GEOMETRY ACTIVITY 1

ENQUIRY OF LEARNING What can we learn from star patterns?

LEARNING QUESTION What stars can we make with triangles?

This activity can be used to support learning about number patterns in maths or as a standalone project.

In this activity, students use a template to draw a series of triangles, all of which have their vertices located on the circumference of a circle. These triangles build up to create a 12-pointed star. The name for this star shape in geometry is a 'dodecagram'.

There are two common ways to draw a dodecagram using 12 points spaced equally around the circumference of a circle. The first involves connecting every fourth point around the edge of the circle to draw four triangles. The second involves connecting every fifth point. Both methods result in the creation of a 12-pointed star shape, each with a slightly different internal structure. A further method involving squares is explored in Activity 2.

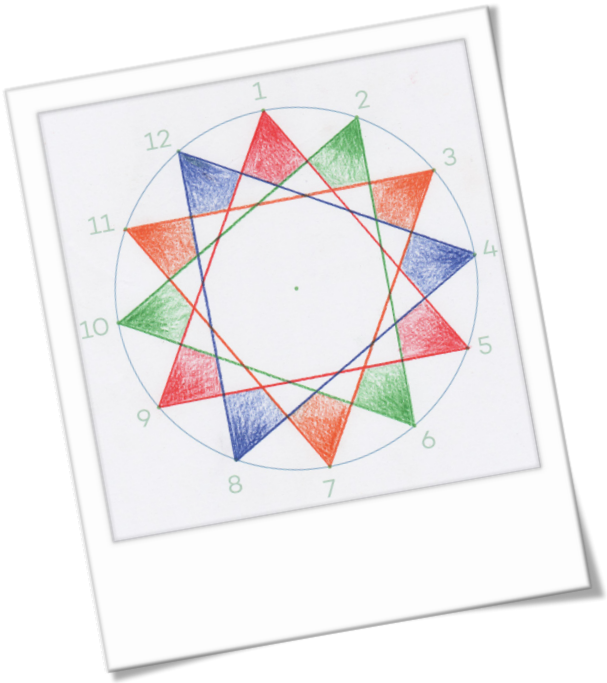
This activity helps children to recognise patterns and to develop a deeper understanding of the relationship between shapes – in this case triangles and circles – and numbers. It also encourages creativity and problem-solving.

YOU WILL NEED

Copies of Resource 1A
A ruler
An HB pencil
A good quality eraser
Coloured pencils

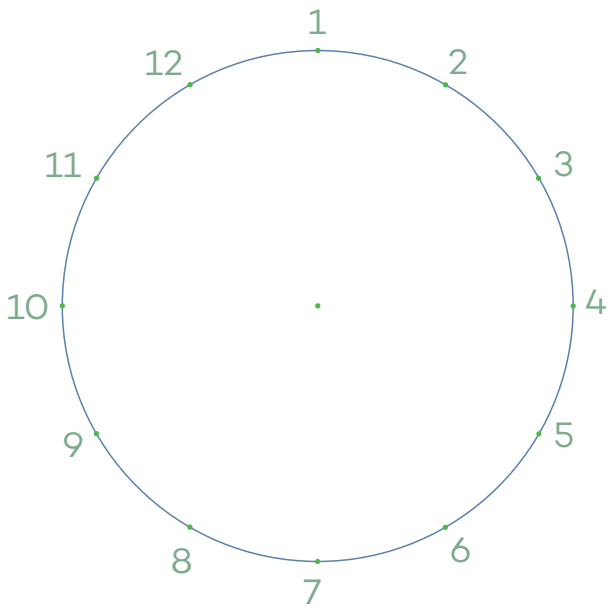
DID YOU KNOW?

A dodecagram (12-pointed star) can represent a number of things. For example, it could represent the twelve hours marked on a clock face or the twelve months in a year. This helps us remember how time is organized and how nature changes throughout the year.



