

GEOMETRY ACTIVITY 1

ENQUIRY OF LEARNING What are the cycles of our Solar System?

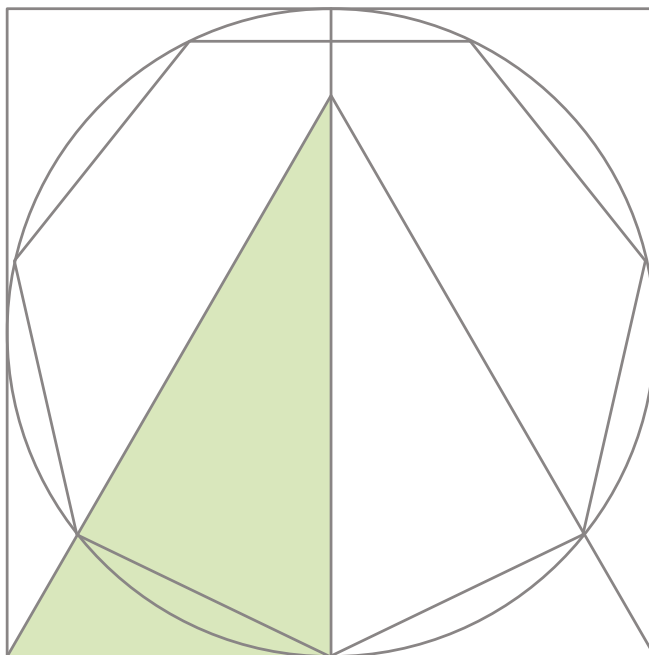
LEARNING QUESTION Why do we have cycles of day and night on Earth?

This activity is part of a Year 4 (Year 5 in Northern Ireland; P5 in Scotland) enquiry of learning about the Solar System, linked to the principle of the Cycle. The wider enquiry allows students to explore the attributes of the Solar System and the effect it has on life on Earth.

This activity introduces learning about the cycles of day and night on Earth. We explore this visually with the division of a circle into seven sections using a compass and a ruler. We know that a week is a unit of time made up of seven days. The cycle of the Moon is 28 days and its divisors of seven and four give us the number of days in a week and the approximate number of weeks in a month. There are seven days in a week because many centuries ago, people noticed that there were certain patterns in Nature, such as the phases of the Moon, that happened roughly every seven days.

YOU WILL NEED

An HB pencil
A ruler
A good compass
A good quality eraser
Coloured pencils
Copies of Resource 1 (p. 7)
Optional: Copies of Resource 2 (p. 8) and/or Resource 3 (p. 9)



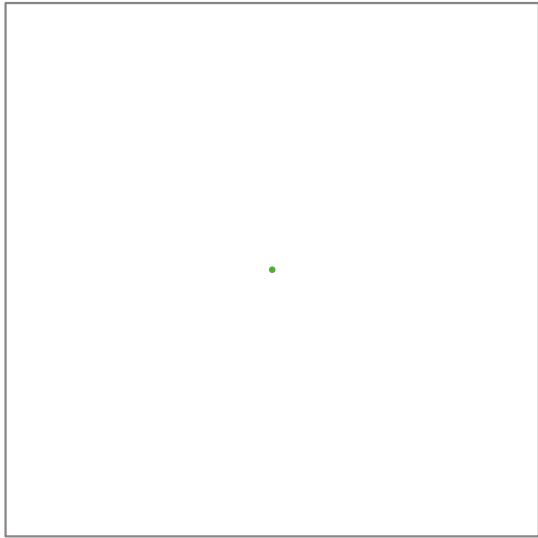
DID YOU KNOW?

The seven-day week is thought to have originated with the Babylonians, who divided the week into seven days based on the phases of the Moon. These days were named after the celestial bodies that were believed to correspond with each day, such as the Sun, the Moon, and the five visible planets. The seven-day week was later adopted by the ancient Romans, who gave each day a name based on the seven celestial bodies. This system was eventually adopted by many other cultures and it continues to be used today.



