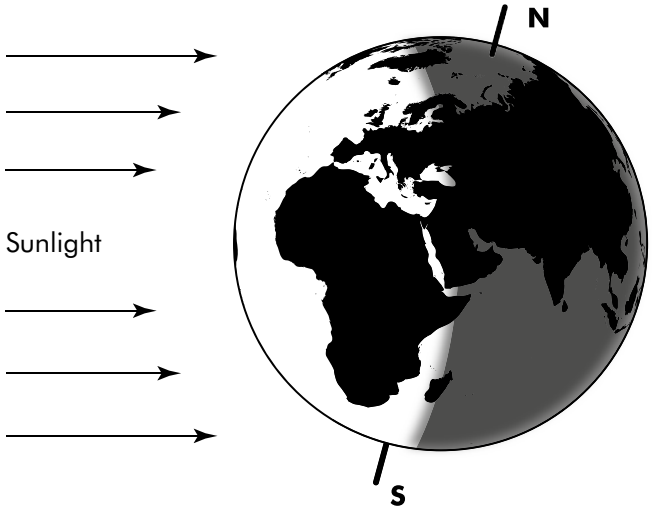
EXOPLANET PHYSICS

LIVING ON AN EXOPLANET: DAY AND NIGHT, SEASONS

An exoplanet is a planet orbiting a star other than the Sun. Astronomers have discovered several thousand exoplanets orbiting stars in our galaxy, the Milky Way.



The Earth when it is winter and daytime in the UK.

Here on Earth, we experience seasons. This is because the axis of the Earth is tilted. In the summer, our part of the Earth is tilted towards the Sun and the weather is warm. In the winter, we are tilted away from the Sun and the weather is cold.

If we lived on an exoplanet, would it have seasons like the Earth? In this activity you will find out about two types of exoplanet which are very different from the Earth.

What you'll need:

- Lamp
- Polystyrene balls
- Marker pen
- Bamboo skewers

What you need to do:

The lamp represents a star. A polystyrene ball represents an exoplanet. A skewer through its centre represents the axis on which it spins.

1. On your 'exoplanet', mark the N and S poles where the skewer passes through the ball. Draw a line round the ball to represent the exoplanet's equator.
2. You should know why we experience night and day. Make your exoplanet spin on its axis and discuss with your partner why this gives night and day.
3. You should know why we experience seasons. Tilt the axis of your exoplanet and move it slowly round the star. Make sure that the axis is always tilted in the same direction (for example, towards the window). Discuss when the planet will experience summer in the northern hemisphere and when it will experience winter.

EXOPLANET PHYSICS

DAY AND NIGHT, SEASONS: PLANETARY ORBITS AND SPINS

1. Astronomers have discovered that some exoplanets orbit their star so that the same side always faces the star. Move your exoplanet round its star in this way. Discuss whether this planet will experience day and night. Will it experience seasons?

2. Astronomers have discovered that some exoplanets have orbits that are not circular. They orbit their stars in elongated ellipses. For part of the year they are close to their star, but then their orbit takes them much farther away. Move your exoplanet in an orbit like this. Discuss what the seasons will be like on such an exoplanet. How will its seasons be different from what we experience here on Earth?

Taking it further Imagine that humans were sent to live on an exoplanet. Conditions would be very different from Earth. Suggest some ways in which people could adapt to life there.