

Sundials

Grade level : Pre-K through 2nd grade

Duration: Daily throughout the school year

Essential Questions

- What is a sundial?
- How are shadows created?
- What do you notice about shadows during the day?

Learning Outcomes

- The sun is a light source
- Understand how shadows change in nature
- Understand how the position of light changes the size and position of a shadow
- Shadows change in a regular pattern over the day.
- One object can have different sizes of shadows

Materials

- Sundial “gnomen” for outside
- Flashlights and pencils for in the classroom
- Camera to document shadow changes outside

Sundial Lesson – Outdoors

- Start with shadow time outside in the morning, at noon, and in the afternoon. Use a camera, chalk, stones, butcher paper, etc., to help students see how shadows are changing.



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- Find a space somewhere outside or on the playground with a natural sundial; a pole or post is great. You can create your own by putting a broom in a bucket. Make sure that it is a sundial that won't move over time!
- Take a picture of the sundial's shadow.
- Be sure to mark where you are standing when taking the picture! This way you can have a reliable record.
- Get the whole shadow in the picture.
- Encourage students to observe their own shadows. Compare and contrast their shadows with the sundial shadow.
- Chart questions, ideas, and observations students have.
- Look at the photographs taken outdoors and make a prediction about students will see today.
- Add the most recent photograph to circle time and discuss what patterns they see.
- Set aside 30-45 minutes each day to observe outside, replicate inside, and discuss with a mini-science talk each day.

Things to Keep in Mind:

- Requires outdoor space that can keep a semi-permanent record of shadow length and position.
- Key word: a gnomon is the part of the sundial that casts the shadow.
- Include your science and resource teachers!

After coming inside...

- Discuss what your students observed outside.
- Let students recreate the shadows with flashlights.
- Encourage students to draw what they observed.



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In the Classroom:

- Make a gnomon with clay and a marker or pencil. Can you make short and long shadows?
- Do you think these shadows are similar to or different from the shadows you explore outside?
- Shadows can change not only over the day, but over the year as well. How do you think shadows change from summer to winter?



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