What can we learn about the geometry of flowers?

Geometry teaching pack

The Harmony Project

GEOMETRY ACTIVITIES

ENQUIRY OF LEARNING What can we learn about the geometry of flowers?

The six activities in this geometry pack have been developed to explore with students the beautiful geometry of flowers. They can be used to support learning about flowering plants in science, to enrich learning about one of the principles of Harmony or to teach geometry as a standalone activity. You can find out more about Nature's principles of Harmony on The Harmony Project website.

For each activity, step-by-step text instructions are provided as a guide for teachers, with accompanying diagrams and lists of the resources students will need to complete each activity. There are also photocopiable templates that can be used to simplify each activity for students requiring additional support, if you do not have access to compasses for the students to use, or to save time.

CONTENTS

WHY GEOMETRY?

Learning the geometry of Nature provides students with a new way of looking at the world. The observational skills and careful drawings that are required to recreate this geometry can have a powerful impact on students' understanding of Nature and their place in it. If we are to create a sustainable future, we need to see the world through a different lens, to understand that the patterns of life that exist around us also exist in us. This way of seeing the world means we view everything from a place of connection, rather than separation. This sense of connection is an essential part of learning to live sustainably. After all, the word 'Harmony' means joined or connected.

COMPASSES

The activities in this pack can be adapted so that there is no need to use a compass to complete them by using the templates provided at the end of each activity. However, if you would like your students to engage in more of the geometric construction, Jakar compasses will help ensure accuracy and are easy to use. The can be purchased at a discount through The Harmony Project website.

GEOMETRY ACTIVITY 1

ENQUIRY OF LEARNING What can we learn about the geometry of flowers?

LEARNING QUESTION How can I draw a three-petalled flower?

The two activities that make up Activity 1 can be used to support learning about flowering plants in science, to introduce the principle of the Cycle or the principle of Diversity to students, or as a standalone project.

In these activities, students use a compass and a ruler to explore the geometry of three-petalled flowers, using the example of a trillium flower as the stimulus for learning. If working with younger students, or if time is short, you may choose only to complete Activity 1A, which can be further simplified by providing copies of Resource 1A and completing Steps 2-5 only.

Activity 1B guides students through a more detailed construction process to draw a trillium with much narrower petals. Students will need copies of the template on Resource 1B to complete this activity.

YOU WILL NEED

An HB pencil
Compass
Ruler
A4 paper
Tracing paper
A good quality eraser
Coloured pencils
Flower images
Copies of Resource 1B
Optional: copies of Resource 1A

These images show the three-petalled form of trillium flowers

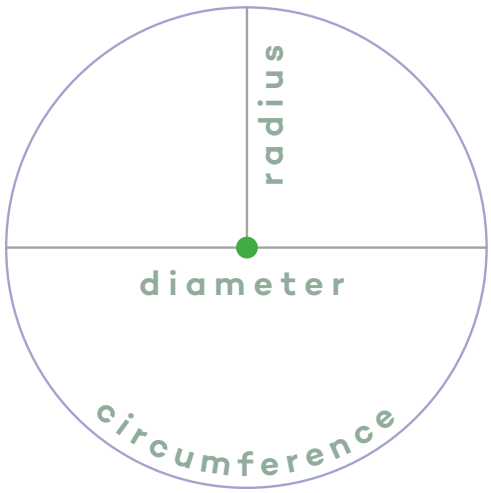
DID YOU KNOW?

Trilliums are a type of spring wildflower. There are over 40 species of trillium, and they are typically found in woodland areas and along streams and rivers. Trilliums are known for their distinctive three-petalled flowers, which come in a variety of colours, including white, pink and red.

ACTIVITY 1A

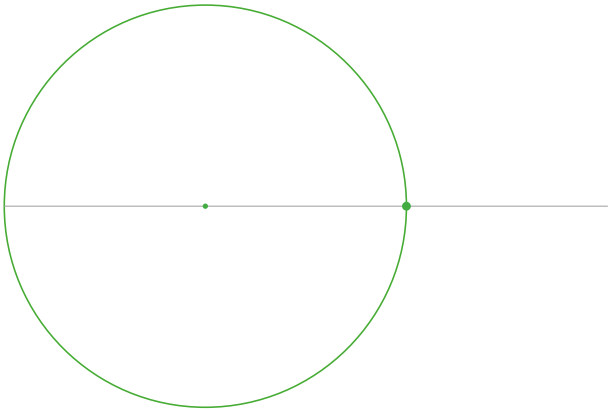
THE CIRCLE

This activity is great for familiarising students with the parts of a circle, as these are used to guide the geometric construction in this activity. Working with a compass relies on finding points of overlap or intersection to complete each step in the process.



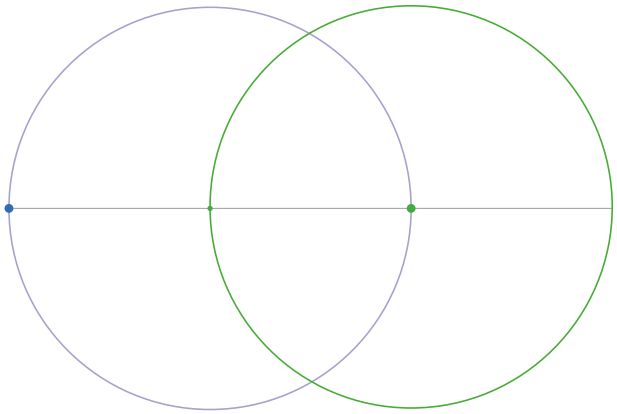
STEP 1 Draw the first circle

Draw a horizontal line across the centre of the page. On the left side of the line, pick a point and mark it with a dot. Open your compass to a width of 5cm (the distance between the pencil point and the compass point), place the point of the compass on the dot and draw a circle. Mark where this circle cuts through the horizontal line with a second dot.



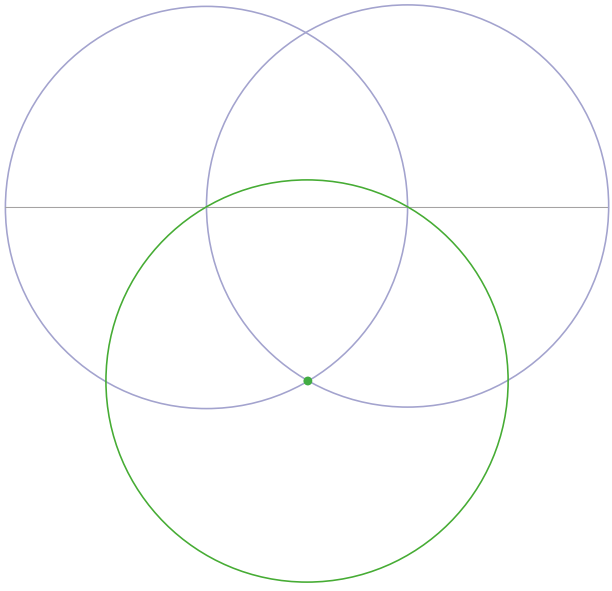
STEP 2 Draw a second circle

Check your compass is still set to 5cm. Place the point of the compass on the second dot and draw a second circle. This will create two overlapping circles, resulting in a shape between them called a 'vesica piscis'. Literally translated, this means 'fish bladder'.



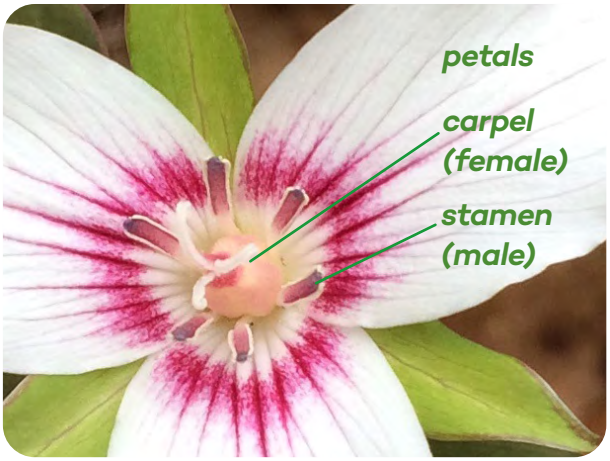
STEP 3 Draw a third circle

Use a dot to mark the point where the two circles overlap below the horizontal line. Place the point of the compass here and draw a third circle. It should pass through the horizontal line at two points.



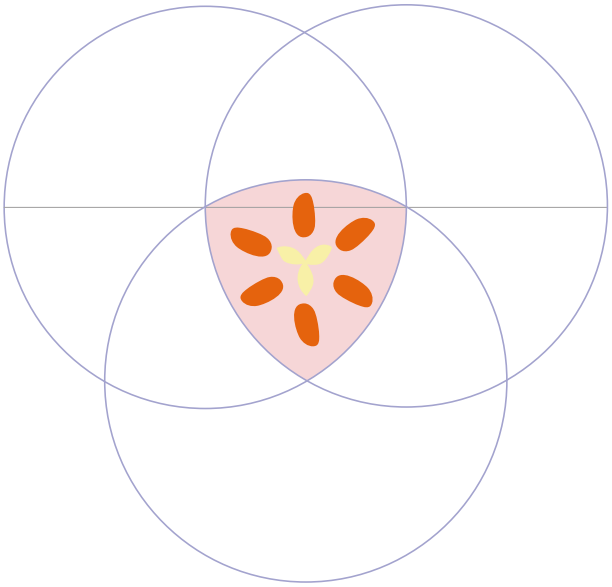
FLOWER PARTS

At this stage, pause and study the appearance of some four-petalled flowers, either in images or foraged. Are there different colours in the petals? What colours and shapes can you see in the different parts of the flowers?



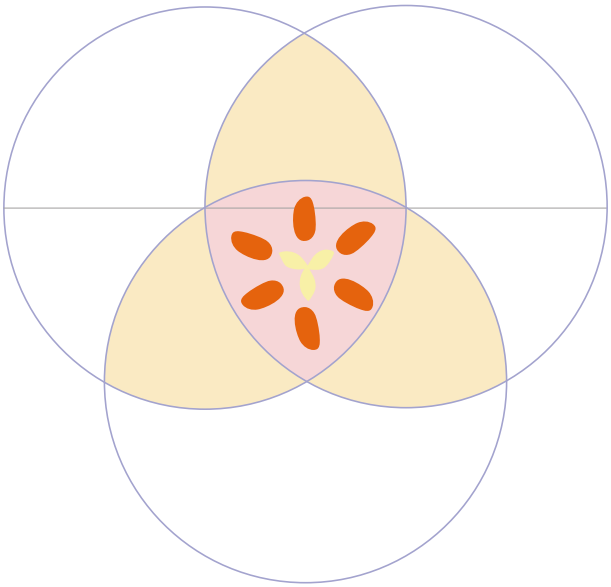
STEP 4 Add detail to the centre of the flower

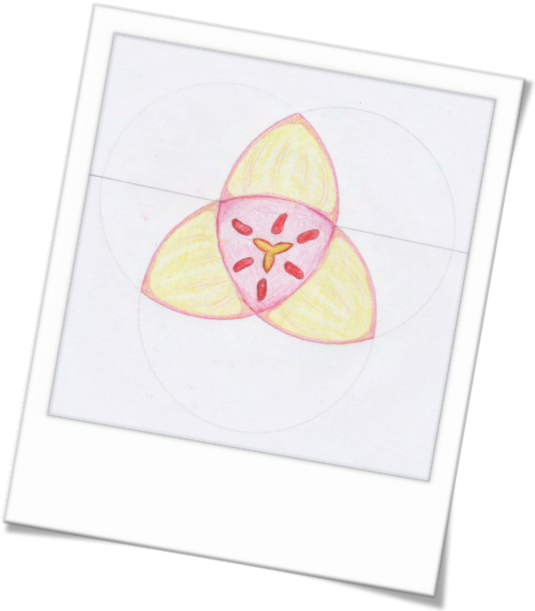
In the centre of the drawing is an area where all three circles overlap. This will be the centre of your flower. Colour this area with a coloured pencil and add details to show the parts you would find in the centre of a flower (shown in image, left).



STEP 5 Shade the outer petals

Shade the outer petals on the drawing, as shown below, to recreate a broader-petalled trillium or another flower with similar-shaped petals. You might want to pause here to look at images of such flowers. What colour are the petals? What detail can you see on them? How can you recreate this?

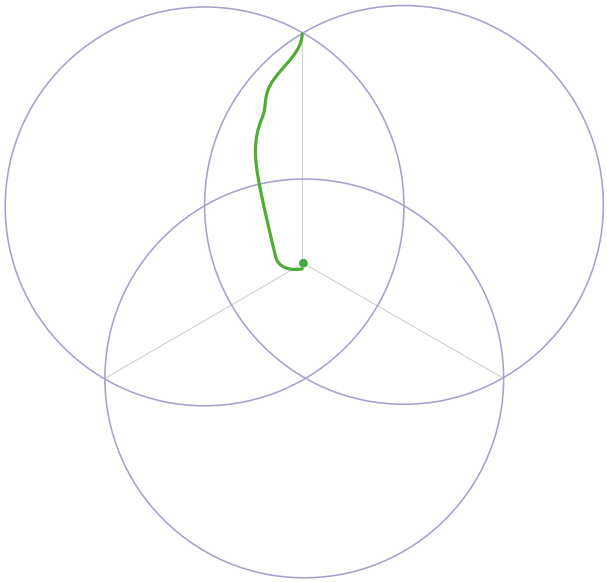




ACTIVITY 1B

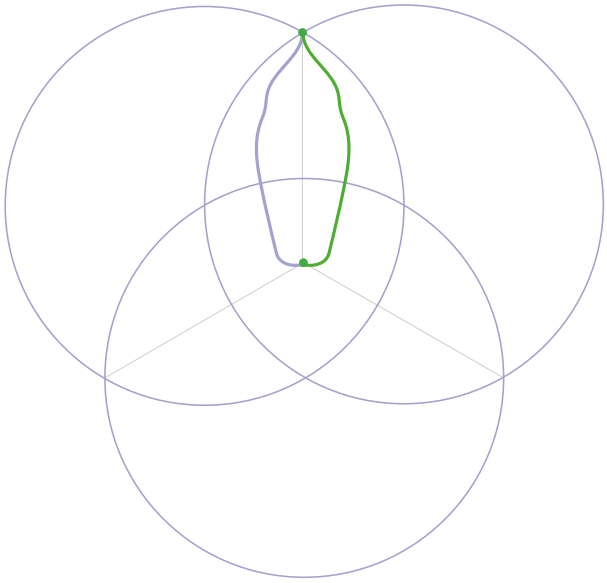
STEP 1 Draw three guidelines

Using the template in Resource 1B and a ruler, draw a straight line from the centre point to one of the outer points where two circles overlap. Repeat to join the centre point to the two other outer points where two circles overlap. These guidelines are shown in green below. Working in the uppermost section of the drawing, draw one half of one of the petals, using the central guideline to help you.



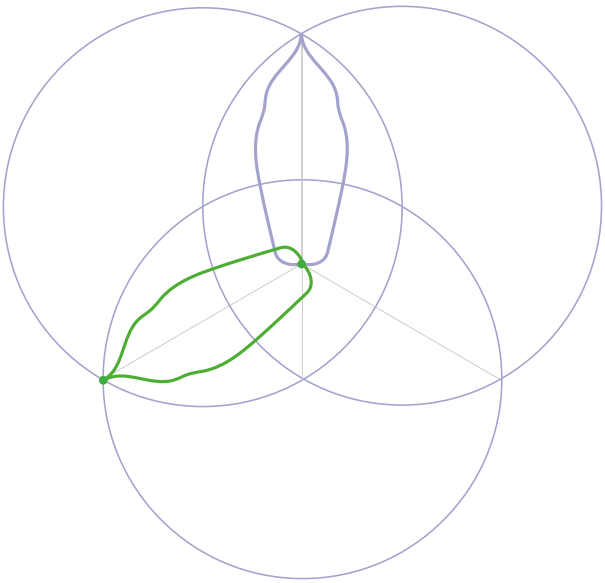
STEP 2 Trace the other half of the petal

Using tracing paper, trace the outline of the first half of the petal, then flip the tracing paper to trace the other half of the petal. If you prefer, complete the outline of the second half of the petal freehand.



