

Into Our Skies: Space in Schools

Classroom Activity: How does the length of a shadow change over one day?

National Curriculum Learning Outcome: Use the idea of Earth's rotation to explain day and night and the apparent movement of the Sun across the sky.

Focus of this activity: Pupils will undertake a practical activity to investigate what happens to the length of a shadow as Earth rotates and plot a line graph of their results. This can be done in pairs or as a class activity.

Resources required: Flat surface, torch (or light source), Lego man (or similar toy figure), ruler, blu tack.

Starter: Use the dance session on night and day and shadows to how the Earth rotates and what this means in terms of the Sun's motion across the sky. Remind them (from lower KS2: Light topic) that "shadows are formed when the light from a light source is blocked by an opaque object."

Teaching Questions:

- Do pupils understand that we get day/night as Earth rotates, and as different sides of the Earth's sphere is lit by the Sun?
- Use the slides to demonstrate how we see the Sun move throughout the day (you can also revisit the information from the dance video)
- How does a shadow change as the Sun moves? Can students measure the length of a shadow and plot it on a graph?

Student Activity:

For this activity we are going to assume that the Sun rises at 6am and sets at 6pm. (This is true on 17th March in Preston)

- Stick the Lego man (or similar) onto the table. The table represents the horizon where we see the Sun rise and set.
- Shine the torch from the East of the table to represent the rising Sun. Can you see a shadow on the table? Measure the length of the shadow with the ruler and note it in the table. (Do this in pairs)
- Move the torch to represent the Sun at 8am, 2 hours later. Measure the length of the shadow and note it in the table.
- Repeat but with the torch a little higher at 10am
- Move the torch to represent the Sun at midday where it will be at its highest point, pointing directly down on the object. Measure the length of the shadow and note it in the table.
- Move the torch so that the Sun is setting in the west. Measure the length of the shadow at approximately 2pm, 4pm and 6pm and note it in the table.

- Plot a line graph of time across the bottom (x-axis) versus shadow length (y-axis). (NOTE: the results the pupils' get will depend on the size of their object and how close they place the torch).

Extension:

- Pupils can use time zones to investigate which countries are (a) waking up when we are going to sleep, (b) eating their evening meal when we are eating breakfast.

Additional Links:

A nice animation showing the change in shadow length over time -

<https://www.schoolsobservatory.org/things-to-do/why-do-shadows-change-over-time>