

Shadow clock

Strand

ENERGY AND FORCES

Strand unit

Light

Objectives

- recognise that light comes from different sources
- recognise that light is needed in order to see

Working scientifically

- Questioning
- Observing
- Predicting
- Investigating and experimenting
- Estimating and measuring
- Recording and communicating

Designing and making

- Exploring
- Making
- Evaluating

Background information

The position of the sun can be used to tell the time of day. Because the sun changes position, sundials only remain accurate in one position for about two weeks.

A sundial is made of a dial plate marked out with hour lines and a raised section called a 'gnomon', that casts a shadow. The inclined edge of the gnomon is called the style and the shadow of this edge is used to tell the time.

A sundial must be made specifically for the spot where it will be used and pointed in the right direction.

Before sundials, the ancient Egyptians built tall stone towers called obelisks and could tell the time by looking at the shadow.

Before the lesson

Materials needed

- Pictures of sundials, cardboard, pencils, modelling clay, markers, a compass (for direction).

Preparation

- Cut pieces of cardboard into rectangles 30 cm x 50 cm (one for each group).
- Wait for a sunny day.

The lesson

Stimulus

- Look at examples and pictures of sundials. Discuss the history of the sundial (refer to the background information).

What to do

- Divide pupils into small groups of three or four.
- Pupils construct a shadow clock following directions set out on the worksheet.
- Over the next few days, pupils test their shadow clocks to see how well they work. Pupils make suggestions on how they could improve their clocks.

After the lesson

Answers

- 2. Teacher check
- Answers may include:
 - Will not work if there is no sun.
 - Are not precisely accurate.
 - Will change as the Earth moves around the sun.
 - Difficult to read inside.

Additional activities

- Research and make other types of sun clocks.

Display ideas

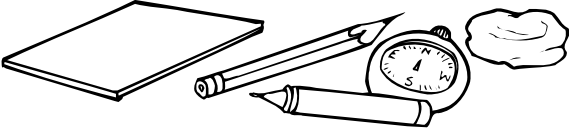
- Take photos of pupils at work and display on pin-up board. Pupils can summarise their results and display with the photographs.

Shadow clock

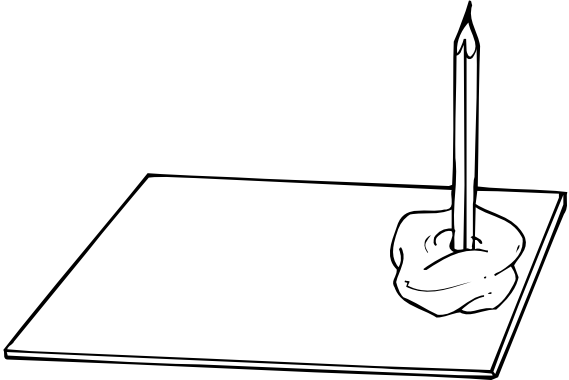
1 Follow the directions to make a shadow clock.

You will need:

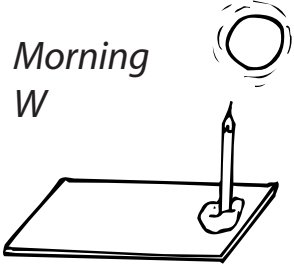
- a piece of cardboard (30 cm x 50 cm)
- a pencil
- modelling clay
- marker pen
- compass (for direction)



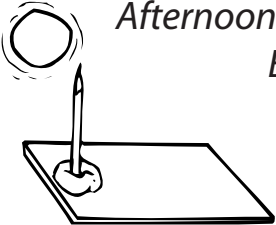
Attach the pencil to one end of the cardboard with the modelling clay.



Morning W

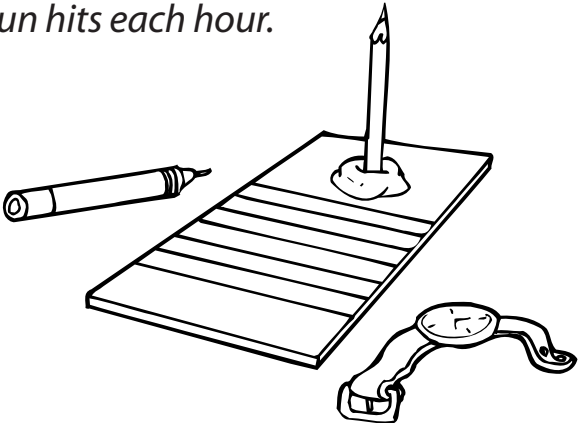


Afternoon E



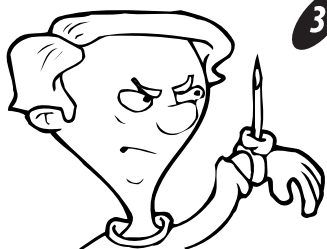
In the morning face your shadow clock towards the west. In the afternoon face your shadow clock towards the east as shown in the diagrams.

Use a clock or watch and a marker to mark off on the cardboard where the sun hits each hour.



2 (a) Was your clock successful? yes no

(b) What changes would you make to your clock?



3 What are the problems with a shadow clock?