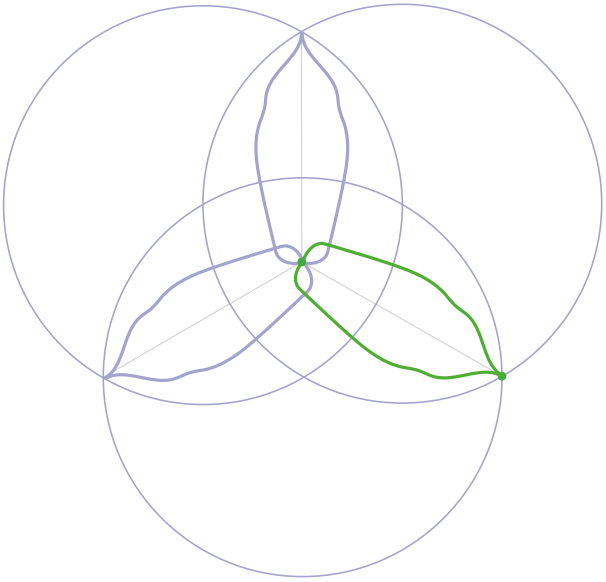
STEP 3 Trace the second petal

Trace the completed petal onto tracing paper. Flip the paper over and position the traced petal above the dividing line in the next section of the drawing, as shown below. Transfer your petal to the page and go over by hand any areas that have been missed.



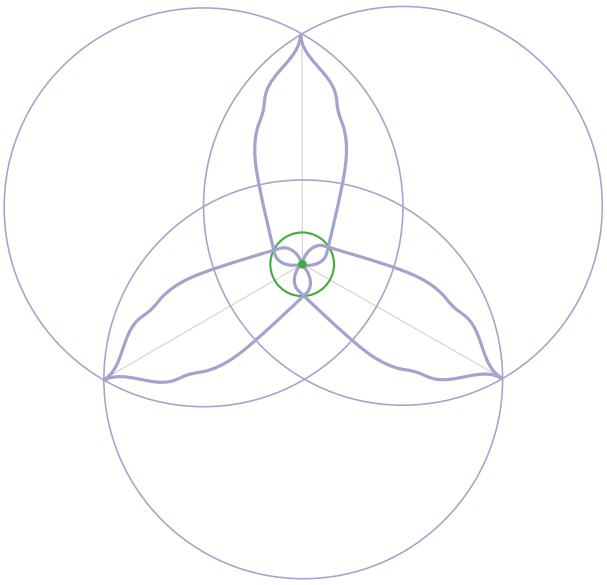
STEP 4 Trace the third petal

Repeat this process one last time for the third petal.



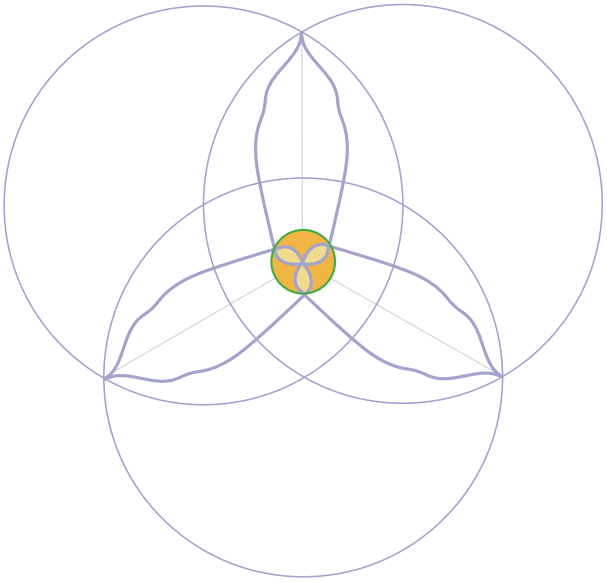
STEP 5 Add the centre of the flower

At the centre of your drawing, add a small circle that fits where the three petals overlap. This will be the centre of the flower where you can add the detail of the flowers parts.



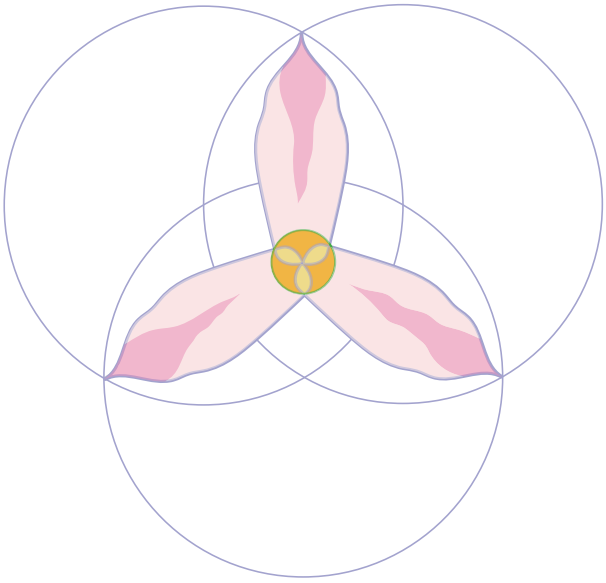
STEP 6 Colour the centre of the flower

Use coloured pencils to colour the centre of the flower. Look carefully at the colour of the male and female parts found in three-petalled flowers to help you.



STEP 7 Colour the petals

Complete the drawing by colouring the petals in a colour that works with the rest of the flower. Look at other three-petalled flowers to inspire you. It is a good idea to use a light colour as a base so that you can add details on top, if you wish.

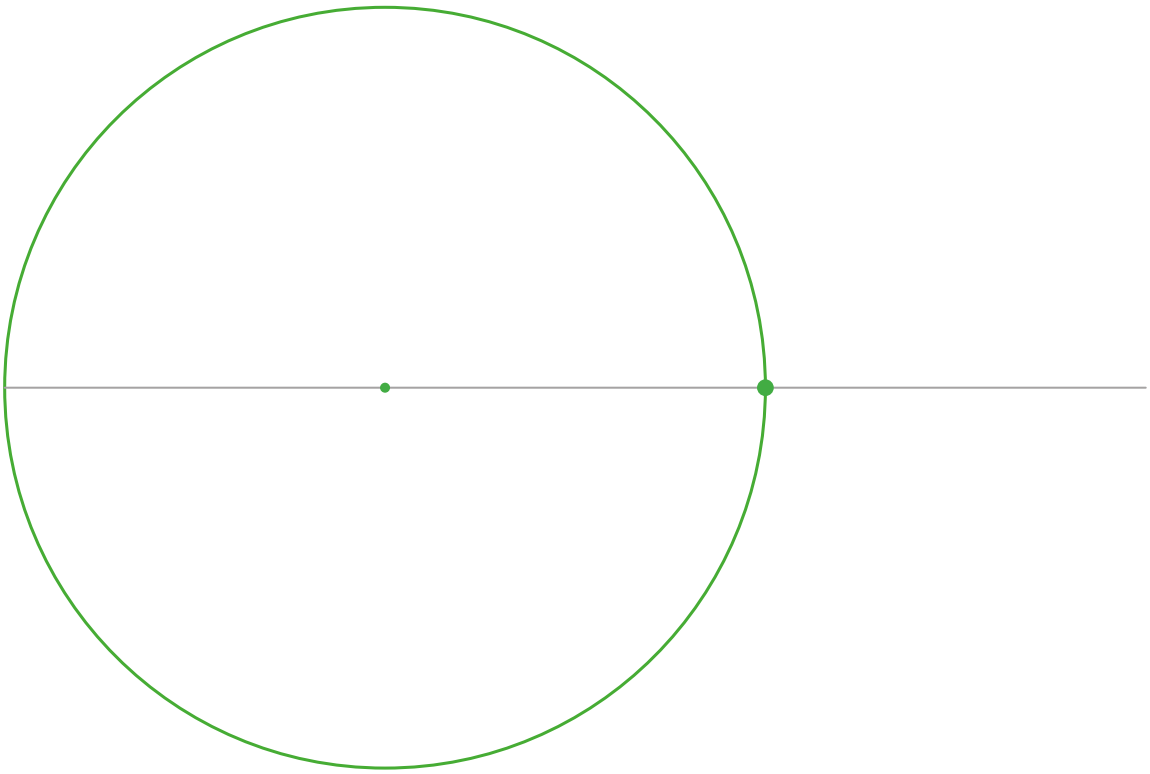


GROUPWORK

The completed individual flowers can be arranged together to create a larger wall design. Once all the flowers are complete, arrange them on a large poster board or wall space. To create harmony, have students consider and use a colour scheme. Encourage collaboration and discussion among students, as they work together to arrange the flowers and make any necessary adjustments to ensure a harmonious final outcome.

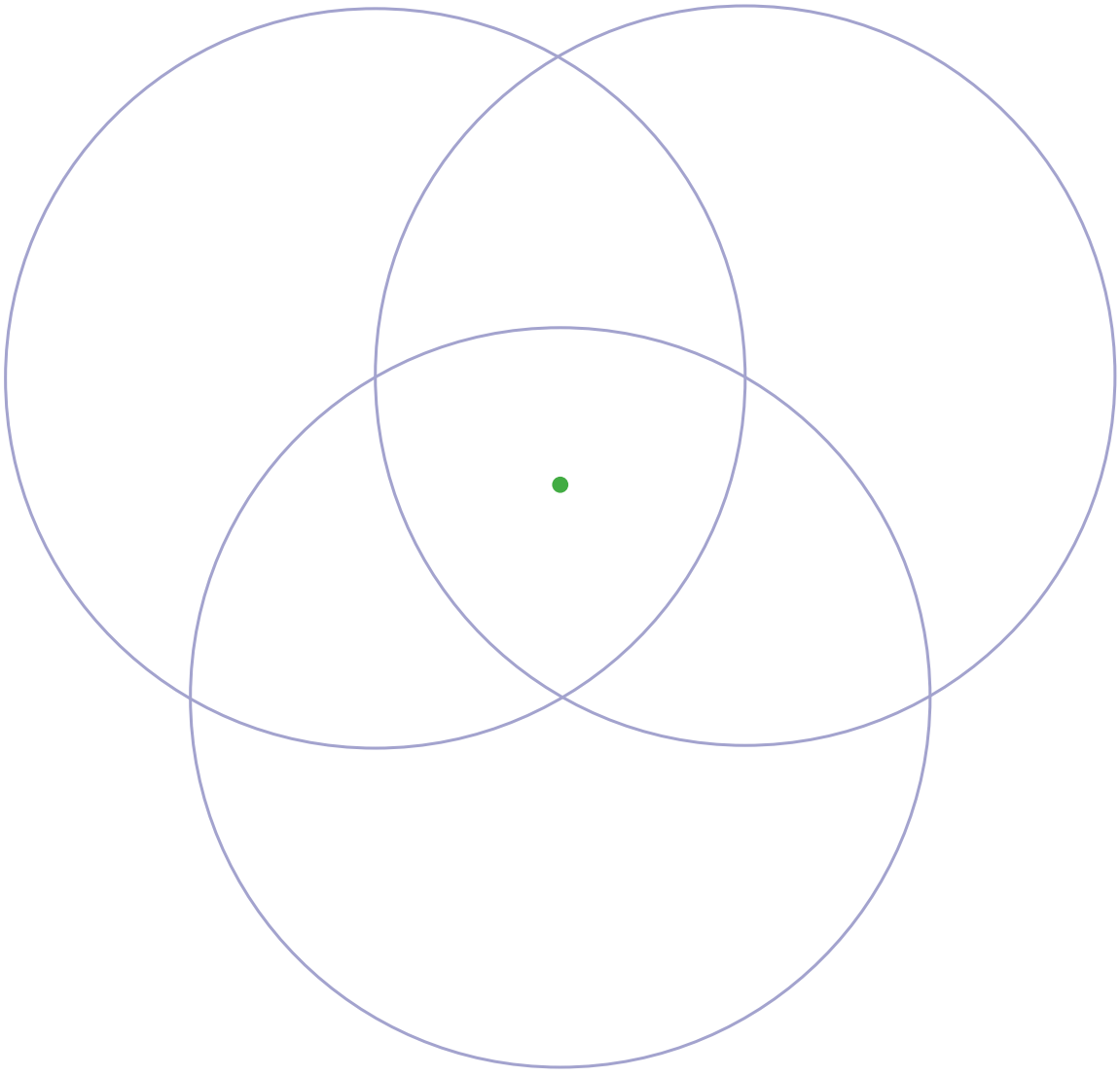
PHOTOCOPIABLE RESOURCE 1A

If using this template, start following the instructions from Step 2.



PHOTOCOPIABLE RESOURCE 1B

Template for drawing three-petalled flowers freehand.



GEOMETRY ACTIVITY 2

ENQUIRY OF LEARNING What can we learn about the geometry of flowers?

LEARNING QUESTION How can I draw a four-petalled flower?

This activity can be used to support learning about flowering plants in science, to introduce the principle of the Cycle or the principle of Diversity to students, or as a standalone project.

In this activity, students use a compass and a ruler to explore the geometry of four-petalled flowers, using the examples of rocket flower and cuckooflower as stimuli for learning. The activity can be simplified if time is short, or if working with younger students, by completing Steps 1-6 only. To complete the more detailed construction process, complete Steps 1-4 and then Steps 7-13.

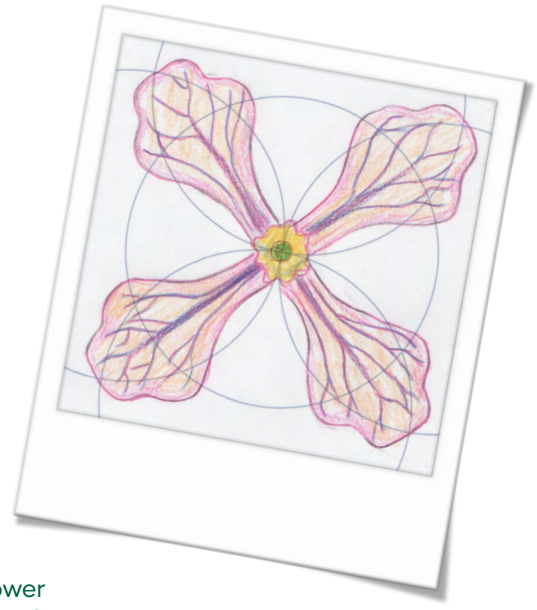
The activity can be further simplified for students requiring additional support by providing copies of Resource 2A and starting from Step 2. Alternatively, students can use the template on Resource 2B to draw a four-petalled flower without completing the compass work in Steps 1-4.

YOU WILL NEED

An HB pencil
Compass
Ruler
Template or A4 paper
A good quality eraser
Coloured pencils
Flower images
Optional: copies of Resource 2A or 2B

DID YOU KNOW?

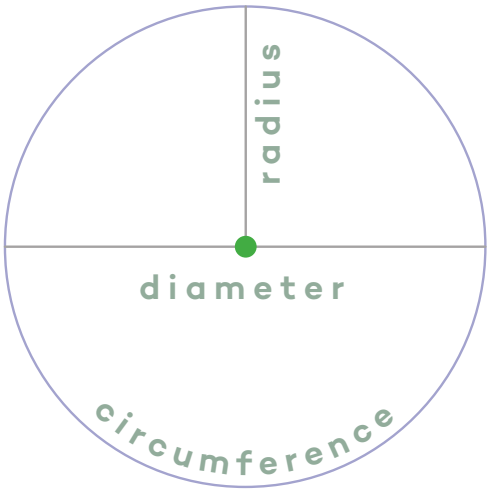
Cuckooflower, also known as the Lady's Smock, is a wildflower that belongs to the cabbage family. The plant gets its name from the fact that it typically blooms around the same time that cuckoos start to call in the spring. Cuckooflower is the larval food plant of the orange tip butterfly, which lays its eggs on the plant in the spring.



Top: Rocket flower
Bottom: Cuckoo flower

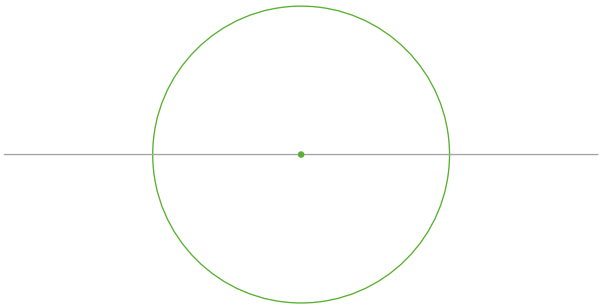
THE CIRCLE

This activity is great for familiarising students with the parts of a circle, as these are used to guide the geometric construction in this activity. Working with a compass relies on finding points of overlap or intersection to complete each step in the process.



