



What is the influence of the Sun?

Seasons

time

50 minutes

learning outcomes

To:

- learn that the Sun turns on its axis from West to East (anticlockwise)
- discover that the days in winter are short because the position of the Earth changes in relation to the Sun
- know that the Earth completes a single revolution around the Sun in one year
- know that the Earth completes a single turn on its axis in one day

end product

- a model of the Earth and the sun to illustrate the seasons

materials needed

- 36 cocktail sticks
- 12 drawing compasses
- 12 polystyrene spheres
- 12 torches
- A4 paper
- stickers
- sticky tape
- globe (optional)



What time do you go to bed? 10 min.

Ask the children at what time they go to bed. Do they go to bed at the same time in the summer as in the winter? Do they find it harder to go to bed in the summer when it is still light outside? Come to the conclusion that during the summer the days are longer than during the winter.



The children investigate the influence of the Sun in the different seasons.



Long days, short days 30 min.

Give each child a polystyrene sphere, cocktail sticks and a pen. Explain that meridians are imaginary lines running vertically over the surface of the Earth and that the Equator is an imaginary horizontal line on the surface of the Earth midway between the North Pole and the South Pole. The Earth's axis is an imaginary line through the centre of the Earth from the North Pole to the South Pole. Use a globe to show this if you have one. The children work in pairs to complete [Task 1](#) on the worksheet. For Steps 6 to 9, explain that the Earth completes a single revolution of the Sun in one year and a single turn on its axis in 24 hours. If the UK [substitute your country throughout this lesson if different] is dark in your experiment, it means that it is night there. Encourage the children to turn the Earth so that it is day in the UK. The UK is facing the Sun. Make sure they do not change the tilt of their Earth's axis.



Where does the Sun rise? 10 min.

Ask in which point of the compass the Sun rises. And in which point of the compass the Sun sets. Ask if it is the Sun that is turning or the Earth. Come to the conclusion that the Earth turns from West to East. This makes it seem as if the Sun is moving from East to West. The children complete Task 2 up to and including 7 on the worksheet. Explain that the UK is not always in the same position in the part of the Earth lit by the Sun: this position depends on the season. During the winter the UK is far above the middle of the area lit by the Sun which means it is warmed by the Sun for fewer hours each day. Also, the Sun's rays hit the UK at a shallow angle so they are spread out over a larger area and the sunlight is less intense. In the summer the opposite happens. The Sun's rays hit the surface at a steeper angle so they are concentrated on a smaller area, and there are more hours of daylight to warm the Earth.



Discuss what the position of the Sun has to do with the seasons. The children complete step 8 from Task 2 on the worksheet.



What is the influence of the Sun?



In this experiment you will be answering the following research question:

What is the influence of the Sun on the different seasons?

1 Long days, short days



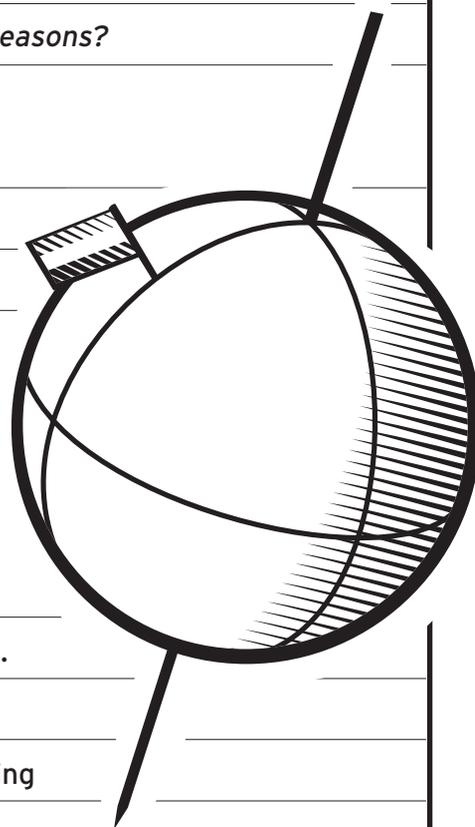
What do you need?

- 2 cocktail sticks
- 2 sheets of A4 paper
- polystyrene globe
- pen
- sticker
- sticky tape
- drawing compass

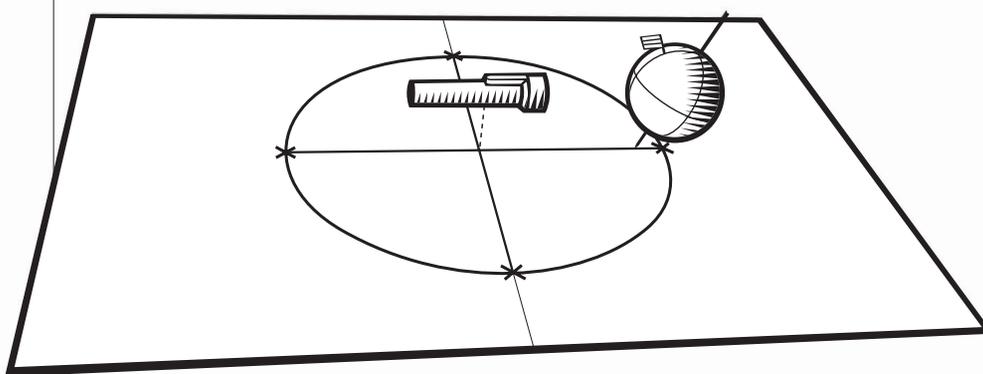
What do you need to do?