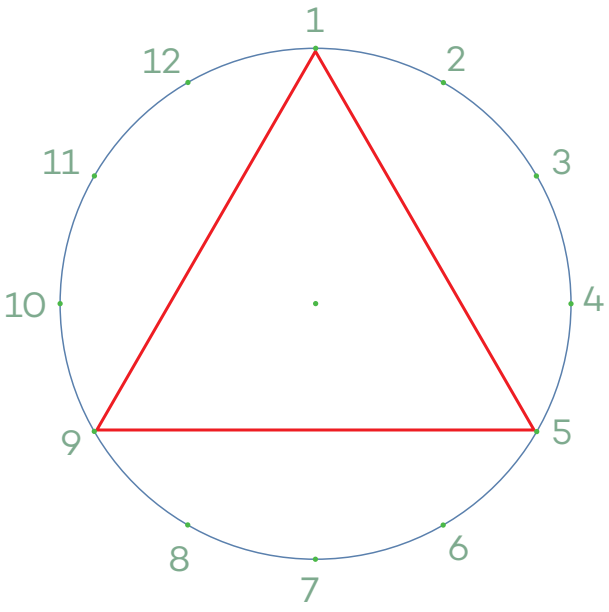
STEP 1 Get to know the 12-point template

Using copies of Resource 1A, take a moment to familiarise yourself, and your students, with the template. You might like to discuss the similarities and differences between the template and a clock face (note that in the template, the number 1 appears at the very top of the circle where the number 12 would be on a clock).



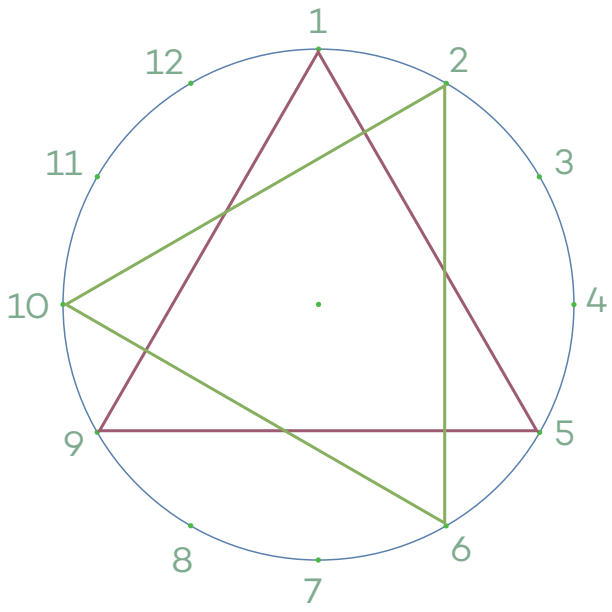
STEP 2 Draw the first triangle

Using a ruler, draw three lines to connect points 1 and 5, 5 and 9, and 9 and 1. This will create the first triangle in your drawing.



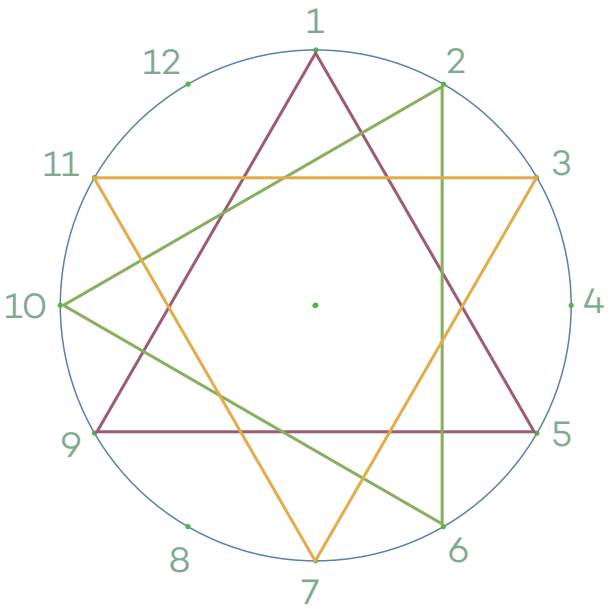
STEP 3 Draw the second triangle

Using a ruler, draw three lines to connect points 2 and 6, 6 and 10, and 10 and 2. This will create the second triangle in your drawing. You might want to continue using an HB pencil, or draw each triangle in a different colour so you can see more clearly how the dodecagram is constructed.



