

### Learning objective

QCA Unit 3F 'Light and shadows'

- To know that shadows can be used to tell the approximate time of day.

### Resources



'Light and shadows' flipchart file; photocopiable page 134, 'Make your own sundial' for each child (photocopied onto card if possible); magnetic compass; scissors; sticky tape or masking tape; a sunny day!

### Links to other subjects

#### Mathematics

NNS: Identify right angles in 2D shapes and the environment.

- Use the shapes and angles of the sundial and gnomon to identify right angles.

#### Design and technology

PoS (2d) To measure, mark out, cut and shape a range of materials, and assemble, join and combine components and materials accurately.

- Challenge the children to design their own sundials using more robust materials, such as wood and card.

### Whiteboard tools



Pen tool



Marquee select tool

# Shadow time-telling

## Starter

At the beginning of the day, ask any children with watches to remove them. If possible, remove or cover the classroom clock. Before the lesson starts, ask the children to estimate the time, justifying their estimates.

Inform them that digital watches were invented less than 50 years ago and mechanical watches appeared about 500 years ago, yet the Ancient Egyptians had ways of telling the time nearly 5000 years ago. How do the children think people would have told the time before clocks and watches?

## Whole-class shared work

- Discuss how each object on pages 7 to 11 of the 'Light and shadows' flipchart could have been used to tell the time. Discuss which historical era each object is from, and its approximate age.
- Ask the children to circle the objects that rely on light and shadows (the Egyptian obelisk and sundial) and label them.
- Discuss the children's familiarity with sundials and display page 11, explaining that the dial's shadow is used to tell the time. Point out that the *gnomon* is the part of the sundial that projects the shadow, which is used to tell the time.
- Encourage them to say how the dial works, using the correct scientific and technical vocabulary.
- Tell the children that they are going to make their own simple sundials and display page 12.
- Drag the gnomon over the base to demonstrate where it fits. Use the right-angled corner to emphasise the correct orientation of the gnomon.
- Display page 13. Tell the children that they will be using a magnetic compass to make sure that their sundials are pointing north.

## Independent work

- Hand out a copy of photocopiable page 134 'Make your own sundial' to each child.
- Tell the children to carefully cut out the gnomon, and cut the slit in the base as indicated.
- Help them to fold the gnomon along the line and insert it into the base, making sure it is correctly orientated. They then need to secure it underneath with a strip of tape.
- Place the completed sundials in direct sunlight and use a compass to point them northwards.
- Ask the children to estimate the time from their sundials. Compare their estimates with the correct time. If possible, repeat at a different time of day.
- Support less able learners in making and reading their sundials.
- Extend more able learners by asking why the time on the sundials might be different from the correct time, drawing out the limitations of the sundial.

## Plenary

- Ask the children to share their experiences with their sundials.
- Encourage them to judge the accuracy of the sundials and suggest the limitations of them.