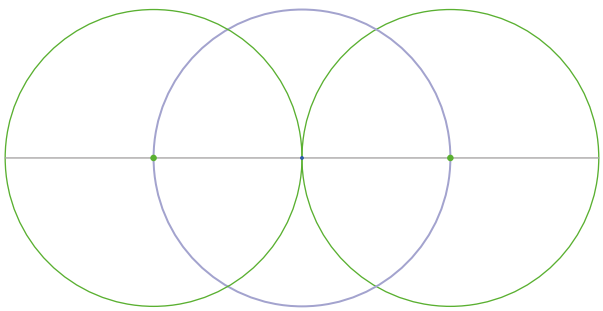
STEP 1 Draw the first circle

Draw a line across the centre of the page and mark the centre of that line. Place the point of your compass on the centre point of the line and draw a circle with a radius of 4cm. This leaves you with a circle of 8cm diameter in the centre of your page.



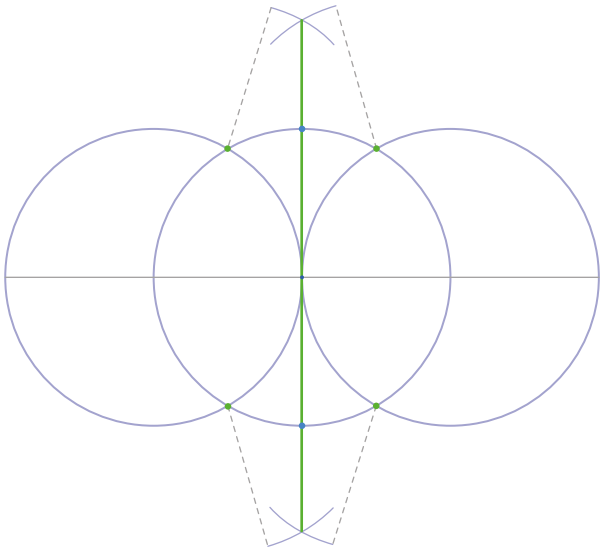
STEP 2 Draw two further circles

If using the template in Resource 2A, start at this step. Mark two points where the straight line cuts through the circumference of the first circle. These will be the points where you place the point of your compass to draw two overlapping circles. Throughout the construction process, the compass should remain set to a radius of 4cm.



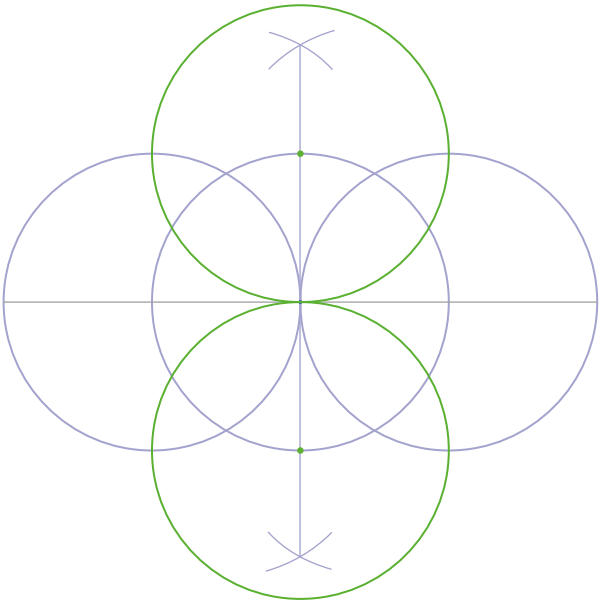
STEP 3 Draw a vertical line

Use a dot to mark the two points at which the central circle intersects the circles to either side of it at the top of your drawing. With the radius of the compass still set to 4cm, place your compass point on one dot and draw an arc roughly over the centre of the central circle. Do the same from the other dot. Repeat the process on the bottom half of the drawing. Use a ruler to draw a line connecting the points at which the arcs cross at the top and bottom of the drawing and passing through the centre point of the central circle.



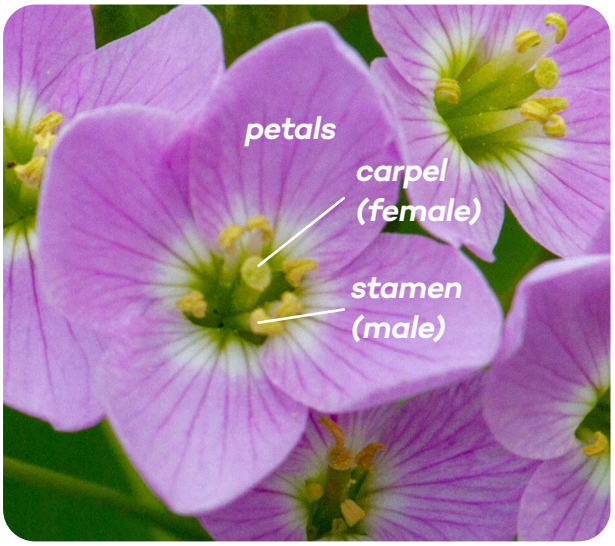
STEP 4 Draw two further circles

Use dots to mark the two places where the vertical line cuts through the central circle. With the compass still set to a radius of 4cm, place the point of the compass on each dot in turn and draw two further circles. You now have a completed pattern of five overlapping circles.



FLOWER PARTS

At this stage, pause and study the appearance of some four-petalled flowers, either in images or foraged. Are there different colours in the petals? What colours and shapes can you see in the different parts of the flowers?



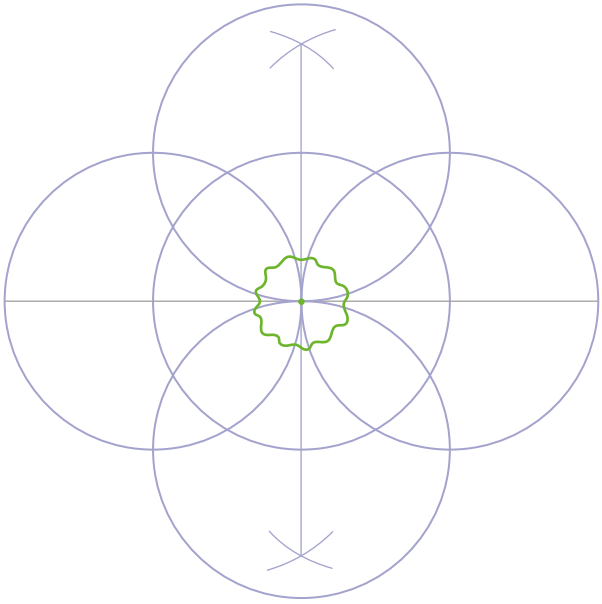
OPTIONAL STEP 5 Draw the centre of the flower

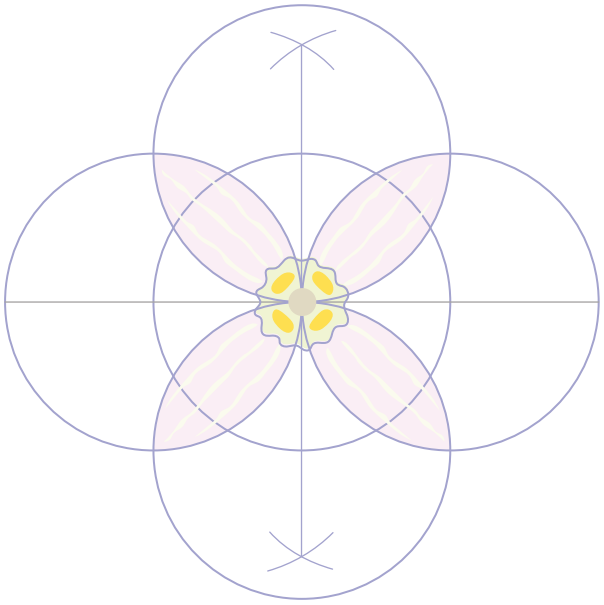
Notice the four 'petals' created by the five overlapping circles. These will form the petals of your flower. Where these four petals meet at the centre of the diagram, draw a circle with an irregular edge, about 2cm across. This is the area in which you will add the male and female parts of the flower.

OPTIONAL STEP 6 Add detail and colour the petals

Use a coloured pencil to add the details of the male and female parts of the flower to your drawing. Next, colour the outer petals using colours that you might find in the natural world. Look at flower images for inspiration. What sort of detailing do you notice in the petals?

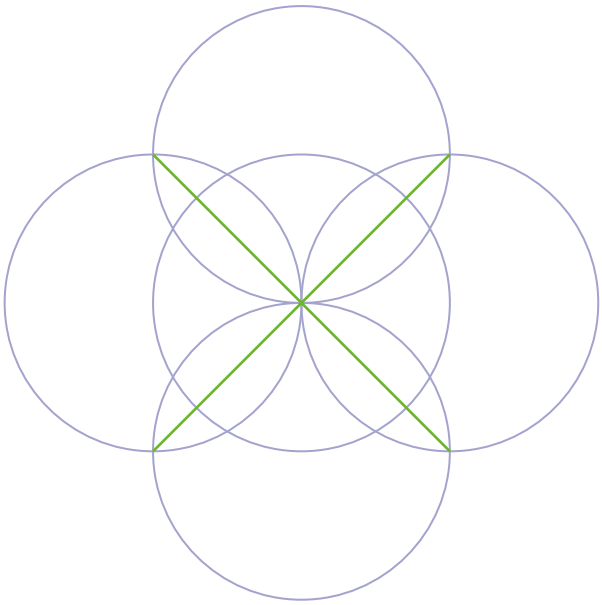
Alternatively, skip Steps 5 and 6 and complete Steps 7-13 to draw a more detailed four-petalled flower.





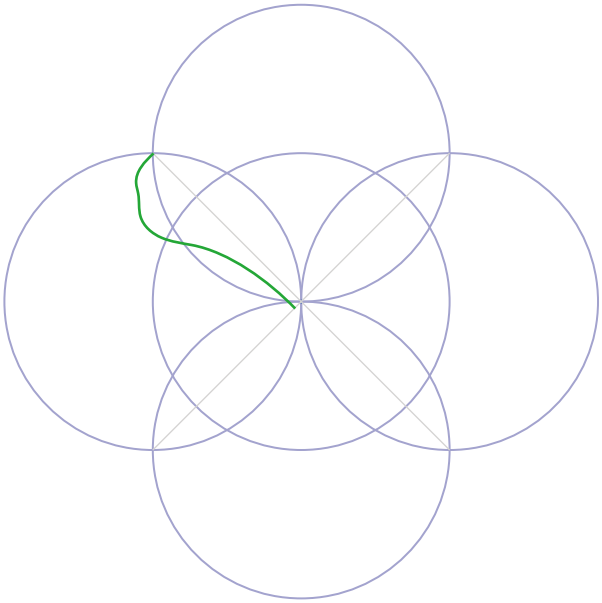
PETAL VARIATIONS

You can design four-petalled flowers with different petals using the template in Resource 2B. Start by finding the diagonal lines through the diagram. These will help you draw the outline of symmetrical petals.



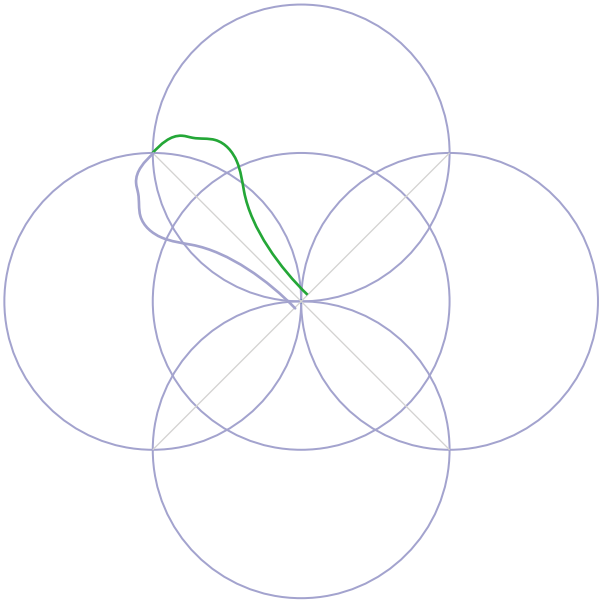
STEP 7 Draw one half of a petal

We are looking at the rocket flower for inspiration for this petal design. Rocket flower petals have a wider tip and become narrower towards the centre of the flower. Draw one half of a petal against the diagonal line, as shown below.



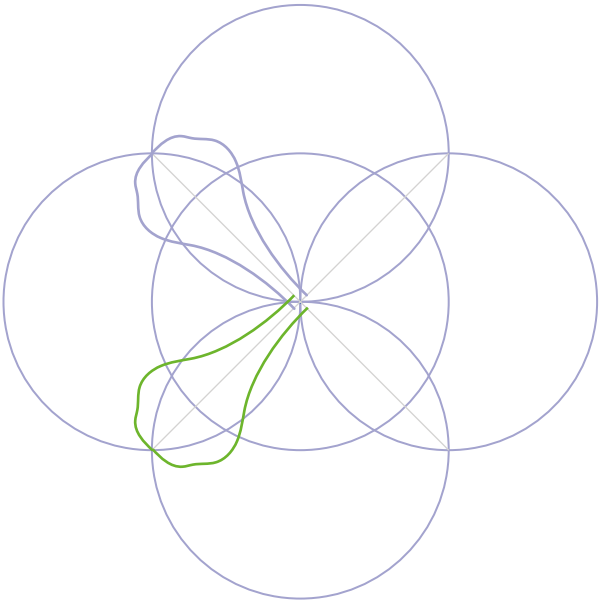
STEP 8 Complete the first petal

Either working by hand or using tracing paper, repeat the half petal on the other side of your diagonal line. If using tracing paper, you would go over the half outline and then flip the tracing over and line it up against the diagonal line again before going over it with a hard pencil.



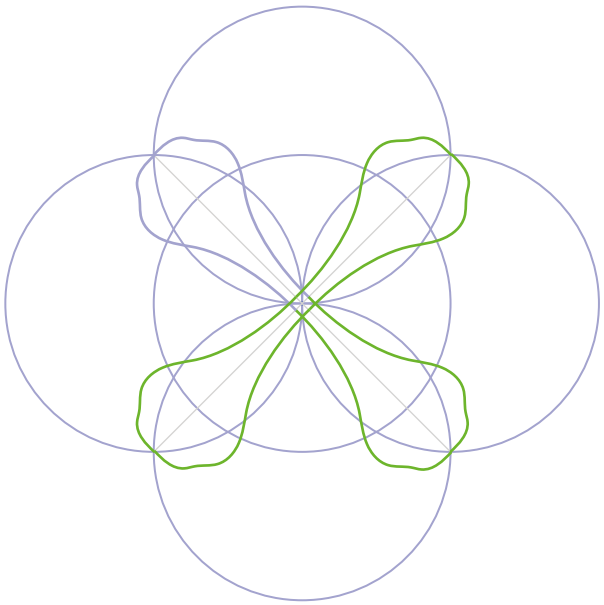
STEP 9 Trace the next petal

Now you can trace the whole petal and rotate it on the page to transfer to the next section of your four-fold diagram.



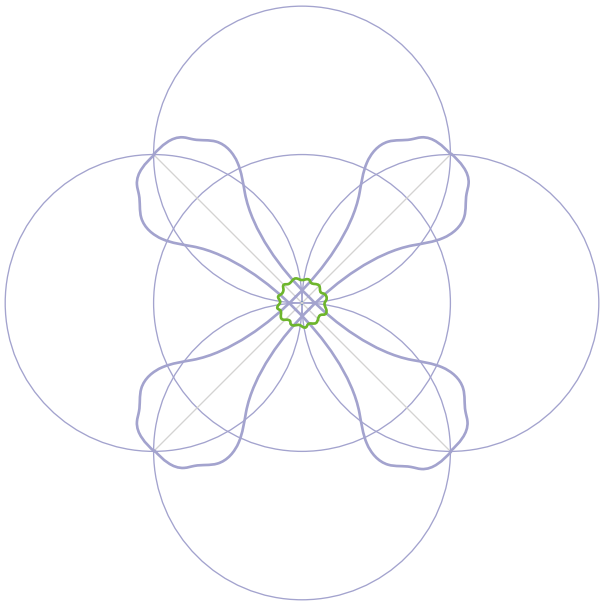
STEP 10 Trace the remaining petals

Trace the petal design twice more until you have drawn all four petals. At the centre, you will have some overlap of lines.



