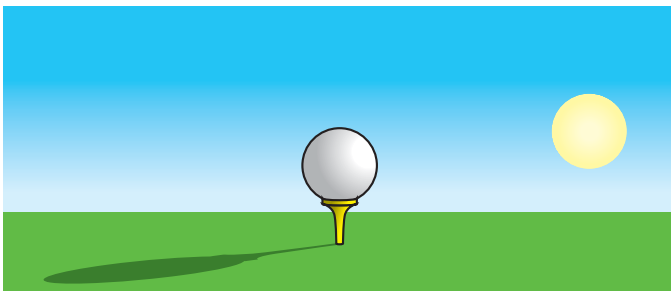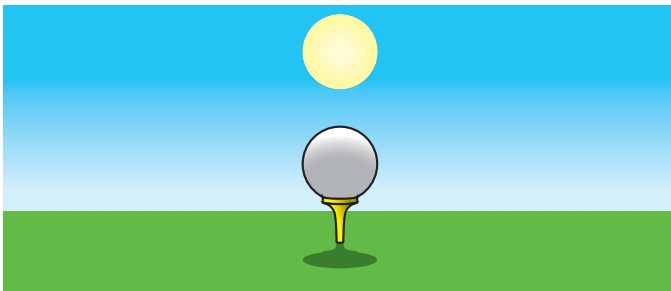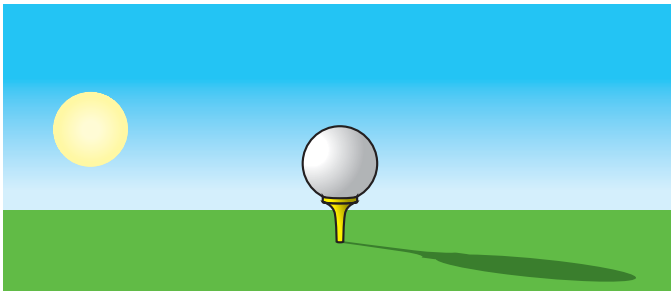# Sundials

The Sun is in different parts of the sky at different times during the day. We can trace what changes this brings and use them to tell the time.

Have you noticed that your shadow changes length with the time of day and the time of the year?

Each day the Sun is at a low angle at sunrise, rises to its highest by midday and then sinks down to disappear at sunset* (Picture 1). But there are also changes due to the seasons.

▲ **(Picture 2) In the winter, when the angle of the Sun is low in the sky, the shadows are long.**
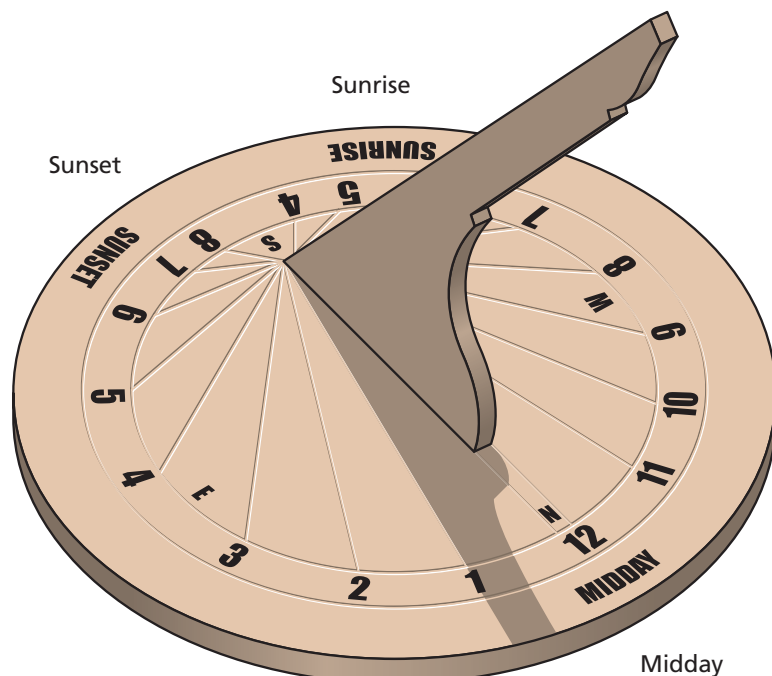
In winter, the Sun is always low in the sky, and so the shadows are always long, even at midday (Picture 2). In summer, the Sun quickly rises high in the sky and the shadows are much shorter (Picture 3).

▲ **(Picture 1) Shadows cast across the ground are longer at the beginning and the end of the day than they are at midday.**

(*For more on this see the *Science@School* book *5E Earth and beyond*)

▶ **(Picture 3) In the summer, when the angle of the Sun is high in the sky, the shadows are short.**

You can investigate the daily change in shadow direction and length by using a stick placed upright on open ground. If you place the stick on a lawn, you can mark the length and position of the shadow by using a trail of sand. If you place the stick in a sand pit, you can mark the changes with pebbles (Picture 4).

▼ **(Picture 4) The length of a shadow from a stick being measured each hour. In this case a stone, and the time in pebbles, are used as markers.**

Sunset   Sunrise

Midday

▲ **(Picture 5) This sundial is marked in hours.**

Sundials

Because the shadows change in a reliable way, it is possible to use the changing shadow to tell the time (so long as the Sun is shining). In the past, people told the time this way by making an instrument called a **SUNDIAL** (Picture 5).

Sundials can be made to be flat, or upright on a wall.

You can make a simple sundial by folding over a card so that one part stands upright. Then stick it to a circle of cardboard.

Summary
• **As the Sun moves, the shadows move too.**
• **Sundials use moving shadows to tell the time.**