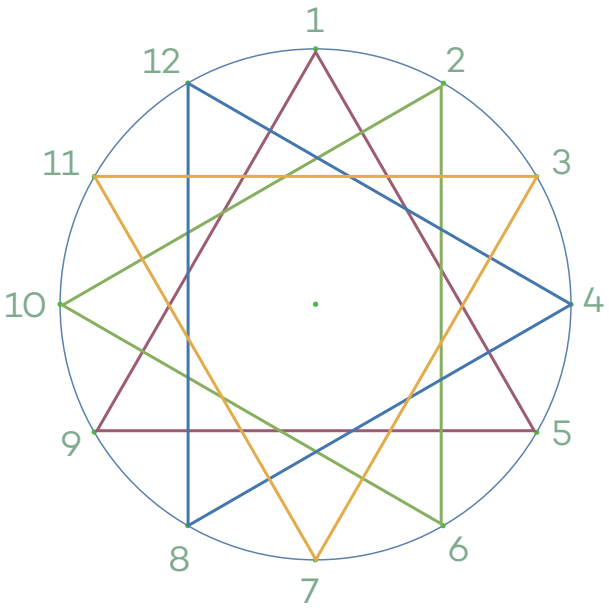
STEP 4 Draw the third triangle

To draw the third triangle, connect points 3 and 7, 7 and 11, and 11 and 3.



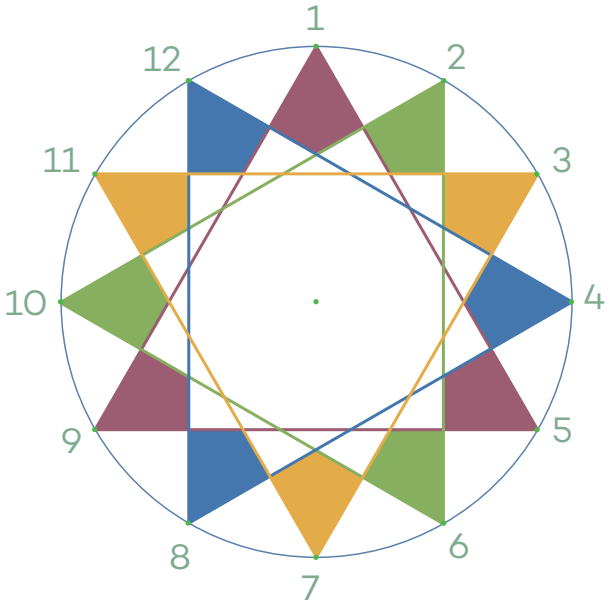
STEP 5 Draw the fourth and final triangle

To draw the final triangle, connect points 4 and 8, 8 and 12, and 12 and 4.



STEP 6 Colour the kite shapes

If you look closely, you will see 12 kite shapes located at the point of the dodecagram you have drawn. You could colour these to make the points of the 12-pointed star stand out.