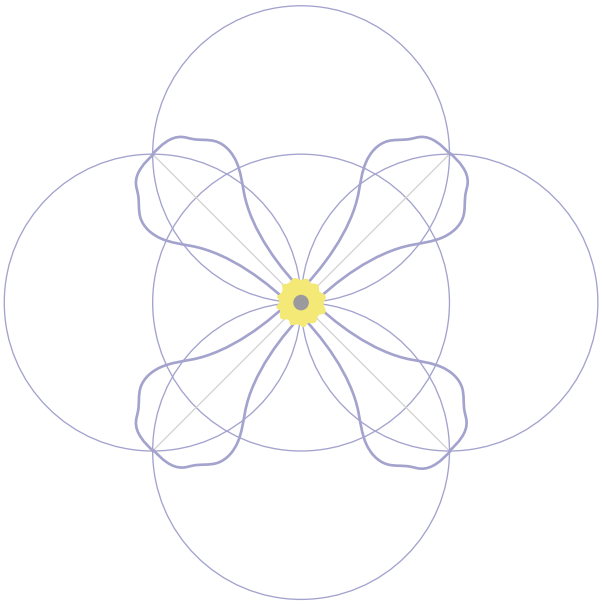
STEP 11 Draw the centre of the flower

Look back at the image of the rocket flower on page 11, then add the centre of the flower to your drawing. Its shape is a circle with wavy edges.



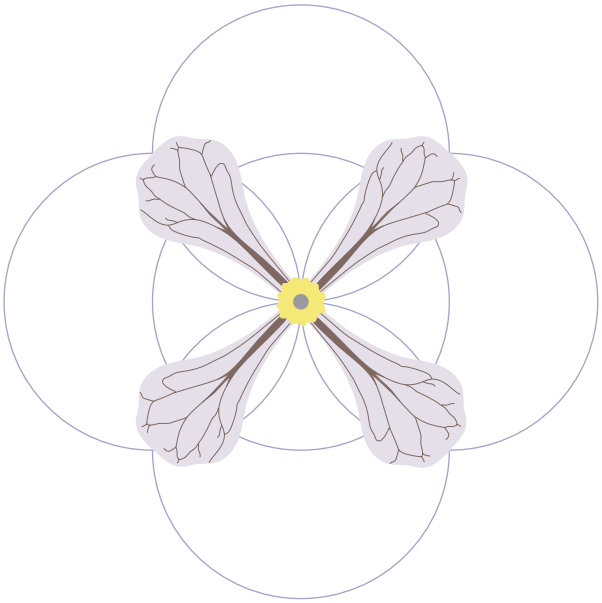
STEP 12 Colour the centre of the flower

The diagram is ready to be coloured in. Use a small eraser to remove overlapping lines from the centre and any other lines you don't want to be visible in the finished drawing. Colour the centre of the flower with pen or pencil.



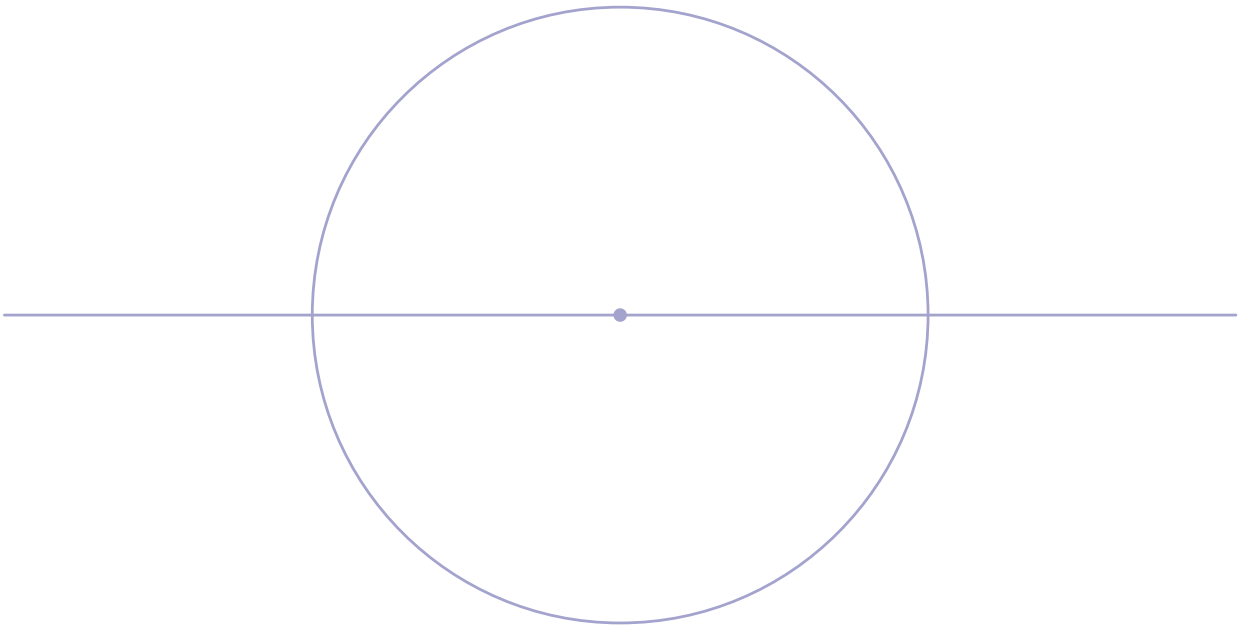
STEP 13 Colour the petals

Complete the drawing by colouring the four petals. Look back at the photo of the rocket flower to help you. You can add subtle details to the petals such as the thin branching lines of veins.



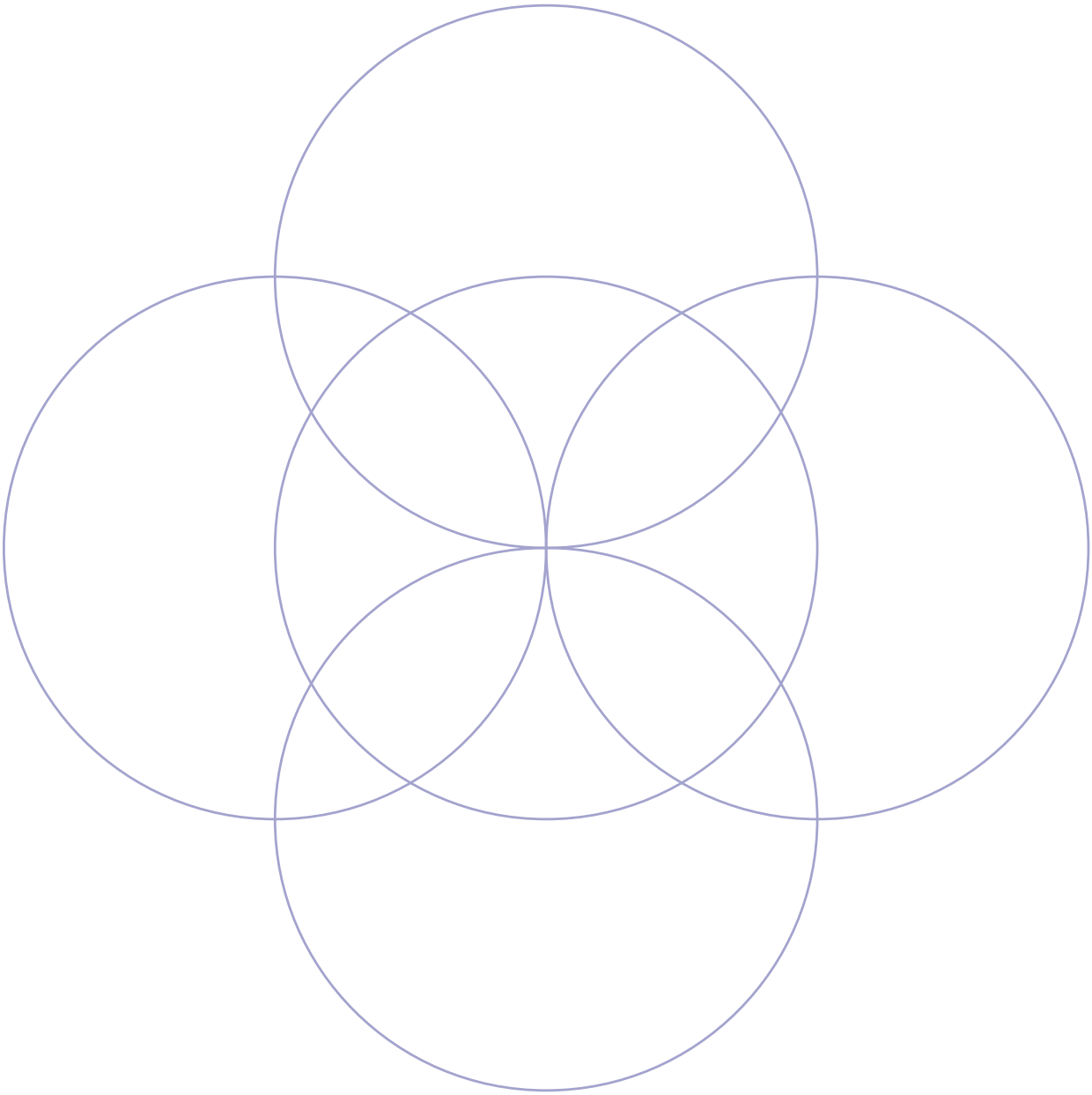
PHOTOCOPIABLE RESOURCE 2A

If using this template, start from Step 2.



PHOTOCOPIABLE RESOURCE 2B

Template for drawing four-petalled flower variations freehand (Steps 7-13).



GEOMETRY ACTIVITY 3

ENQUIRY OF LEARNING What can we learn about the geometry of flowers?

LEARNING QUESTION How can I draw a five-petalled flower?

This activity can be used to support learning about flowering plants in science, to introduce the principle of the Cycle or the principle of Diversity to students, or as a standalone project. In this activity, students use a compass and ruler to explore the geometry of five-petalled flowers, using the examples of herb robert and forget-me-not as stimuli for learning. The activity can be simplified for students requiring additional support, or if time is short, by providing them with copies of Resource 3B then following the instructions in Step 9.

YOU WILL NEED

An HB pencil
Compass
Ruler
Copies of Resource 3A
A good quality eraser
Coloured pencils
Flower images
Optional: copies of Resource 3B

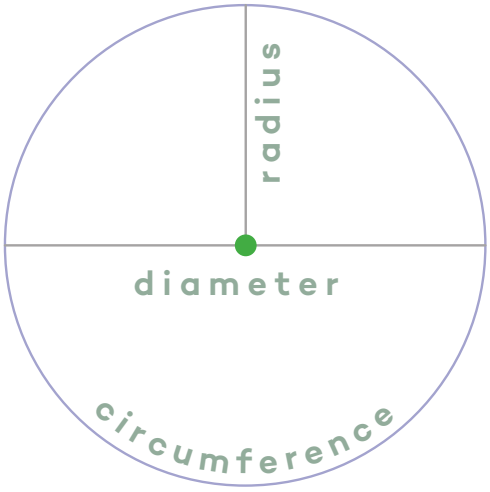
Left: herb robert
Right: forget-me-not

DID YOU KNOW?

Herb robert is a plant that grows in the UK and elsewhere around the world. It has pretty pink flowers with five petals and a strong smell if crushed. Some people believe that it can help you feel better if you are unwell. It's been used for hundreds of years to help with stomach aches, coughs, and skin problems.

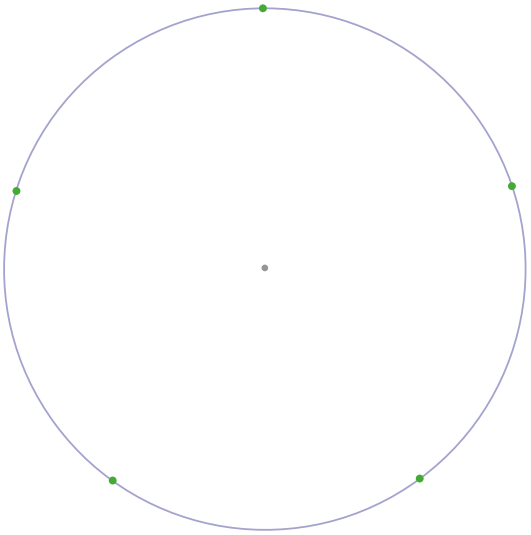
THE CIRCLE

This activity is great for familiarising students with the parts of a circle, as these are used to guide the geometric construction in this activity. Working with a compass relies on finding points of overlap or intersection to complete each step in the process.



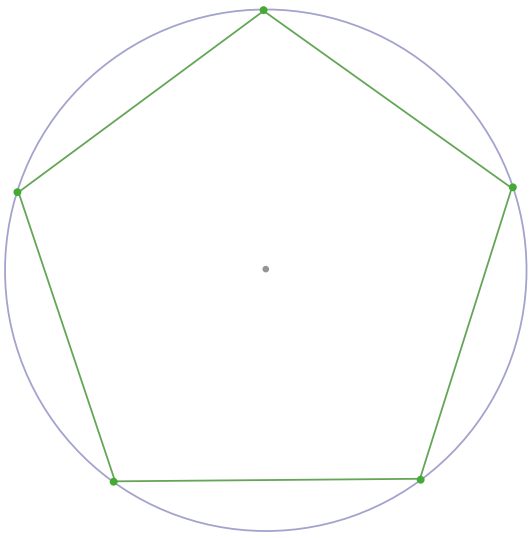
STEP 1 Get to know the template

All students will need a copy of the template in Resource 3A to complete this activity. Around the edge of the circle on this template are five, equally spaced dots. These provide the five points needed to construct a pentagon. The centre point is also marked.



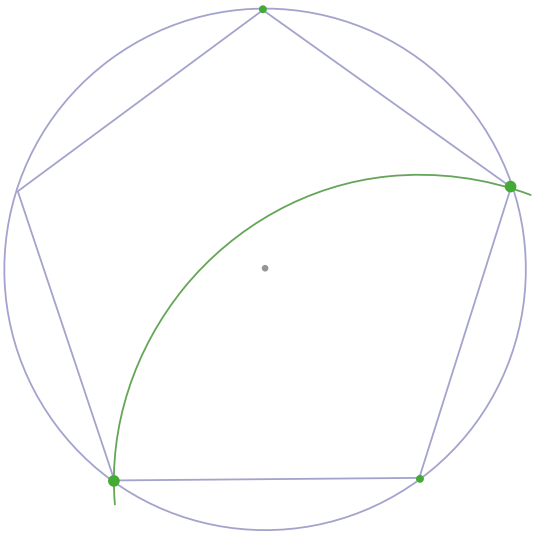
STEP 2 Draw a pentagon

Using a ruler, draw five lines from point to point around the circle to create a pentagon. The flower you draw will be constructed inside this pentagon.



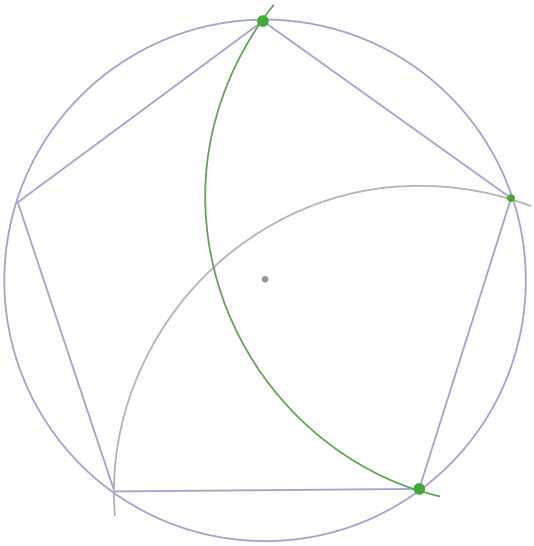
STEP 3 Draw the first arc

Place the point of your compass on the bottom right vertex of the pentagon. Expand the arms of the compass so that the distance between them is equal to the side length of the pentagon. Sweep the compass from one vertex to another, creating an arc between the two, as shown below.