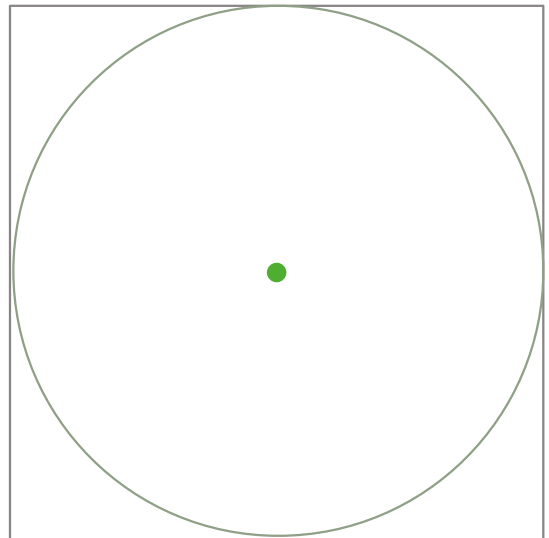
STEP 1 Familiarise yourself with the square template

The template on p. 7 shows a square with a dot marking its centre point. If you were to draw two diagonal lines joining the opposite vertices of the square, this would be the point at which they cross.



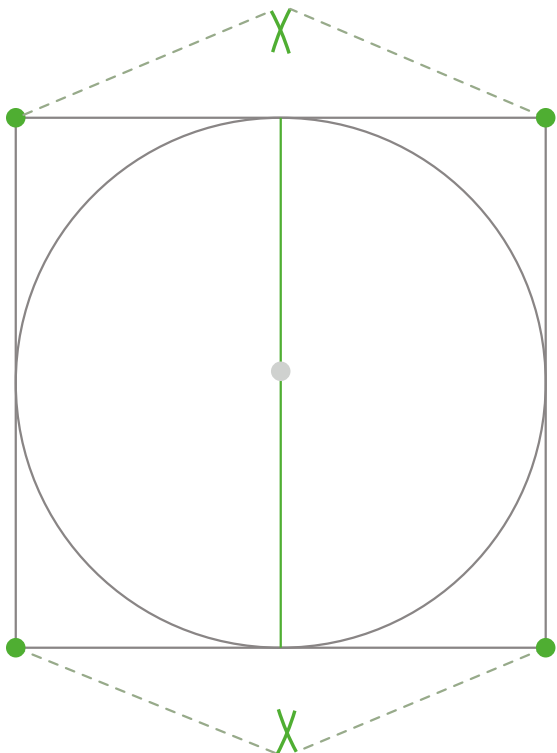
STEP 2 Draw a circle in the square

Place the point of your compass on the centre point and widen the arms until the pencil point touches (tangents) every side of the square. Draw a circle.



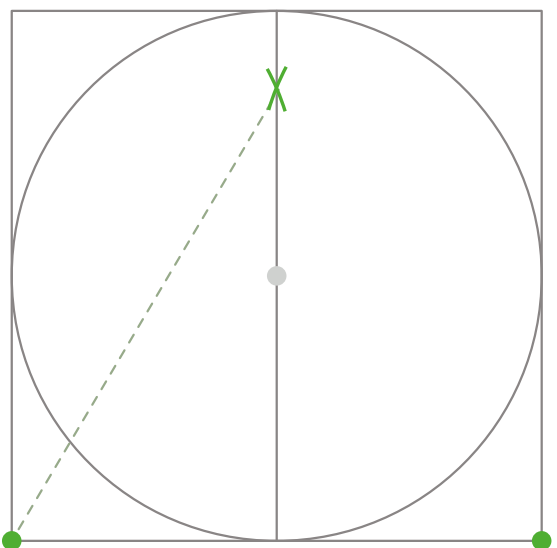
STEP 3 Bisect the circle vertically

Placing the compass point on the top corners of the square in turn, draw two small arcs roughly over the centre of the square (they should cross). Ensure the compass radius stays the same each time. Repeat with the compass point on the bottom corners. Using a ruler, draw a line connecting the two crosses through the centre point of the circle.



