

Lesson Plan: Patterns and Sundials

Lesson Name: Foot Sun Shadow Clock

<p>Enduring Understandings: The purpose of this activity is to give children an understanding on how the sundial patterns work through time and earth rotation.</p>	<p>Overarching Question: Child-friendly question that <u>connects the knowledge and skills that children should develop throughout the lesson</u> Ex. What does the sun shadow know?</p> <p>Content Questions: Why do we need the sun? What makes the sun move? How does the sun use its shadow to tell time? Should we look directly at the sun (why or why not)? When will the shadows fade?</p>
<p>Objective(s): By the end of the lesson the children will...aligned to your chosen standards, and using Bloom's Taxonomy verbs (see link below): https://www.apu.edu/live_data/files/333/blooms_taxonomy_action_verbs.pdf,</p> <p>By the end of this lesson children will...</p> <ul style="list-style-type: none">• Identify patterns of change in the Sun's shadows• Discuss how sundials serve as clocks• Collect data to share with peers• Note the position/direction of the Sun• Build sundials and observe shadows as the Sun's position changes through time	
<p>Standards: CCCS (grades k-3) within Earth Science 4e. students knowing the position of the Sun changes in the sky during the course of the day season to season. Investigation & Experiment 5c-e. collecting data and reading/ compare contrast numbers investigate the data of their predictions. CCCM (grades k-3) represent and interpret data</p>	<p>Assessment of Objective(s): In small groups, children will be able to data track the sun's shadow changing through time</p>
<p>Materials: chalk, ruler, child's foot, outdoor flat surface to draw on, the Sun, clock or watch, worksheet to write down data</p>	<p>Vocabulary: pattern, time (hour hand & minute hand), directions (vertical & horizontal), rotation, star, Sun, shadow, sundial, compare & contrast</p>
<p>Anchor texts: Sun Up, Sun Down by Gail Gibbons, What Makes a Shadow? by Clyde Robert Bulla, The Sun is My Favorite Star by Frank Asch</p> <p>Learning Center Extension: Art center: have different materials put out for children to make their own sundial clocks that they can take home.</p>	

Plan for Assessment during lesson: During this lesson, checking if children can follow time patterns based on the Sun's shadows. After checking the children's knowledge about the sundial patterns and ask if the children can identify any limitations.

Formative Assessments (required): The teacher will be watching for if the children are able track the different time patterns of the Sun's shadow. Also, if children can read time and report the data back to one another. *If children do not know the time teacher can give assistance. As this is a group activity, teacher will be watching for group participation and seeing if children can come up with educated predictions.

Procedure:

1. Starting in the morning, put the children into small groups and give them each worksheet papers that their data will be written down on
2. Explain to the children that they will be going outside to draw their own human sundials in a sunny spot with chalk (each group making a big circle in their own area, writing the numbers even spaces apart (with ruler) that resemble the numbers on a clock, then putting an X on the center part of the circle/draw the hour and minute hand of the clock)
3. Have each child in the group take either their left foot or right foot (taking turns) and trace their foot with the chalk color ex: purple on what time (numbers being the time on the clock) they are predicting the Sun's shadow will pass by (mark that foot as prediction 1).
4. Have the children take note of where the sun is position at the time in the morning and write it down on their worksheet. *****Warn the children not to look directly at the sun*****
5. Allow children to return in the midday and early afternoon to check where the Sun's shadow has moved to and write it down on their worksheets.
6. At the end of the day ask the children again to make another prediction (mark with foot #2) of where they think the shadows will fall with the chalk being a different color ex: red.
7. The following day bring the children outside so they can see if their predictions were correct.
8. Have the children trace the real shadows this time with a different color chalk ex: blue so they can compare & contrast/ also to see if they notice the sun rotating pattern.

Hook: Talking to the children about the solar system during the week. Talk about the stars and discuss how the Sun is a star. Talk about the benefits of the Sun.

Beginning: The purpose of this lesson is to learn about time through sun patterns while using a sundial learning vocabulary.

Middle: Being in groups collecting data of the Sun's shadows at different times of the day.

End: This activity can be extended to more days. Children see if their predictions were correct from the previous day.

Family Engagement: Encourage the students to find creative ways to tell time at home with their families and building sundials with their families that represent their culture.

Differentiation: (not necessarily for children with disabilities, differentiation supports all learners)

For children who need additional support: Help the children identify the numbers on the clock so they can track the time. EX.: point out either the hour or minute hand what number it is on and how to read it.

For children who are ready for a challenge: Ask the children to come up with longitude predictions of the sun's shadow patterns in different seasons.

Children with documented disabilities: Give extra time for children to gather the information. If they cannot use their foot let them use their hand etc.

Children whose home language is a language other than English: Find books in other languages that talk about the sun and patterns. Label the activity in the language of the classroom. Have children teach the numbers of time in their language to each other.

Planning for worst case: Have activity sheets ready for them to color or picture. Let them draw their own sundial patterns.

Plan for action if the above happens: Have paints or crayons ready in case they do not want chalk.