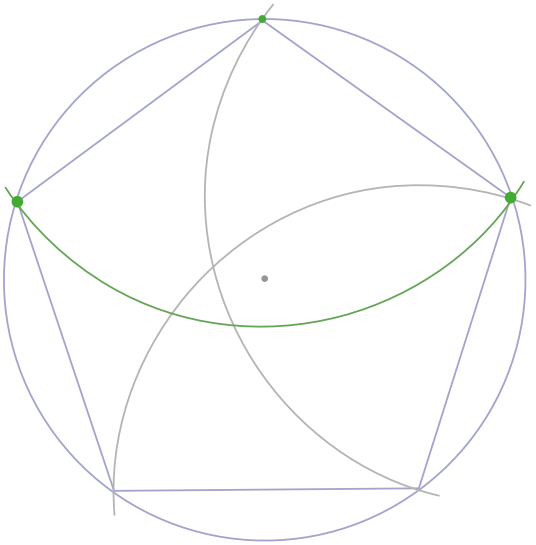
STEP 4 Draw the second arc

Keeping your compass at the same radius, work anti-clockwise, placing the point on the next vertex and repeating the process in Step 3.



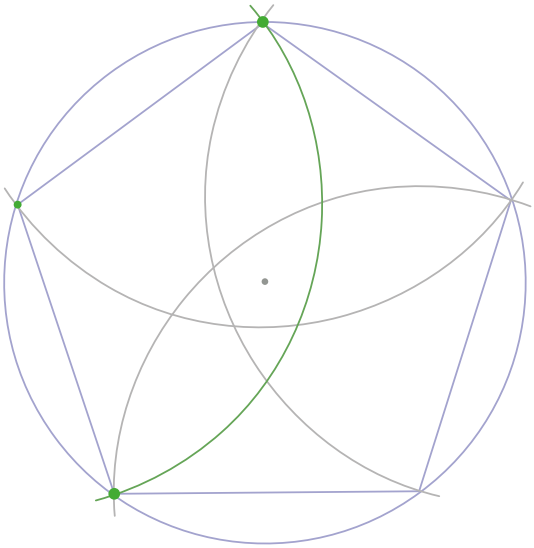
STEP 5 Draw the third arc

Double-check the radius of the compass against one of the side lengths of the pentagon. Working anti-clockwise again, place the point of the compass on the next vertex and draw a third arc.



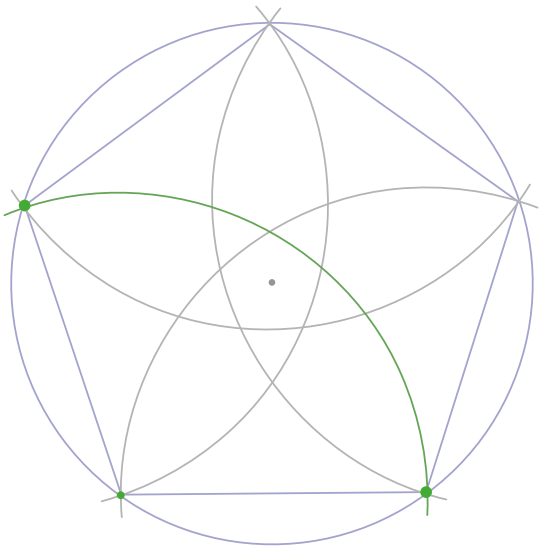
STEP 6 Draw the fourth arc

Repeat this process to draw a fourth arc. You should now be able to notice a flower shape emerging with two layers of petals. This shape is five-fold, and similar to the shape at the centre of the 'Dance of Venus' orbit pattern.



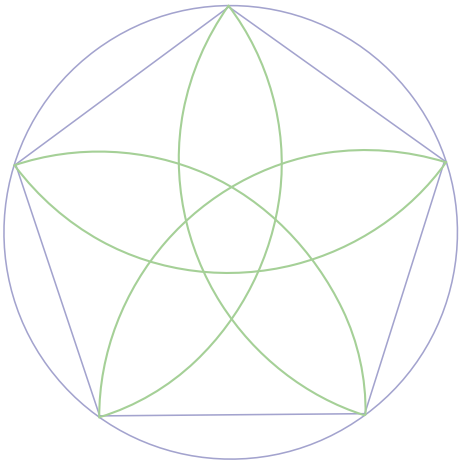
STEP 7 Draw the fifth arc

Repeat this process to draw the fifth and final arc.



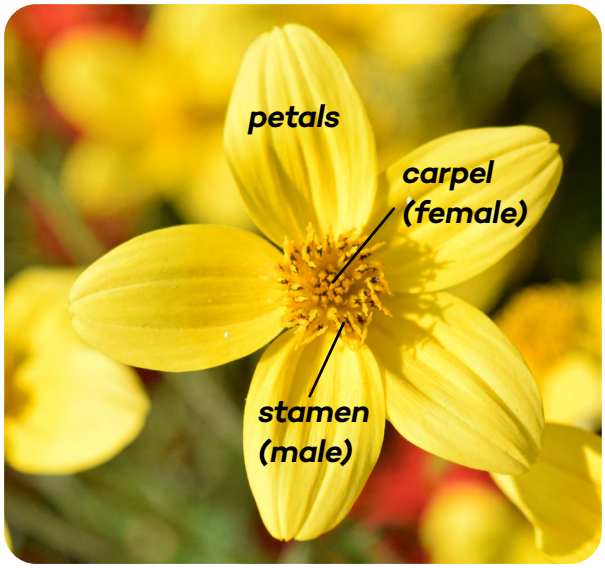
STEP 8 Erase unnecessary lines

Tidy the construction lines with an eraser. Remove any parts of the diagram that extend beyond the circle.



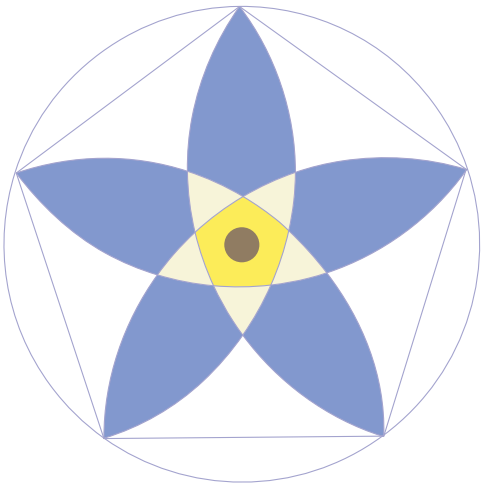
FLOWER PARTS

At this stage, pause and study the appearance of some five-petalled flowers, either in images or foraged. Are there different colours in the petals? What colours and shapes can you see in the different parts of the flowers?



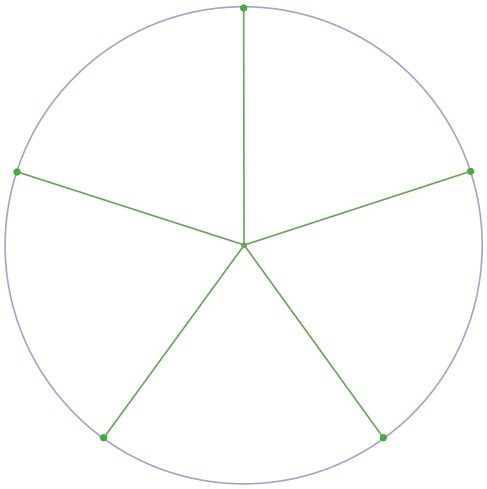
STEP 9 Colour the flower

Colour the petals of the flower and add detail to show the parts found in the centre of the flower. If you're recreating a forget-me-not in your drawing, you can use complementary colours, which will make the drawing really stand out.



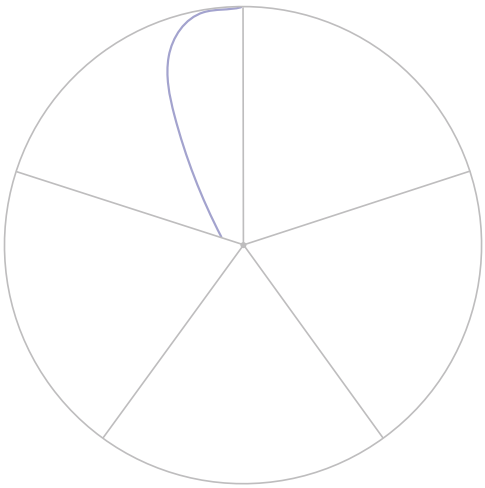
PETAL VARIATIONS

An alternative way to use the template in Resource 3A is to draw five lines connecting each of the points around the edge of the circle to the centre point. You can use this simple template to draw different five-petalled flowers with symmetrical petals by following the remaining steps in this activity.



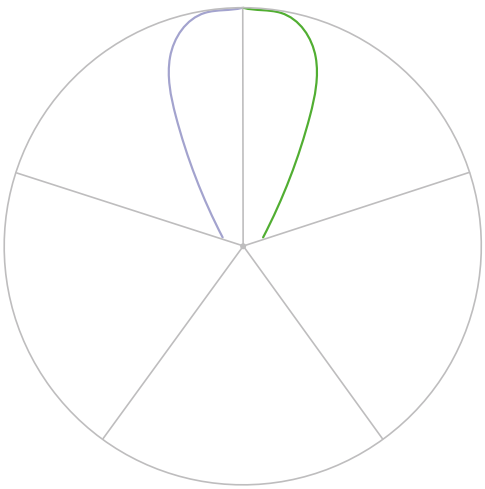
STEP 10 Draw half a petal

Steps 10-13 focus on the flower herb robert. Its petals have a wider tip then narrow towards the centre of the flower. Draw one half of the first petal against the vertical line, as shown below.



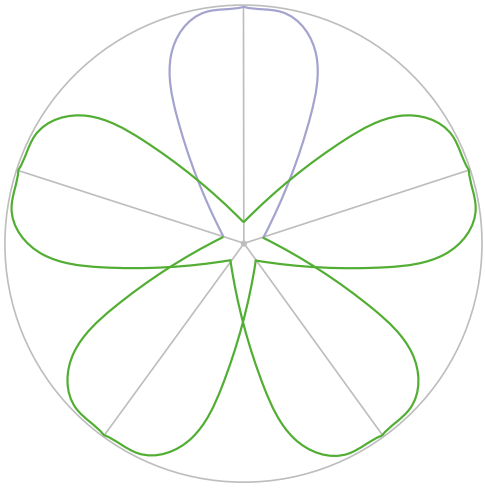
STEP 11 Complete the first petal

Either working by hand or using tracing paper, repeat the half petal on the other side of the vertical line. If using tracing paper, go over the half petal outline then flip the tracing paper over. Line it up along the vertical line again before going over it with a hard pencil.



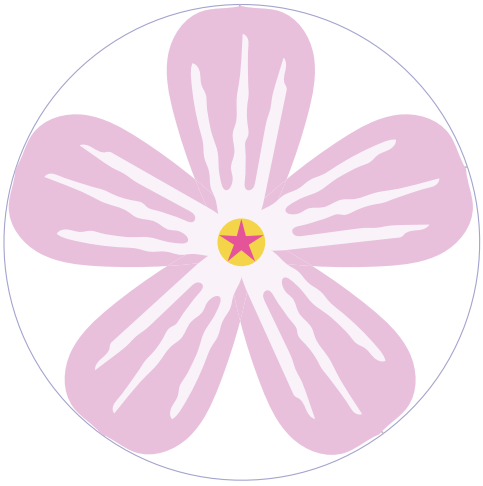
STEP 12 Trace the remaining petals

Trace the whole petal and rotate it on the page to transfer it to all the other branches of your five-fold template. You will have some overlap of lines at the centre of the flower that gives you a separate area to work with in the next step.

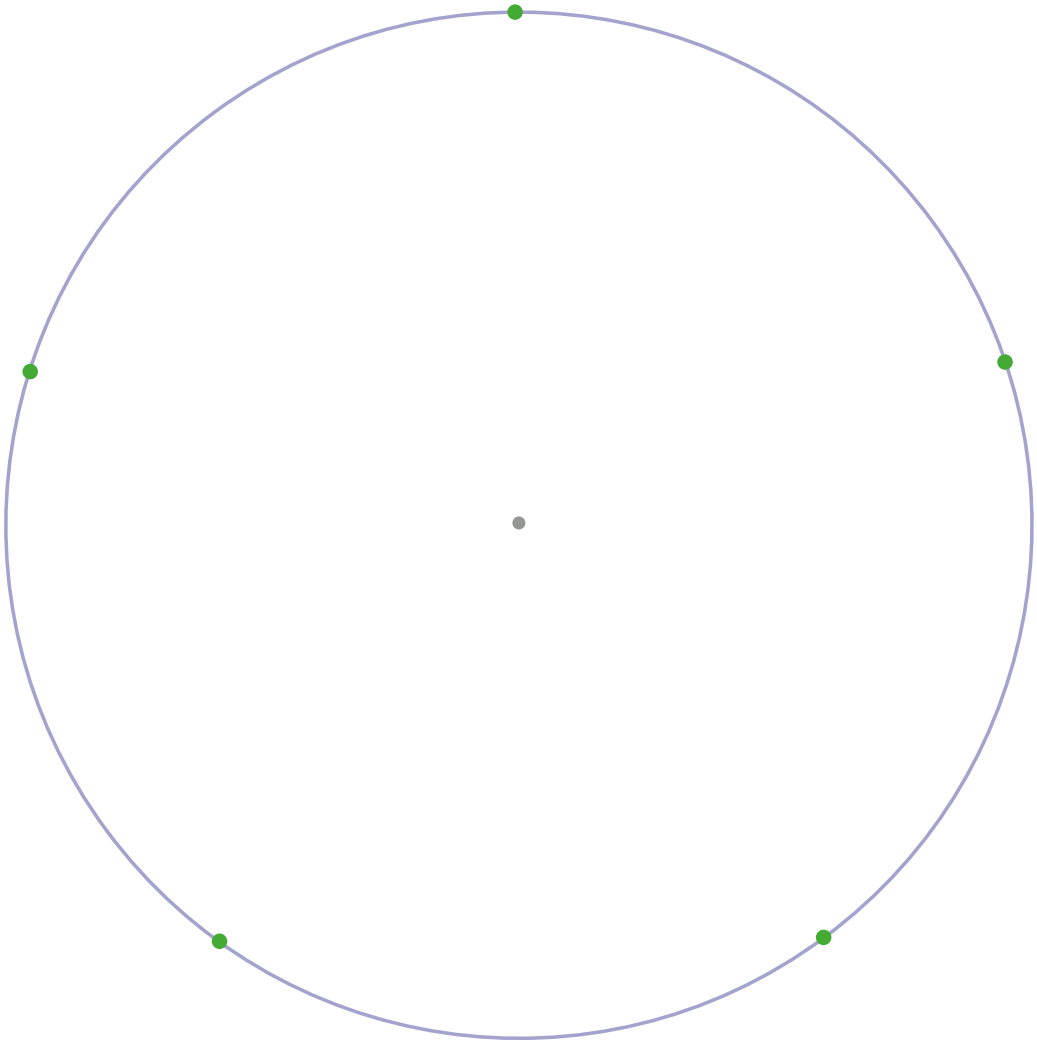


STEP 13 Colour the petals

Colour the centre of the flower using a darker shade of pink and add yellow to show the pollen. Complete the drawing by colouring the five petals. You can add subtle details to the petals to recreate them accurately.

