6 Shadows and eclipses

When sunlight is blocked, it casts a shadow. This is true both for small objects like a tree and for large ones like the Moon.

Sunlight travels in straight lines and cannot bend around objects. This is why, when sunlight is blocked by an object like a tree or a stick, it casts a shadow away from the Sun (Picture 1).

Shadow direction

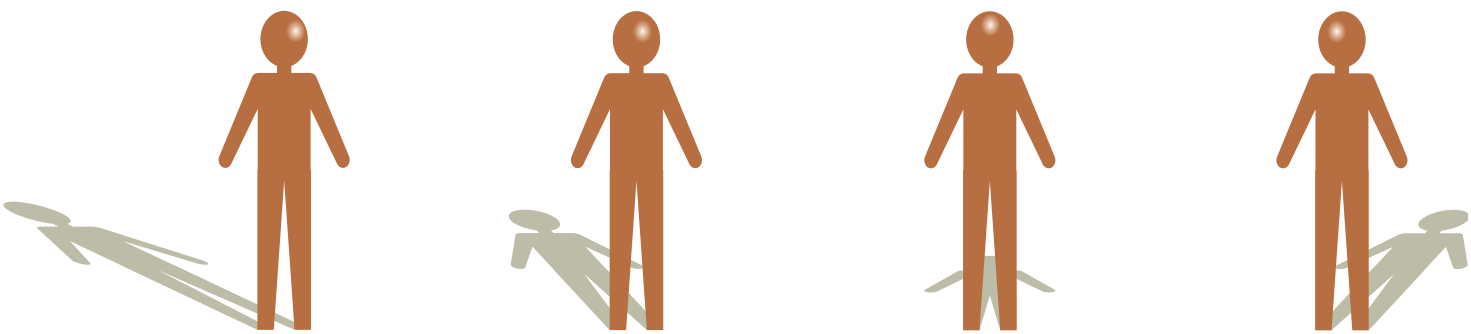
The direction of the shadow depends on where the Sun is in the sky. In the morning, the Sun is in the east and so the shadow lies to the west; in the evening the Sun is in the west and so the shadow lies to the east (Picture 2). In the northern hemisphere, the sun shines out from the southern half of the sky so the shadow also lies slightly to the north.

▲ **(Picture 1) Long shadows cast by the early morning Sun as it is blocked by some trees.**

Shadow length

Shadows change length depending on the height of the Sun in the sky. In the morning and evening the Sun is low and the shadows are long. Near to midday the shadows are much shorter.

▼ **(Picture 2) How the length and direction of the Sun's shadow change through the day. (Here we have our back to the Sun. Compare this to Picture 2, page 7, where we are facing the Sun.)**