STEP 4 Set the compass radius to one side length of the square

Extend the arms of the compass so that the distance between the compass point and the pencil point (this is called the radius) is equal to one of the square's side lengths. Place the compass point on the bottom left vertex of the square and draw an arc that intersects the vertical line.

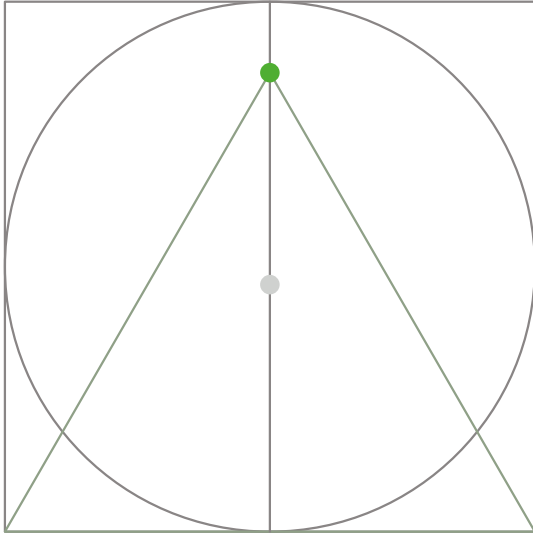


TEACHER TIP

A good compass makes these activities much easier. However, string or strips of paper and a ruler can be used to allow children to complete some of the stages.

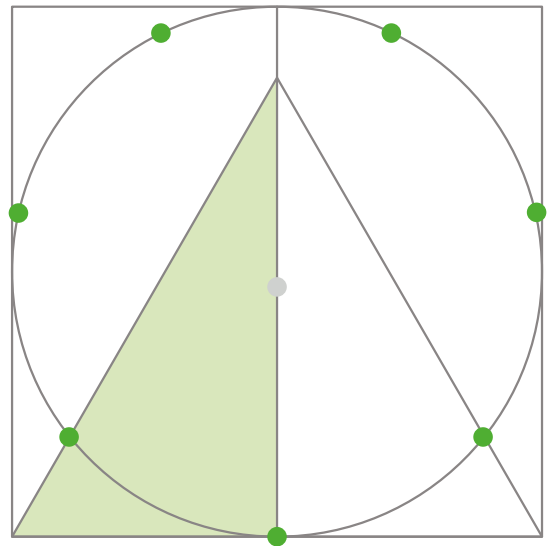
STEP 5 Draw two diagonal lines

Use a ruler to draw a line connecting the bottom left vertex of the square to the point at which the arc you have just drawn intersects the vertical line (marked with a dot below). Now draw a second line connecting the dot to the bottom right vertex of the square. The two diagonal lines you have just drawn and the bottom side of the square now form the sides of an equilateral triangle.



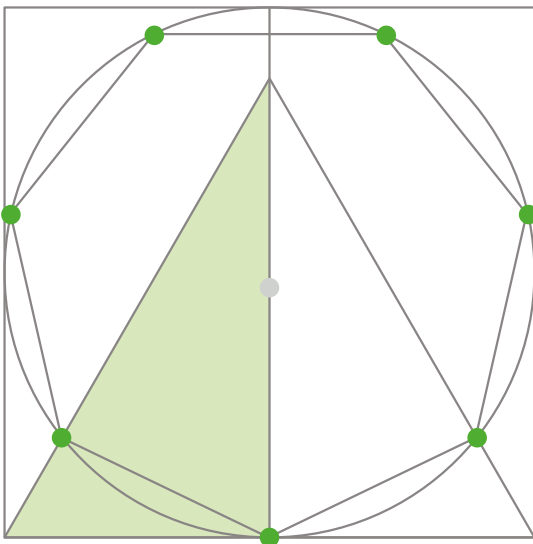
STEP 6 Mark seven points around the circle with a compass

Place the point of the compass on the point at which the vertical line meets the bottom side of the square. Now place the pencil point of the compass on the point at which the left-hand diagonal side of the triangle intersects the circumference of the circle. Keeping the arms of the compass set this distance apart, place the compass point on the point at which the left-hand diagonal side of the triangle intersects the circumference of the circle and draw a small arc that intersects the circumference. Repeat this, working around the circle until there are seven, equally spaced marks, as shown below.