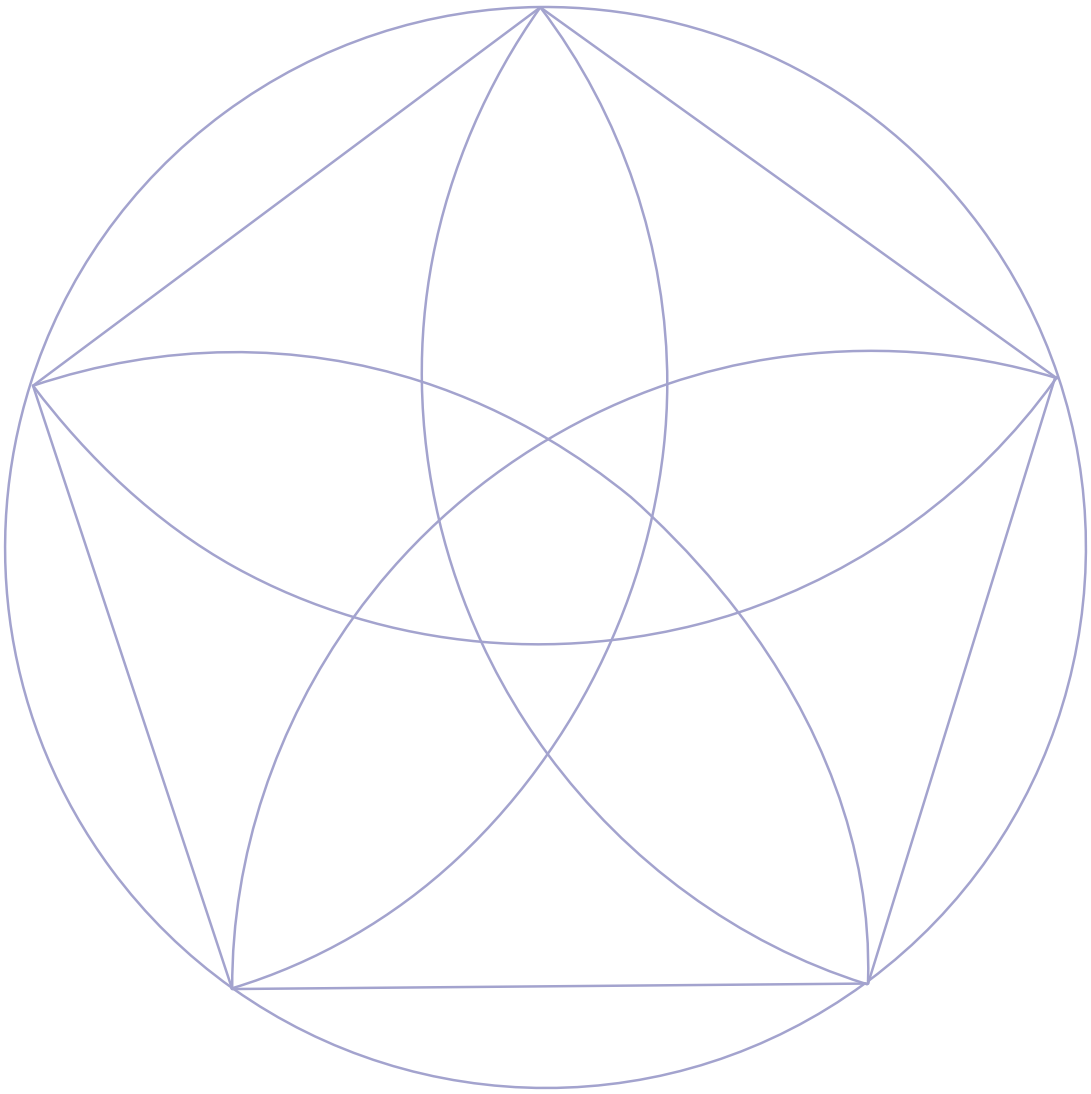


PHOTOCOPIABLE RESOURCE 3A



PHOTOCOPIABLE RESOURCE 3B

Use this template as a shortcut to Step 9 so students don't have to complete the geometric construction involved in Steps 1-8.



GEOMETRY ACTIVITY 4

ENQUIRY OF LEARNING What can we learn about the geometry of flowers?

LEARNING QUESTION How can I draw a six-petalled flower? (1)

The two activities that make up Activity 4 can be used to support learning about flowering plants in science, to introduce the principle of the Cycle or the principle of Diversity to students, or as a standalone project.

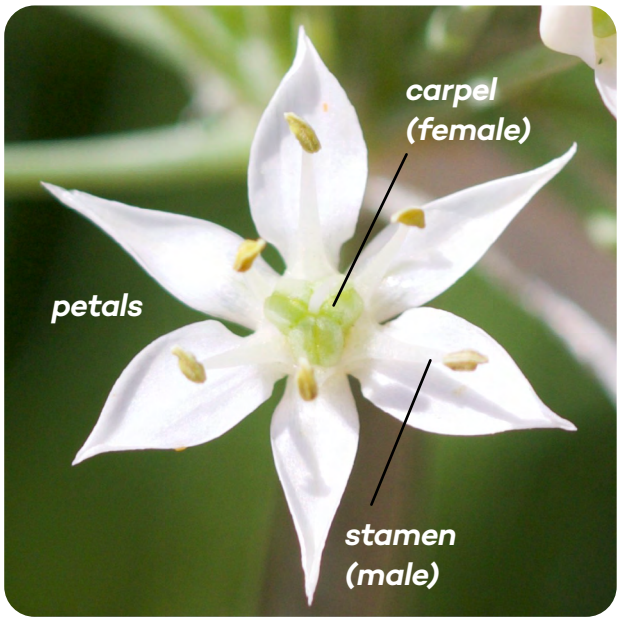
In Activity 4A, students use a compass and a ruler to explore the geometry of six-petalled flowers, creating a template they can use to develop more detailed drawings. In Activity 4B, they use the template they have created in Activity 4A, or the one provided in Resource 4B, to recreate the geometry of a daffodil flower.

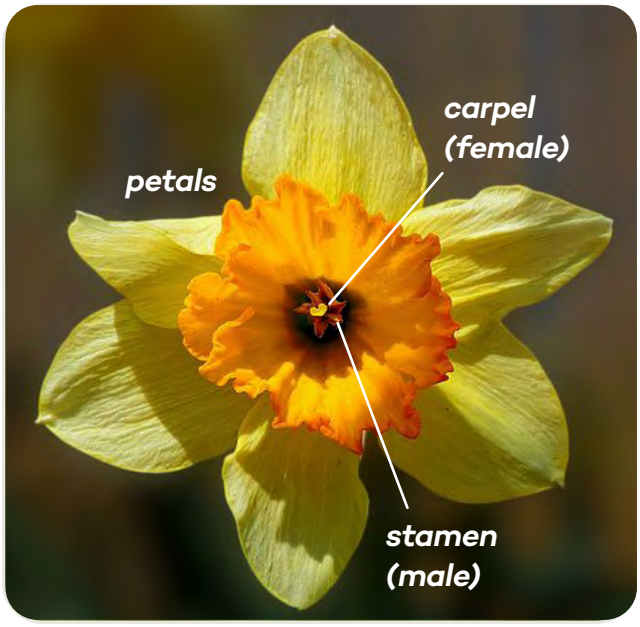
The activity can be simplified if time is short, or for students requiring additional support, by providing copies of Resource 4A and starting from Step 2. Alternatively, students can use the template on Resource 4B to draw a six-petalled flower, such as a wild garlic flower, without completing the compass work in Steps 1-4.

YOU WILL NEED

An HB pencil
Compass
Ruler
Template or A4 paper
A good quality eraser
Coloured pencils
Flower images
Optional: Copies of Resources 4A and 4B

Left: wild garlic flower
Right: daffodil





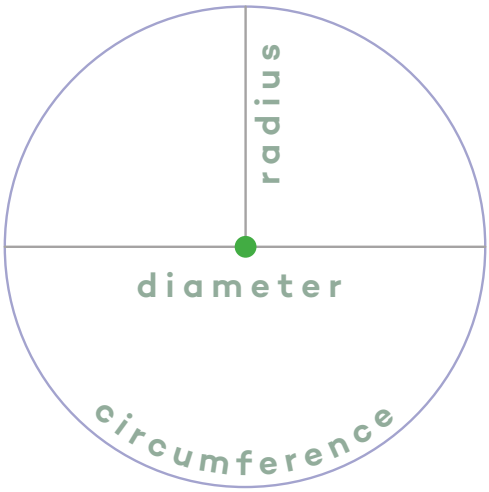
DID YOU KNOW?

Daffodils are bright, cheerful flowers that usually bloom in the spring. They come in different colours like yellow, white, and even orange. Daffodils grow from bulbs planted in the ground and can live for many years. There are more than 13,000 varieties of daffodils, with different shapes and sizes. Daffodils are a sign of new beginnings and are often associated with Easter.

ACTIVITY 4A

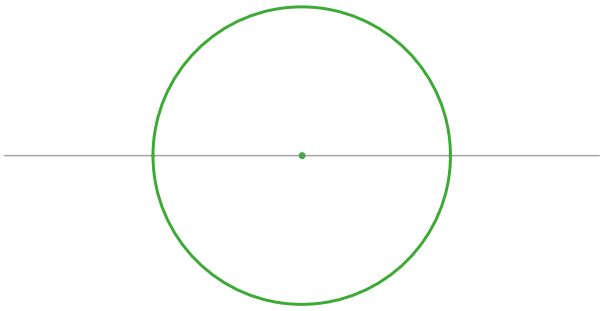
THE CIRCLE

This activity is great for familiarising students with the parts of a circle, as these are used to guide the geometric construction in this activity. Working with a compass relies on finding points of overlap or intersection to complete each step in the process.



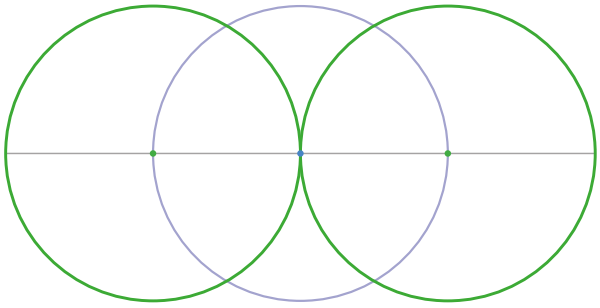
STEP 1 Draw the first circle

Draw a line across the centre of the page and mark the centre of that line. Place the point of your compass on the centre point of the line and draw a circle with a radius of 4cm. This leaves you with a circle of 8cm diameter in the centre of your page.



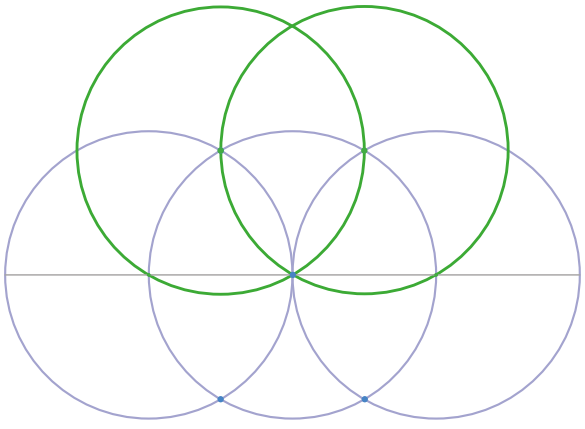
STEP 2 Draw two further circles

If using the template in Resource 4A, start at this step. Mark two points where the straight line cuts through the circumference of the first circle. These will be the points where you place the point of your compass to draw two overlapping circles. Throughout the construction process, the compass should remain set to a radius of 4cm.



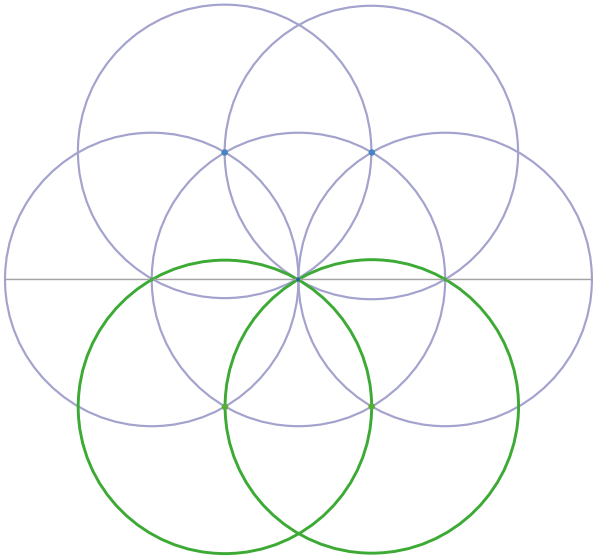
STEP 3 Draw two circles at the top of the drawing

Use a dot to mark the two points at which the central circle intersects the circles to either side of it at the top of your drawing. With the radius of the compass still set to 4cm, place your compass point on one of these dots and draw a fourth circle. The place the compass point at the second dot and draw a fifth circle.



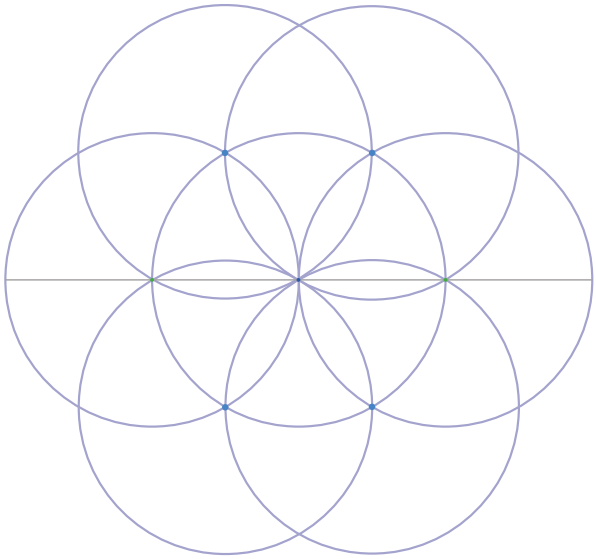
STEP 4 Draw two circles at the bottom of the drawing

Use a dot to mark the two points at which the central circle intersects the circles to either side of it at the bottom of your drawing. With the radius of the compass still set to 4cm, place your compass point on one of these dots and draw a sixth circle. Then place the compass point on the other dot and draw a seventh circle.



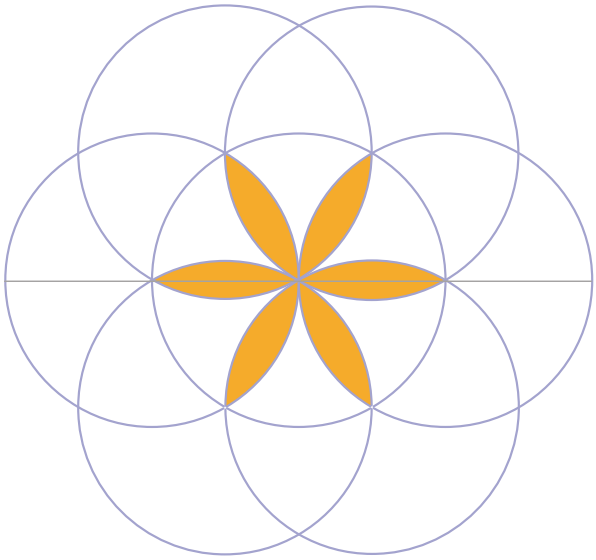
STEP 5 Locate the petal shapes

You now have a completed pattern of seven overlapping circles. Notice that where they overlap you can see shapes like petals.



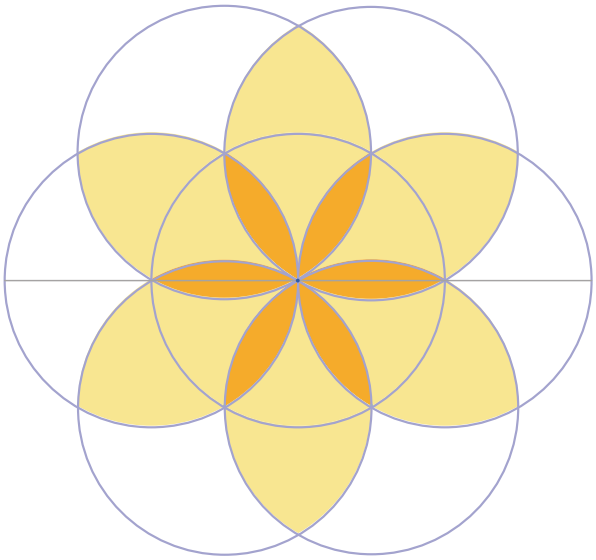
STEP 6 Colour the inner petals

Focusing on the central circle, locate the six thin petals that sit inside it. These petals make up the first type of flower we can pick out from the diagram.



STEP 7 Colour the outer petals

There is also a set of six wider petals arranged around the central circle. Shade these petals in to reveal the next layer of petals in the drawing.