TEACHER TIP

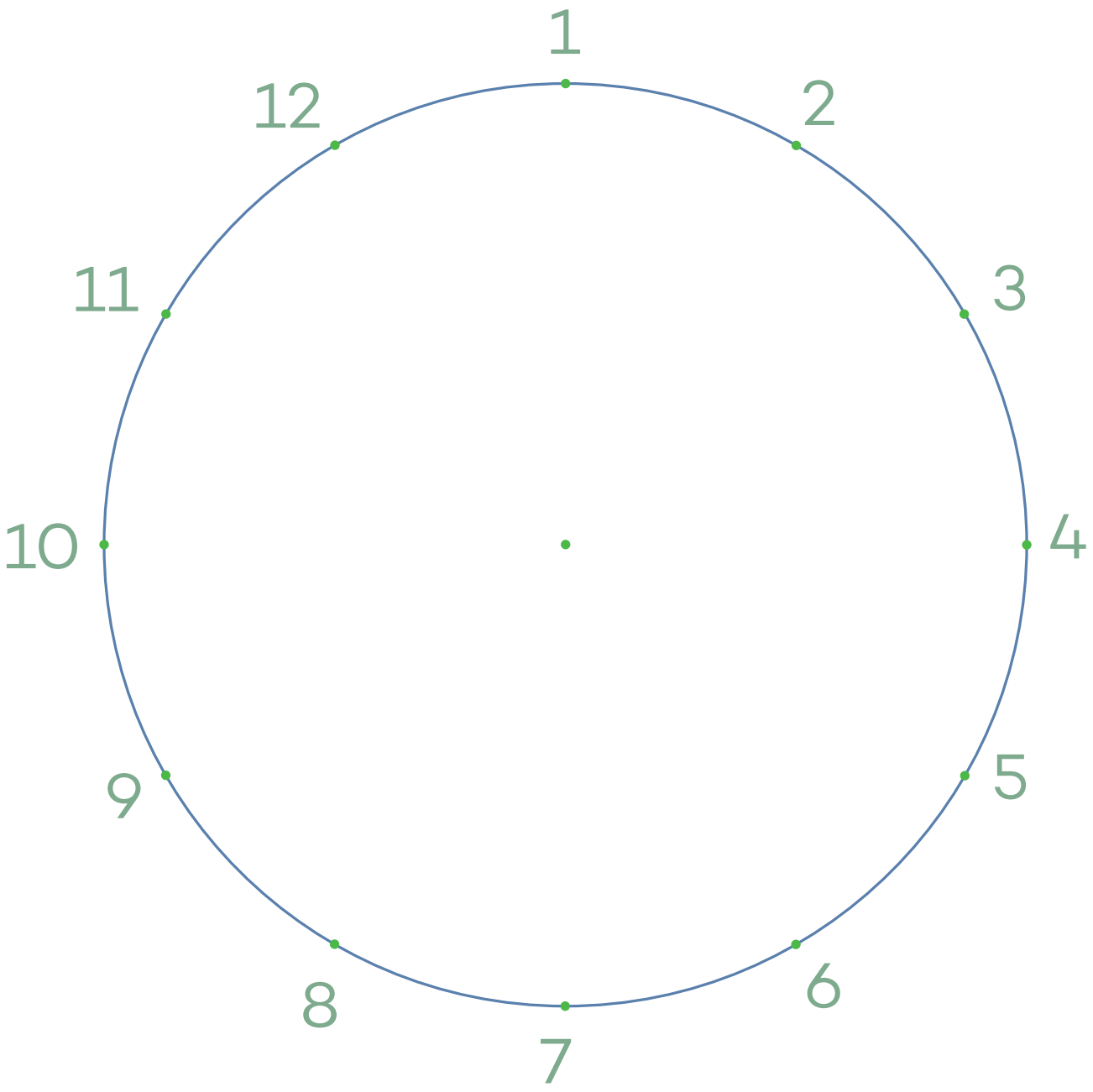
This activity provides a fantastic 'jumping off' point for exploring number patterns in maths. You might ask children for example:

What is the sum of the three numbers you used to draw each triangle? Is there a pattern?

1 + 5 + 9 = 15

2 + 6 + 10 = 18

3 + 7 + 11 = 21

What would the next five numbers in this number sequence be?

PHOTOCOPIABLE RESOURCE 1A