

# The globe: Earth's rotation – day and night



**The cycle of day and night is something that most people take for granted. But what causes the sun to rise and set? Why do we experience daytime and night-time? The answer to this question is that the cycle of day and night is caused by the rotation of the Earth on its own axis.**

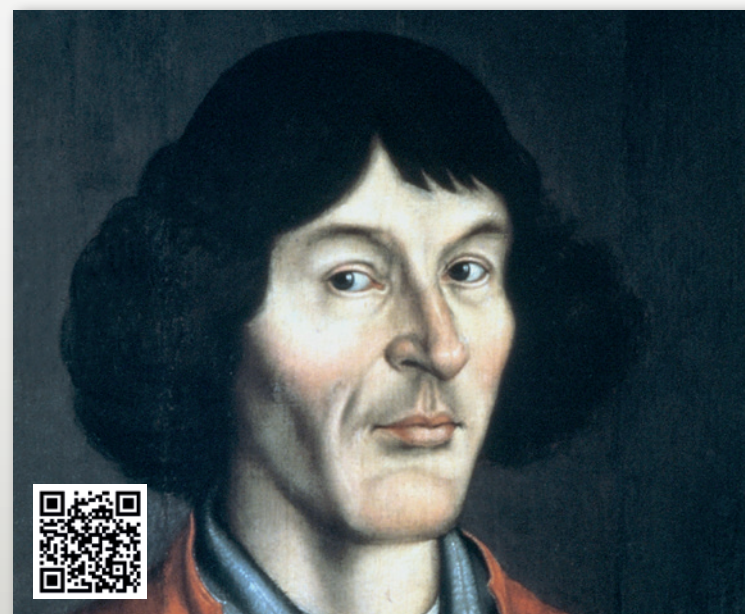
◀ This photograph of Earth was taken from space. It shows the natural, physical features such as oceans (blue), land cover such as vegetation (green) and dry areas (brown). You can also see the clouds in the atmosphere. See how the sun shines onto the right half of the globe. The left half of the globe is in darkness, showing the city lights in densely populated areas.

## Old ideas and new discoveries

Until about 470 years ago, scientists thought that Earth was at the centre of all things in space. They saw the sun rising on one side of Earth, moving across the sky and setting on the other side of Earth, and concluded that the sun moved around the Earth.

In 1543, a Polish astronomer called Nicolaus Copernicus suggested that the sun, and not the Earth, was the centre of our solar system, and that the Earth and other planets move around the sun. Copernicus explained that the Earth rotates on its own axis once every 24 hours, causing the sun to appear to rise and set. This idea shocked the world at the time, and was only accepted many years after his death.

▶ Nicolaus Copernicus (1473–1543), a Polish mathematician and astronomer



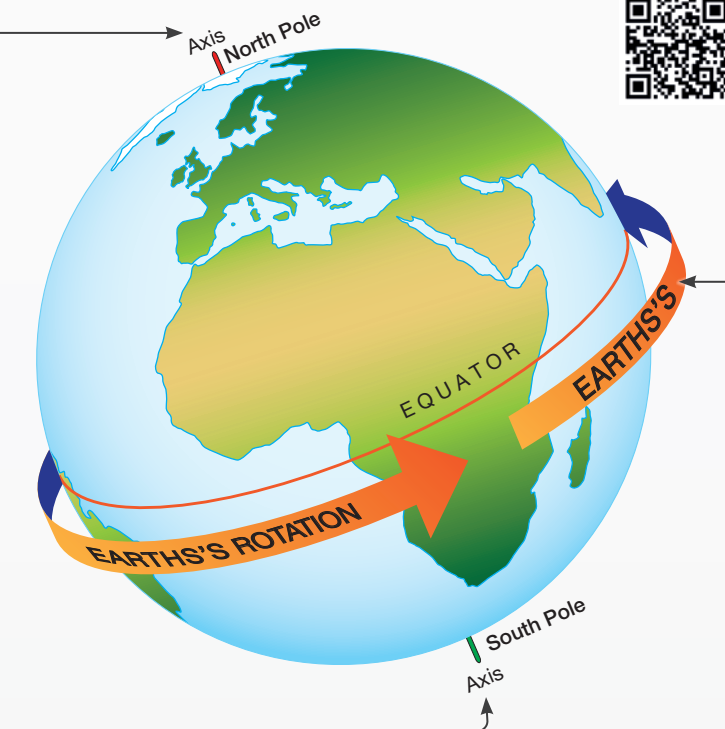
## Earth moves all the time

Earth is like a spinning top in slow motion. Earth turns around, or **rotates**, on its own **axis**. Earth's axis is like a pin that goes through Earth from the North Pole to the South Pole. Earth rotates at a speed of 1 670 kilometres (km) per hour at the equator, which is halfway between the two poles. We cannot feel Earth moving, because everything else moves around with us.

Earth's axis is not straight up and down in relation to its position to the sun. The axis is tilted so that one pole points more towards the sun and the other pole points away.

### Note

Earth's axis is tilted at an angle of 23,5° (twenty-three and a half degrees) towards and away from the sun.



Earth rotates on its axis from west to east. Places to the east get sunlight first each day. Places to the west come into the light as Earth moves around. So the sun "rises" in the east and "sets" in the west each day.

### Look closer

Mpumalanga means "land of the rising sun". Why do you think a province on the eastern side of South Africa has this name?

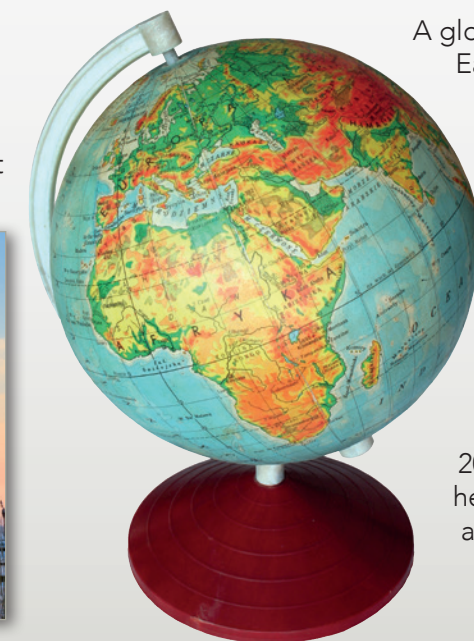
## Lengths of day and night change

One 24-hour day has some hours of daylight and some hours of darkness. But, because the Earth's axis is tilted, the lengths of day and night change, depending on the position of Earth in relation to the sun. Days are longest in summer and shortest in winter. (For more information about this, see pages 26 and 27.)



▲ Sunrise in winter over a farm in Netherlands. Mid-winter days in Netherlands are about 7,5 hours long.

## The globe



A globe is a model of planet Earth. It is often held on a stand at an angle that shows the tilt of Earth's axis. A globe can have features such as lines of latitude and longitude drawn onto it. (For more information about latitude and longitude, see pages 20 and 21.) A globe can help to explain a lot about our planet!