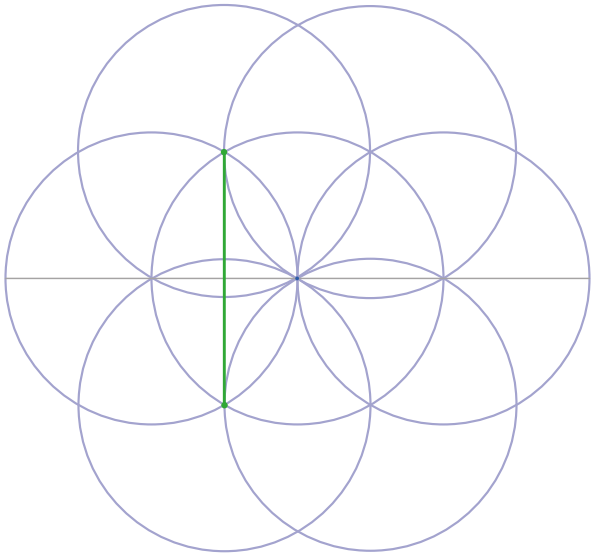
ACTIVITY 4B

DAFFODILS

This activity focuses on the six-fold geometry of daffodils. You can either use template 4B as your starting point, or complete Steps 1-4 in Activity 4A using a ruler and a compass.

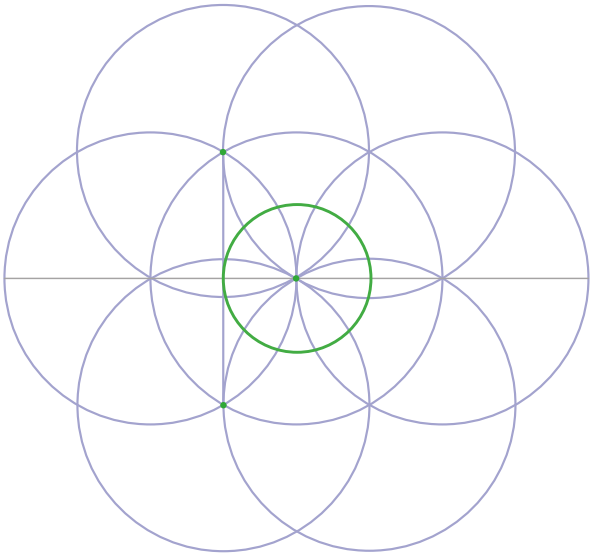
STEP 1 Draw a vertical line

Trumpet proportions in daffodils vary between different species, and from flower to flower. The next steps show one type of common proportion. Begin by drawing a vertical line between two adjacent inner petal tips, as shown below.



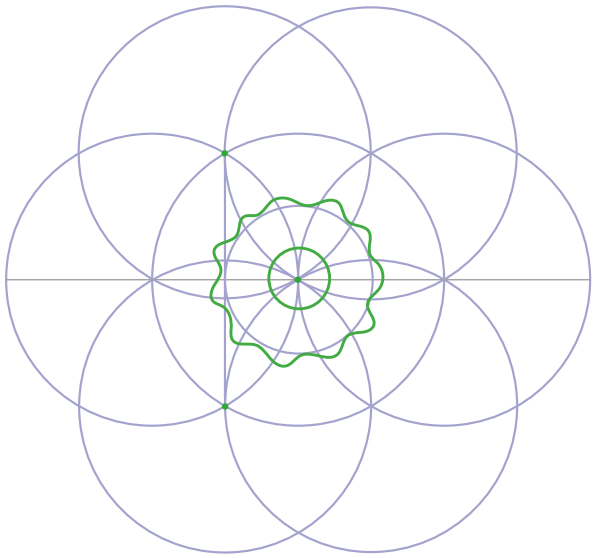
STEP 2 Draw the trumpet circle

With the point of your compass on the centre point of the central circle, draw a smaller circle that just touches the line you drew in Step 1.



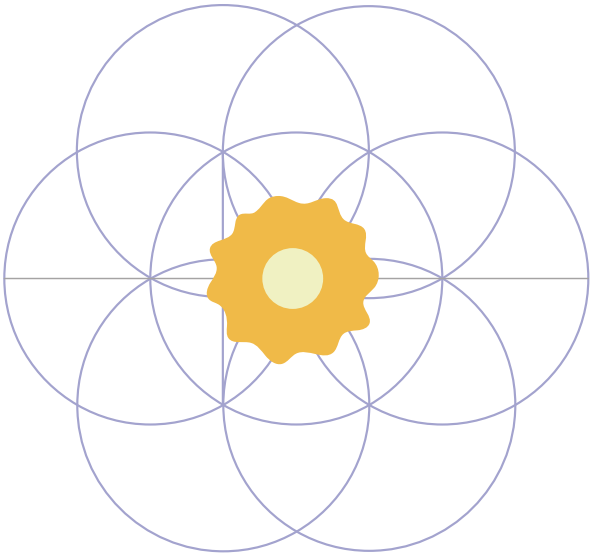
STEP 3 Outline the trumpet

Draw a wobbly line around the circle to represent the edge of the daffodil trumpet. Draw a smaller circle inside to show the very centre of the trumpet where the male and female parts of the flower are located.



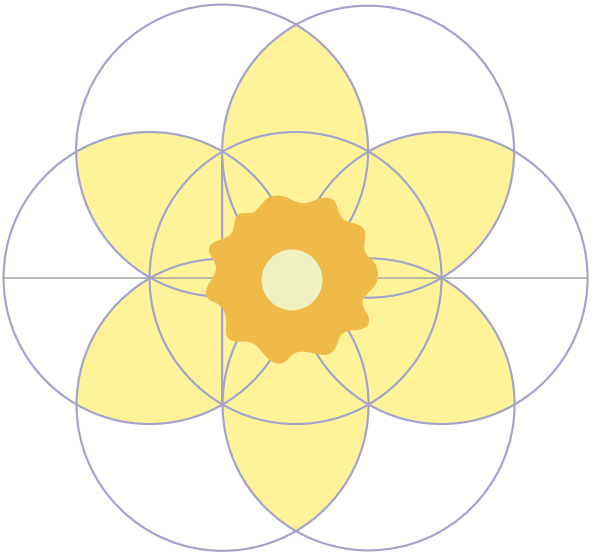
STEP 4 Shade the trumpet

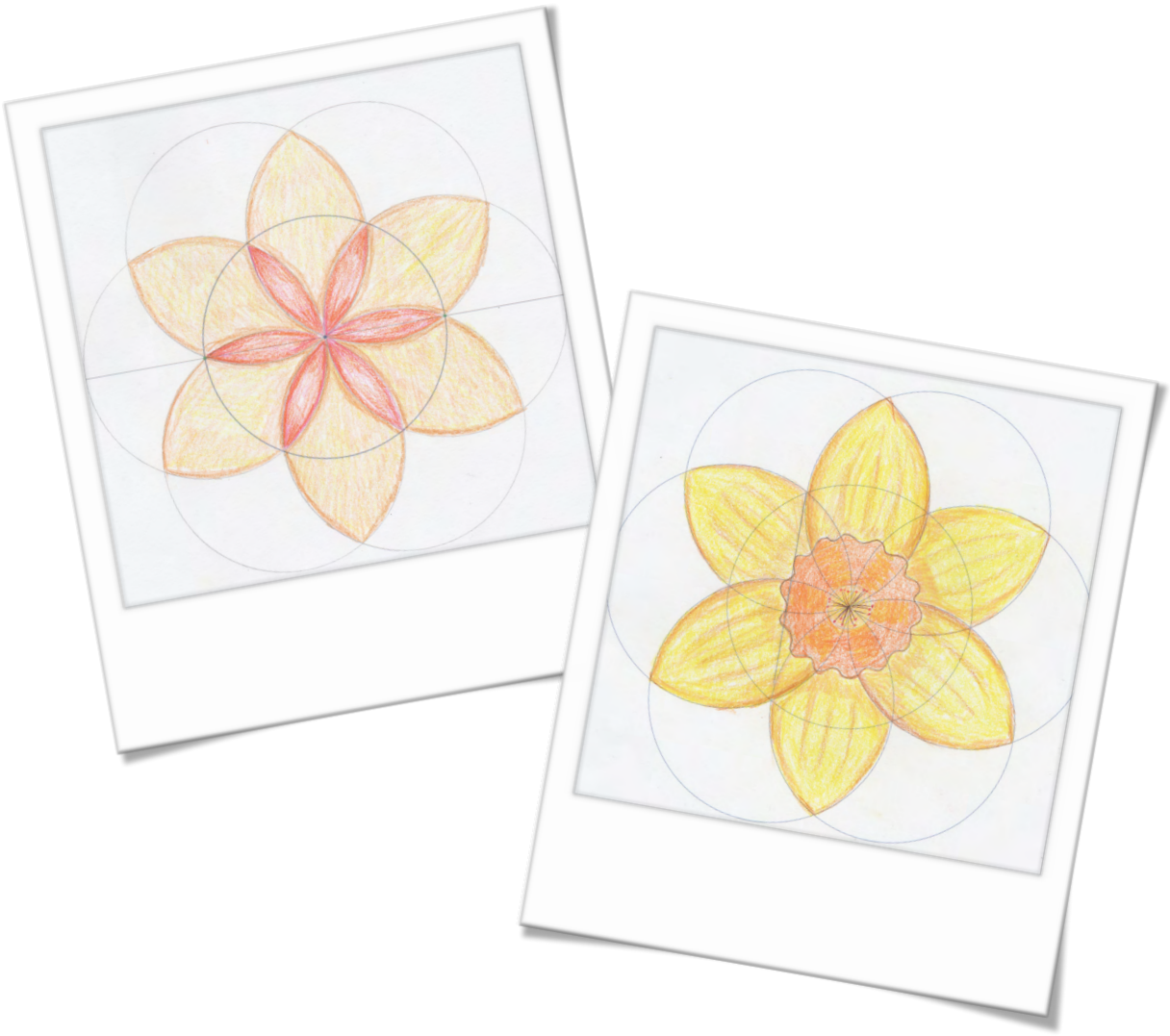
The trumpet is a bright orange colour. The central circle can be shaded a lighter yellow. You can add delicate details later for the male and female parts of the flower.



STEP 5 Shade the petals

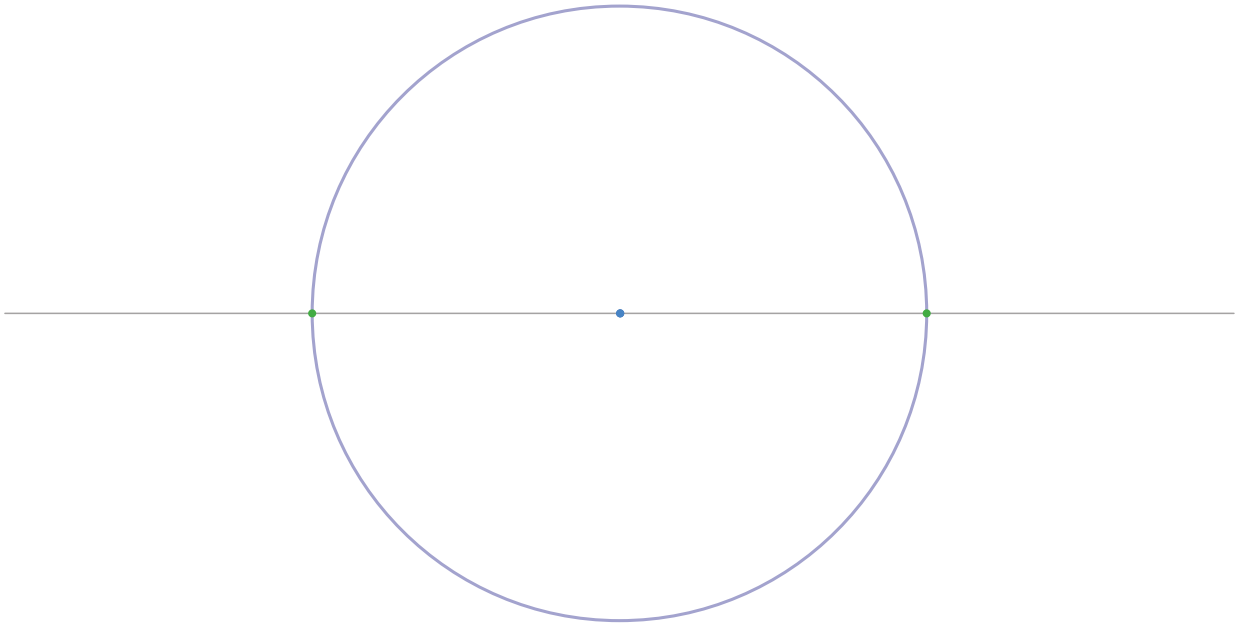
Complete the drawing by colouring in the six petals with a lighter shade of yellow.





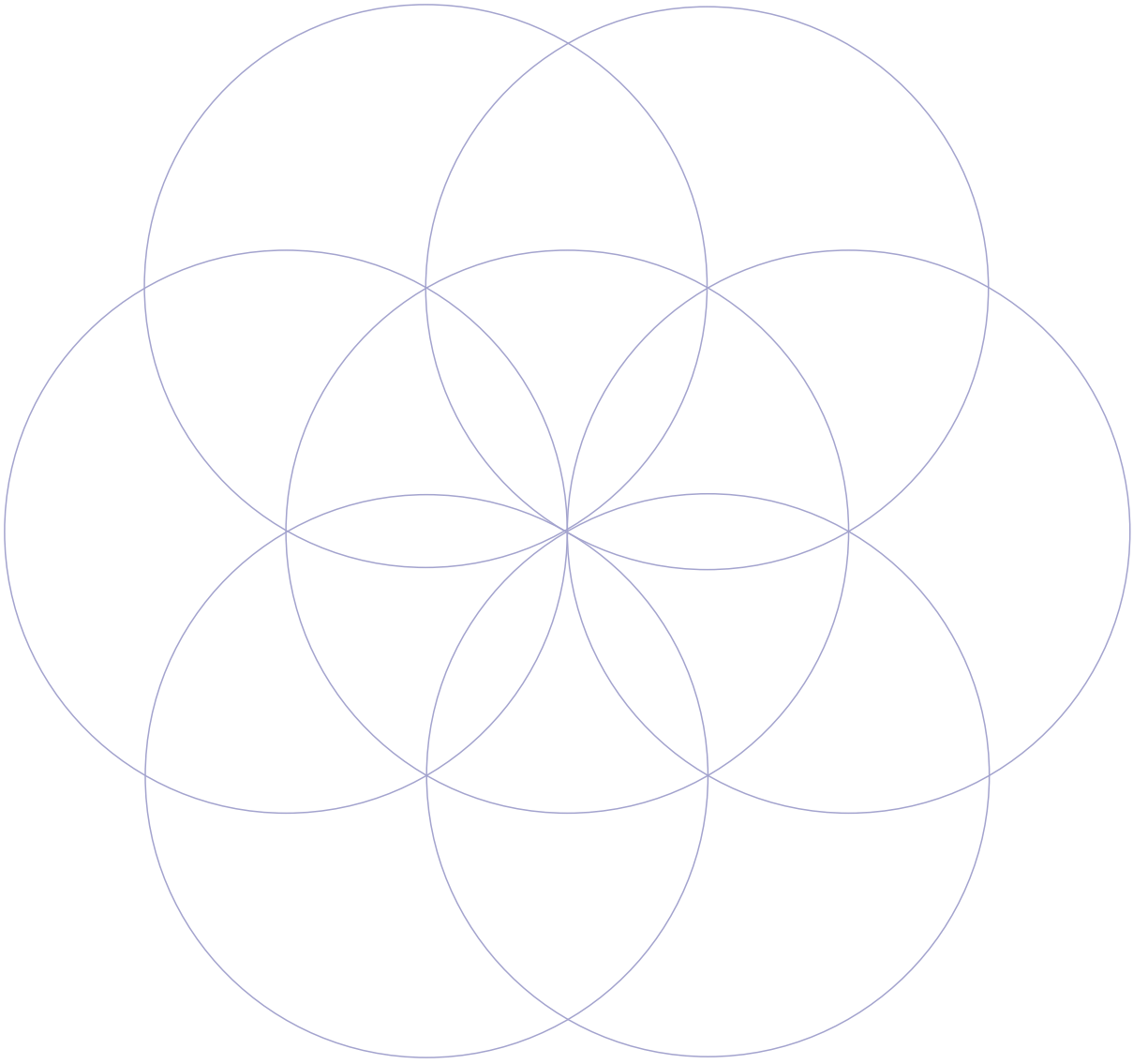
PHOTOCOPIABLE RESOURCE 4A

If using this template, start from Step 2.



PHOTOCOPIABLE RESOURCE 4B

Use this template to draw six-petalled flowers freehand. For example, you could use this to recreate the geometry of wild garlic flowers.