Sunrise **Mid-morning** **Midday** **Mid-afternoon**

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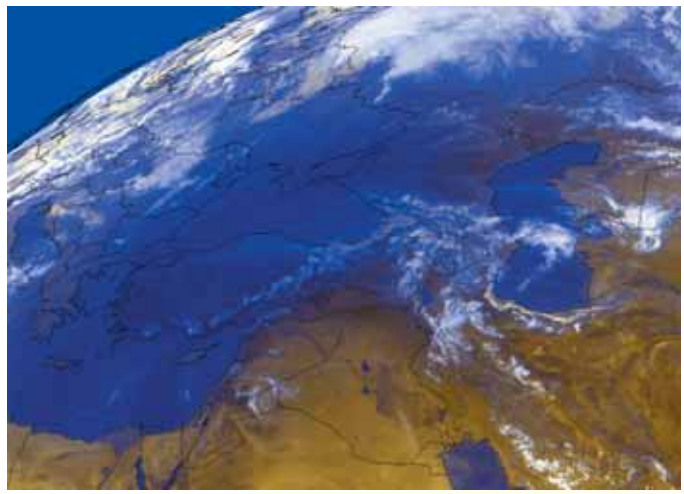
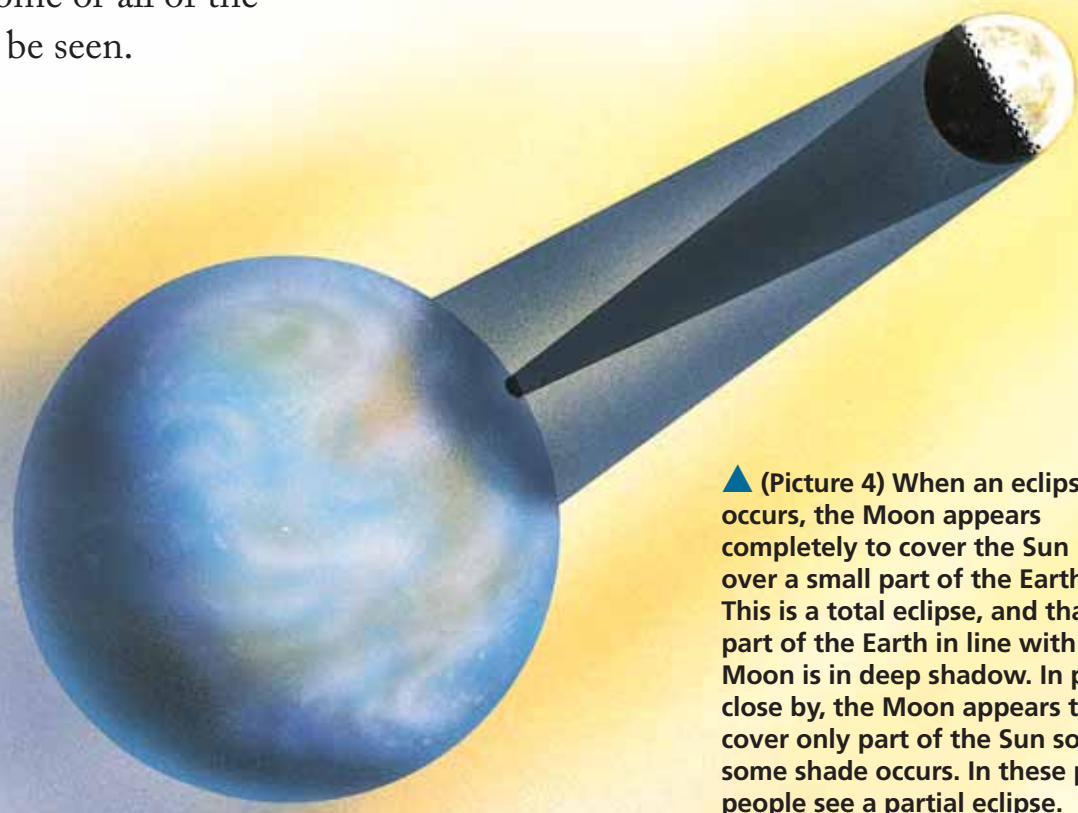


▶ **(Picture 3) As the Moon passed between the Sun and the Earth in August 1999, a satellite took this picture of the eclipse over the Mediterranean Sea and Africa.**

Eclipse

An **ECLIPSE** occurs when the Moon passes directly between the Sun and the Earth (Pictures 3 and 4). The Moon is just big enough to block out sunlight over a small part of the Earth. Outside this small part, some or all of the sunlight can still be seen.



▲ **(Picture 4) When an eclipse occurs, the Moon appears completely to cover the Sun over a small part of the Earth. This is a total eclipse, and that part of the Earth in line with the Moon is in deep shadow. In places close by, the Moon appears to cover only part of the Sun so only some shade occurs. In these places people see a partial eclipse.**

Sunset

Summary

- **Shadows form when an object blocks the path of sunlight.**
- **The length and direction of a shadow change through the day.**
- **Shadows can be used to tell the time.**
- **When an eclipse occurs, a shadow of the Moon is cast on the surface of the Earth.**