

British Science Week 2024 Time - Sundials



National Curriculum links

Y3 Pupils:

- Recognise that shadows are formed when the light from a light source is blocked by an opaque object
- Find patterns in the way that the size of shadows change

Y6 Pupils:

- Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them

Resources/equipment

- Paper plate or circular card for sundial face
- Bendy straws (or card/paper) for gnomon
- Pens/pencils to mark hours on the dial
- Counters/markers to show the position of the shadow

Key Vocabulary

- sundial
- gnomon
- block
- shadow
- travels



Teacher knowledge

- Before sundials were invented, people used the passage of the sun through the sky to help them work out the time of day
- It is thought that the Ancient Egyptian civilisation invented the sundial about 1,500 BC then the Greeks, Romans or Babylonians developed time-keeping devices. It is one of the oldest scientific instruments in the world
- Sundials were used throughout the Roman Empire and there were large ones in public areas as well as pocket-sized ones. Roman numerals were used around the dial to mark the hours
- A sundial is formed from a flat face and a pole or gnomon in the centre which casts a shadow around the dial as the sun moves across the sky throughout the day
- During medieval times, sundials were important in the Islamic world for time-keeping for prayers. Algebra and trigonometry helped people to improve the accuracy of the sundials. At the same time, in Europe, timekeeping fell by the wayside
- Pendulum clocks began to replace sundials in the 1300's

Suggested practical tasks

- Evaluate children's current knowledge. How do we tell the time today? Discuss the difference between analogue and digital time. Which is easier to use? Why? Do you know any different ways the tell the time that were used in the past?
- Introduce the concept of a sundial and explain the history behind this invention. How does a sundial work? Draw on the children's knowledge and understanding of light travelling in straight lines and being blocked by an opaque object to form a shadow. As the Earth is rotating on its axis the position of the sun in the sky appears to move, changing the position of the shadow. Depending on the age of the children, this may need unpicking first
- Create a simple sundial using a paper plate or circle of thick card and a gnomon made from a bendy straw or angled piece of card stuck stuck in the middle. Children will need to divide up the dial with regular intervals - mark 12, 3, 6 and 9 first and go from there
- If it's a sunny day, children can track the movement of the sundial shadows across the day and add markers to show where it has been. If there is no sun, there are videos online showing this and children can take them home to use. Alternatively, you could use a strong torch inside

Talk time

- How are shadows made? How can a shadow help us to tell the time on a sundial?
- Can you use what you know about light to explain to a friend how a sundial works?
- What happens to the length of a shadow over the course of a day?
- Sundials were eventually replaced by mechanical clocks. What were the advantages of mechanical clocks? Can you think of any disadvantages? What were the advantages and disadvantages of a sundial in comparison?

Video link