- 1 Draw a dot on the top and bottom of your globe. These are the North Pole and the South Pole.
- 2 Divide your globe into four equal parts by drawing vertical lines from pole to pole using the pen. These lines are called meridians. Look at the drawing to see how to do this.
- 3 Draw a horizontal line around the middle of the Earth. This is the Equator.
- 4 Push a cocktail stick into one of the meridians midway between the Equator and the North Pole. Attach a sticker to the stick for a flag. This is the UK.
- 5 Stick a cocktail stick into the North Pole and another one into the South Pole. These two sticks represent the Earth's axis.

You now have a model of the Earth showing where the North Pole, the South Pole, and the UK are. You have also made the Earth's axis. Now you are going to draw the path of the Earth's orbit around the Sun on your paper.



- 6 Stick together two sheets of A4 paper along the long edge using sticky tape. Use the compass to draw a circle with a diameter of 40 centimetres. This circle represents the path of the Earth's orbit around the Sun.
- 7 Draw a horizontal and a vertical line through the centre of the circle.
- 8 Draw a cross at the points where these lines cross the circle, as shown on the drawing. Between each cross is a time difference of three months.
- 9 Write a 1 next to the right-hand cross. This is the first month, January. Write the correct months next to the other three crosses. You have now made the path of the Earth's orbit around the Sun. Each cross represents the position of the Earth in its orbit around the Sun in that month.



2 *Where does the Sun rise?*



- 1 Take your globe and hold it at the cross indicating January with the axis slightly tilted so the North Pole is away from the Sun. Make sure that the UK is facing the Sun, as shown in the picture. This is your starting point.
- a What season is it in the UK on your globe?
- 2 Shine the torch on your globe from the centre of the circle. Look at the drawing to see how to do this.
- 3 Turn the Earth a quarter of a turn towards you (to the right).

4 Move the globe anticlockwise to the next cross. Make sure that the UK remains facing the Sun and that the tilt of the axis remains at the same angle. What month is shown here? Write next to the cross which season it is.

5 Repeat step 4 for the remaining two crosses. Look closely at the area of the globe that is lit by the Sun.

b Is the UK always in the same position within this lit area?

yes / no

CIRCLE the correct answer

c Write your answer in the space provided.

The Sun rises in the _____

The Sun sets in the _____

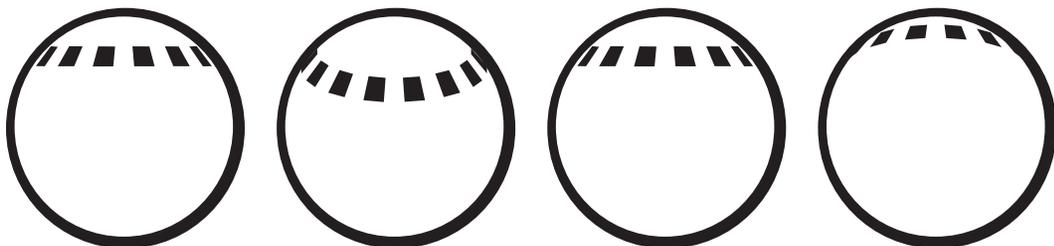
The Earth turns from _____ to _____

7 Hold the Earth in the position that shows summer in the UK (third cross).

Now turn it slowly round on its axis. It is now day and night in the world.

8 The drawing below shows four frontal views of the Earth. Each drawing shows how the position of the UK with respect to the Sun changes during the day.

d Under each view write which season is depicted.



e In which season is the UK nearest the centre of the lit up area?

f

In which season does the UK travel the longest path through the lit area?

And in which season the shortest?

The season with the longest path is: _____

The season with the shortest path is: _____

g

Circle the correct answers.



In the summer the UK is nearest the centre of

the lit area. The rays of the Sun reach the surface of the Earth at a

steeper / shallower angle than in the winter.

CIRCLE
the correct
answer

h

Rays of light with a **steeper / shallower** angle give more heat.

i

In the season where the UK is longest in the lit area,

it is **hotter / colder** during the day

than in the season where the UK is shortest in the lit area.

CIRCLE
the correct
answer

j

Why is it hotter in the UK in the summer than in the winter?

Give two reasons.

1

2