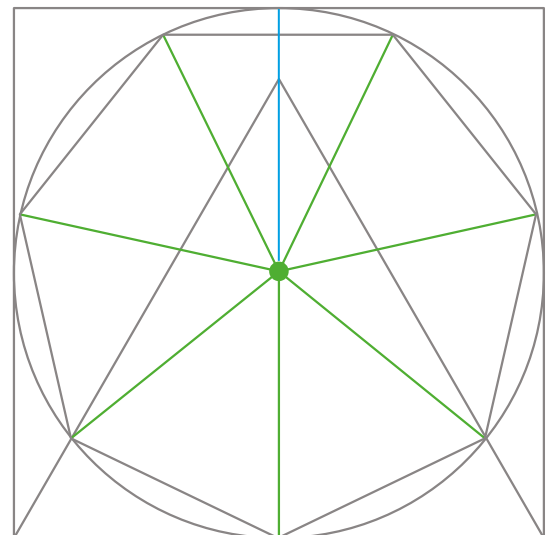
STEP 7 Connect the points

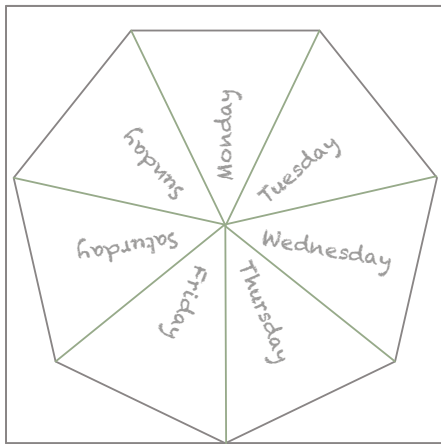
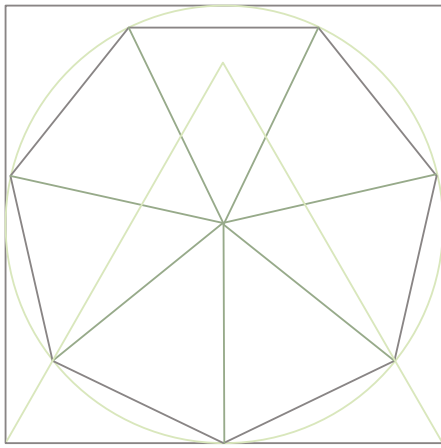
Either working from your own diagram or the template provided on the printable resource on p. 9, use a ruler to connect the seven points to create the sides of a heptagon. Notice that the relationship between the square (4 sides) and triangle (3 sides) gave you the side length of the heptagon (7 sides).



STEP 8 Divide the circle into segments

Use a ruler to draw seven lines connecting each of the vertices of the heptagon to the centre point of the circle. This will divide the heptagon into seven equal segments. At this stage, you may wish to erase the line marked in blue below to avoid confusion.





STEP 9 Label and decorate the heptagon

Colour and label each of the seven segments with the name of the week. If you are working with your own diagram, you can lighten the construction lines with an eraser or leave them in place to reveal the process. This activity can be used as a starting point to research the days of the week and the origins of their names and mythology. Students could also find imagery associated with each day of the week.



DID YOU KNOW?

Monday comes from Old English and means 'Moon's day'. This is because the ancient Anglo-Saxons, like many other cultures, named the days of the week after the celestial bodies that they associated with each day. Monday was named after the Moon because it was believed that the Moon had a special significance on this day.

Tuesday comes from the Old English and Anglo-Saxon name for the god of combat, Tiw, who was associated with the planet Mars.

Wednesday comes from 'Woden's day'. Woden was the chief Anglo-Saxon god, and he was associated with the planet Mercury. The planet Mercury was named after this god because it was believed to be the fastest moving planet, and Woden was known for his speed and cunning.

Thursday comes from 'Thor's day'. Thor was the god of thunder and war in Norse mythology, and he was associated with the planet Jupiter.

