The dial was aligned on the 12 hour mark, with the height of the dial towards the outside of the plate. The students were then asked to predict what affect the sun would have when shining directly above the dial, far to the right side, or far to the left side. Using a compass, the students aligned the "12" mark of their sundial to point North. Finally, the students were allowed to monitor their sundials throughout the day, periodically marking where the shadow fell on the sundial and at what time it was observed. Possible discussion questions include: Why did we only number our plates from 6 am to 6 pm? Why are the spaces between the times not equal? Why did we have to align our sundial with noon facing north? What will happen when the sun shines on the sundial? How can the sun be used to tell time?

Materials Needed (Type and Quantity):

Paper plates

Poster board

Tape or glue

Crayons, markers, or paint

Rulers

Compass

Notes and Tips (suggested changes, alternative methods, cautions):

Worksheets for the next day or for the students to take home as homework would be a good way to make sure that the students continue to understand the lesson longer than the day after it was taught.

Sources/References:

- 1) Georgia Learning Connection Website
- 2)
- 3)