Friday comes from the Anglo-Saxon name for the goddess Venus, Frigg, who was associated with love and beauty. The planet Venus was linked to this goddess because it was the brightest object in the sky after the Sun and the Moon.

Saturday means 'Saturn's day'. Saturn was the Roman god of time, agriculture, and liberation.

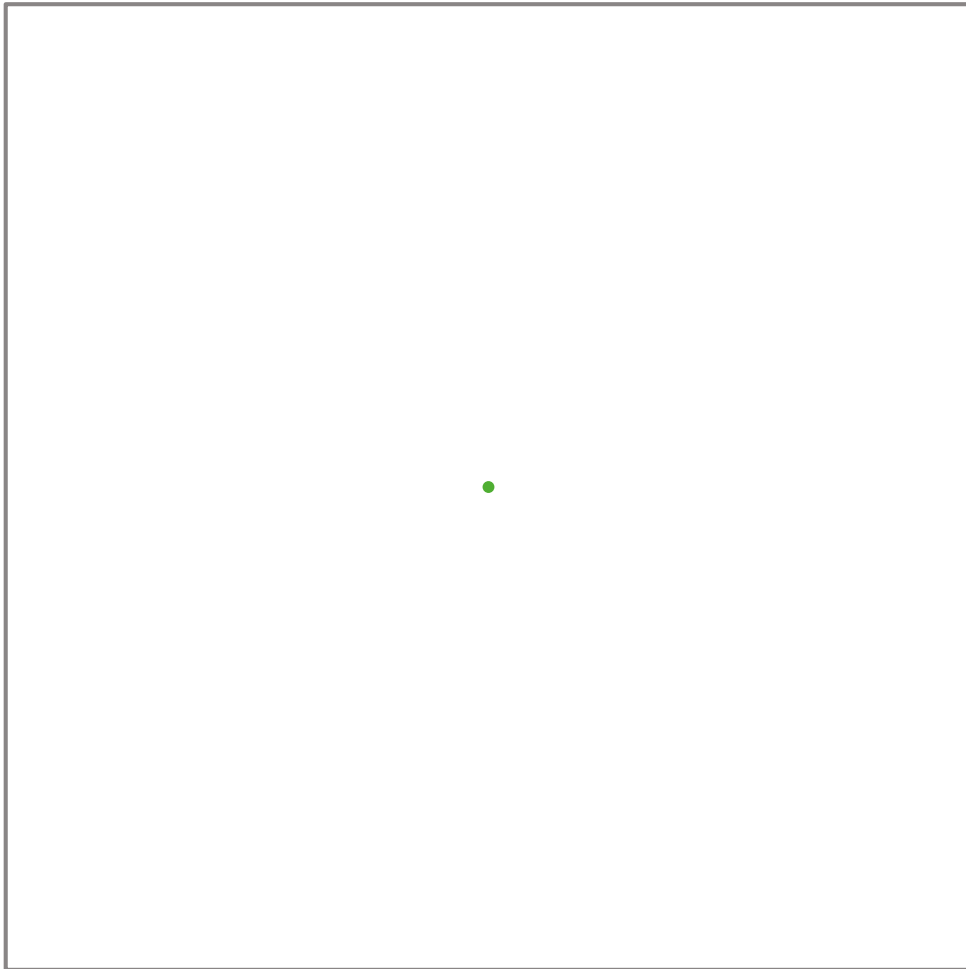
Sunday means 'Sun's day'. Sunday was named after the Sun because it was believed that the Sun had a special significance on this day.

HOW CAN THIS ACTIVITY BE ADAPTED?

Use the printable resources on p. 8 and p. 9 to provide additional support to students who would benefit from it.

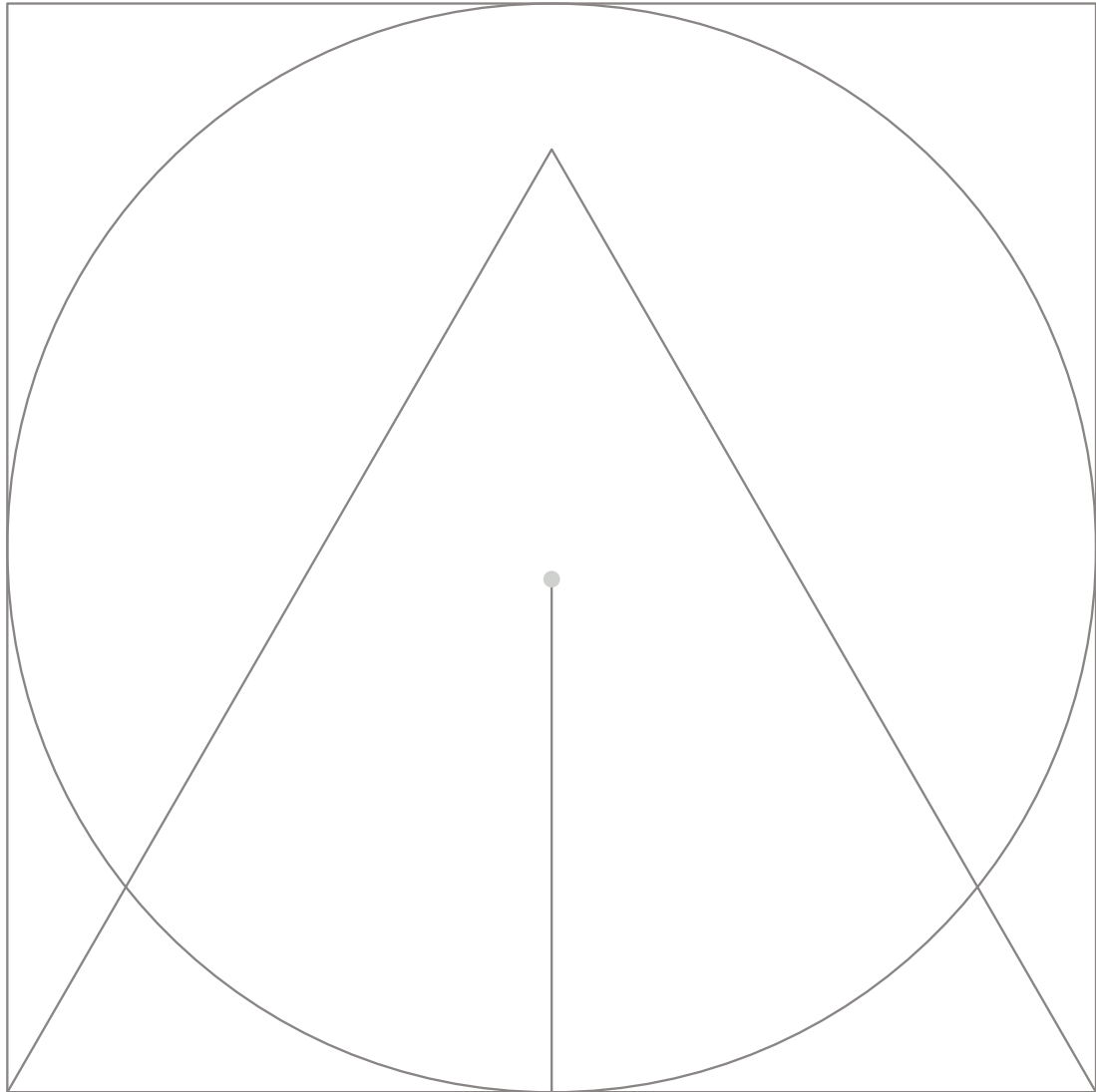
PHOTOCOPIABLE RESOURCE 1

Follow Steps 1-9 with a compass and ruler to find your seven-fold division of a circle.



PHOTOCOPIABLE RESOURCE 2

To simplify this activity for younger students, or for students who would benefit from additional support, photocopy this resource and follow Steps 6-9.



PHOTOCOPIABLE RESOURCE 3

To simplify this activity for younger students, or for students who would benefit from additional support, photocopy this resource and follow the instructions in Steps 7-9.