GEOMETRY ACTIVITY 5

ENQUIRY OF LEARNING What can we learn about the geometry of flowers?

LEARNING QUESTION How can I draw a six-petalled flower? (2)

This activity can be used to support learning about flowering plants in science, to introduce the principle of the Cycle or the principle of Diversity to students, or as a standalone project.

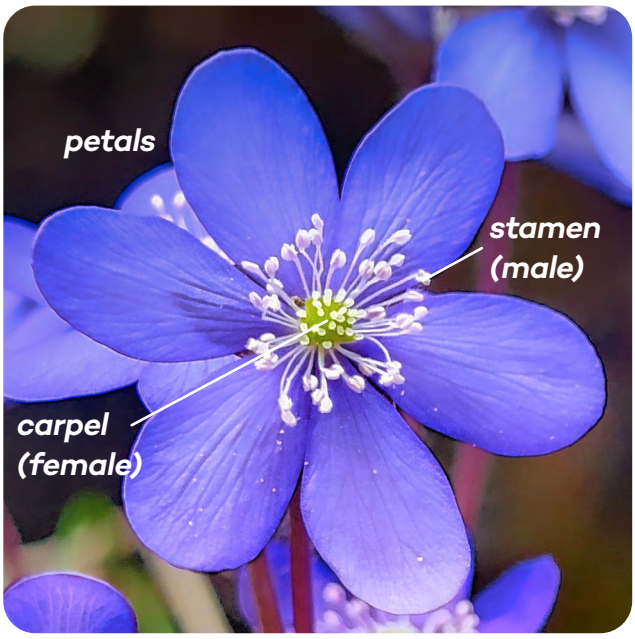
In this activity, students use a compass and a ruler to explore the geometry of six-petalled flowers, using the example of liverleaf as a stimulus for learning.

The activity can be simplified if time is short, or for students requiring additional support, by providing copies of Resource 5A and starting from Step 2. Alternatively, students can use the template on Resource 5B to draw a six-petalled flower, starting from Step 4.

YOU WILL NEED

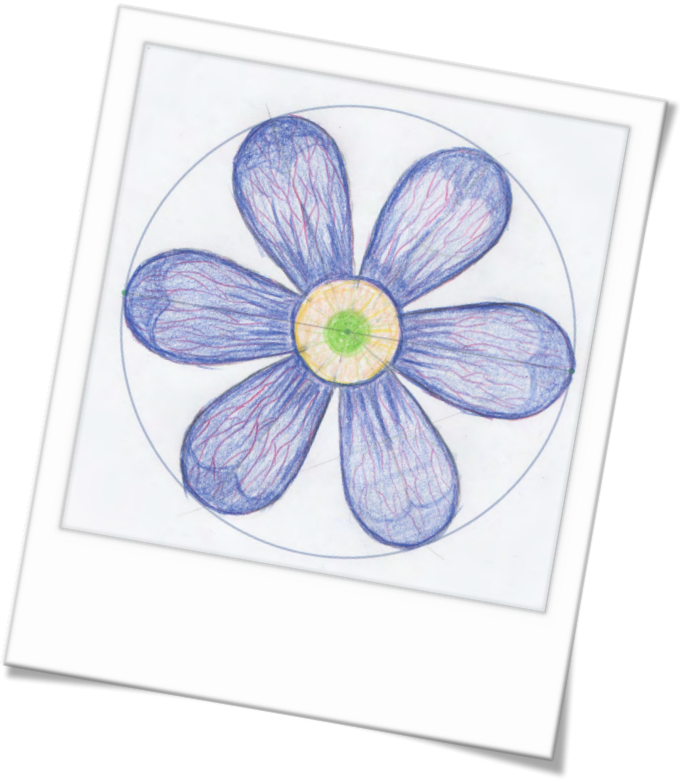
An HB pencil
Compass
Ruler
Template or A4 paper
A good quality eraser
Coloured pencils
Flower images
Optional: Copies of Resources 5A and 5B

Below: liverleaf



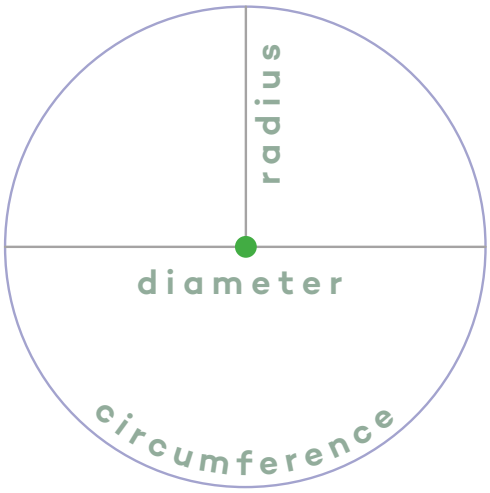
DID YOU KNOW?

Liverleaf, also known as hepatica, is a small plant that belongs to the buttercup family. Liverleaf flowers can have six petals. The flowers bloom in early spring and are typically 1-2cm in diameter. They are often the first wild flowers to bloom and like to grow in wet areas of forest, particularly amongst fallen leaves.



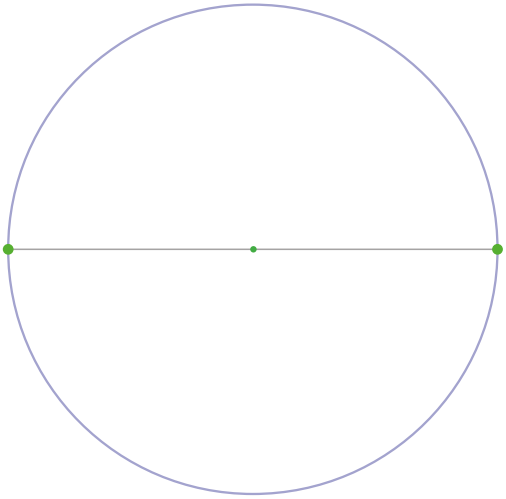
THE CIRCLE

This activity is great for familiarising students with the parts of a circle, as these are used to guide the geometric construction in this activity. Working with a compass relies on finding points of overlap or intersection to complete each step in the process.



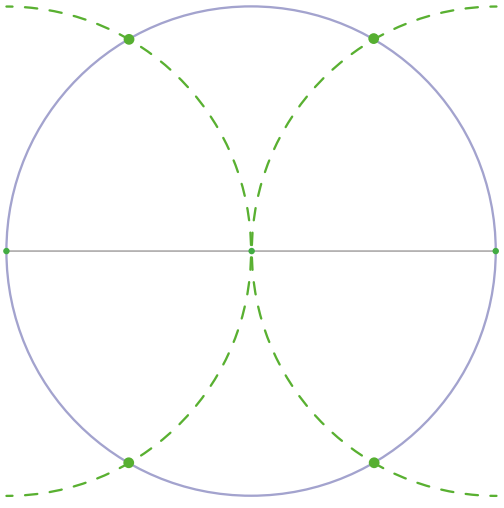
STEP 1 Draw the first circle

Draw a line across the centre of your page and mark the centre of that line. Set the arms of your compass to a radius of 6cm, place the point of the compass on the centre point and draw a circle with a diameter of 12cm. Use two dots to mark the two points at which the horizontal line cuts through the circumference of the circle, as shown below.



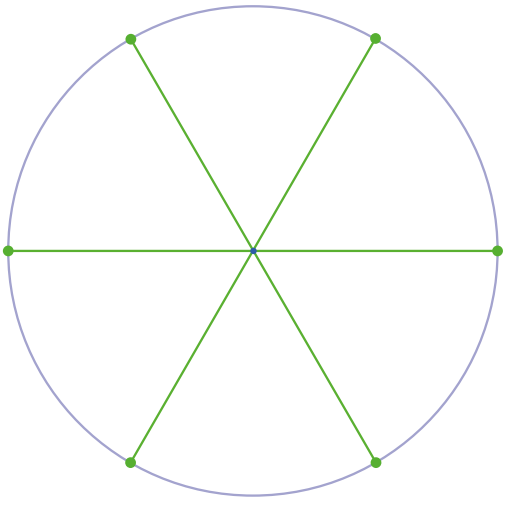
STEP 2 Draw two arcs

Keeping the compass set to a radius of 6cm, place the point of the compass on each of the two dots in turn and either lightly draw two arcs, as shown below, or draw four smaller arcs at the points at which the pencil point meets the circumference of the circle.



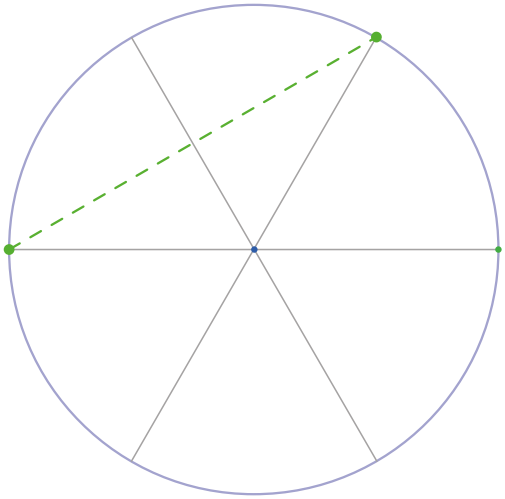
STEP 3 Draw two diagonal lines

Locate the points at which the arcs you drew in Step 2 intersect the circumference of the circle. Mark each with a dot. Connect the dots diagonally opposite each other using two diagonal lines, passing through the centre point of the circle, as shown below. Once you've drawn these two lines, the circle will be divided into six equal parts.



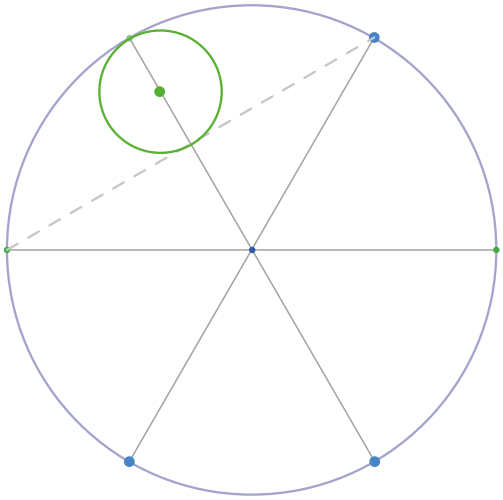
STEP 4 Draw a faint line

Following the diagram below, draw a faint line that connects these two points on the circumference of the circle.



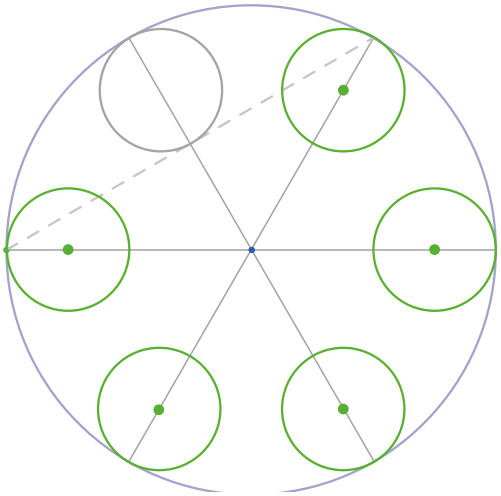
STEP 5 Draw a circle in the space created

Draw a small circle that fits in the space between the last line you drew and the circumference of the circle. You can do this by hand or with a compass. If using a compass, use a ruler to find the midpoint between the line and the circumference of the circle, then place the point of your compass on this point. The circle you draw will help to establish the shape of the liverleaf flower's petals.



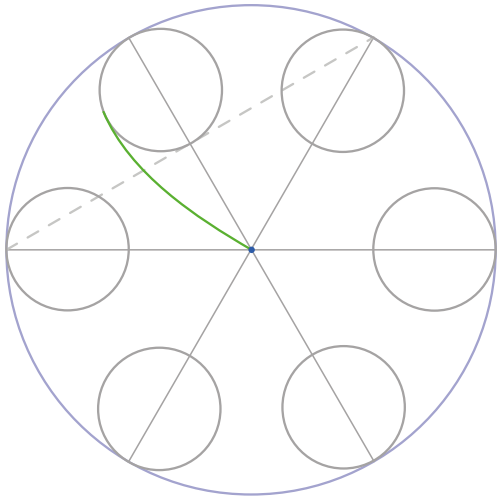
STEP 6 Draw five more small circles

Repeat the process outlined in Step 5 to draw five more small circles, as shown below.



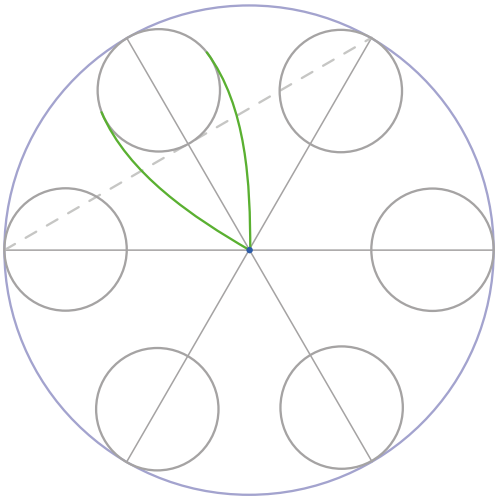
STEP 7 Complete one half of one petal

Using the first small circle you drew to guide you, draw one half of the first petal, as shown below.



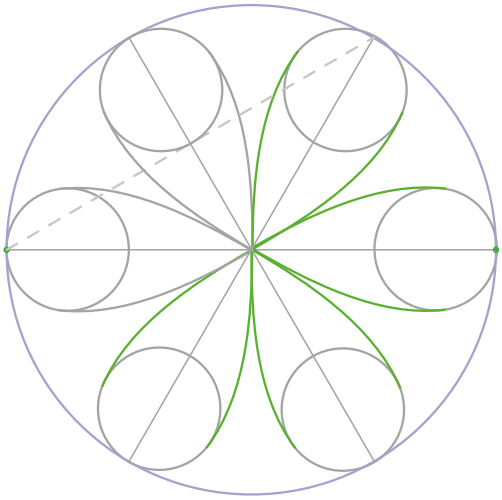
STEP 8 Complete the first petal

Either working by hand or using tracing paper, repeat the half petal on the other side of the diagonal line. If using tracing paper, go over the half petal outline then flip the tracing paper over. Line it up along the diagonal line again before going over it with a hard pencil.



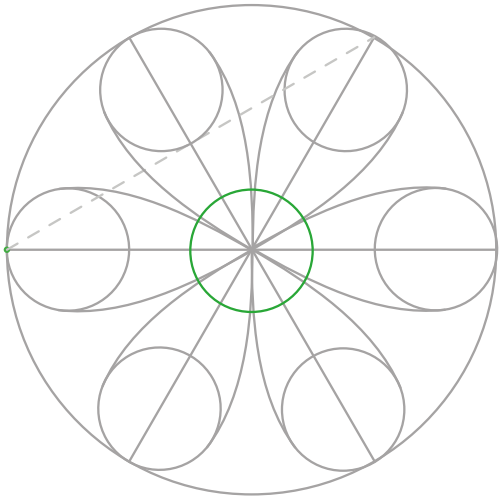
STEP 9 Trace or draw the next petal

Trace the whole petal and rotate it on the page to transfer it to the next branch of the six-fold template. Alternatively, draw the next petal freehand, trying to maintain its symmetry.



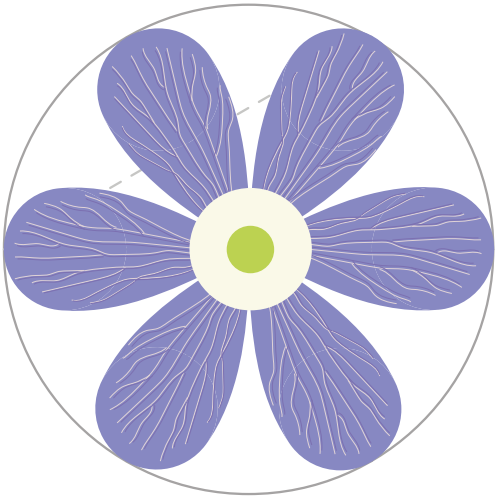
STEP 10 Draw the centre of the flower

At the centre of your drawing, add a final small circle that fits where the six petals overlap. It should be the same size as the other circles you have drawn at the tips of the petals. This will be the centre of the flower where you can add the detail of the flower's parts.



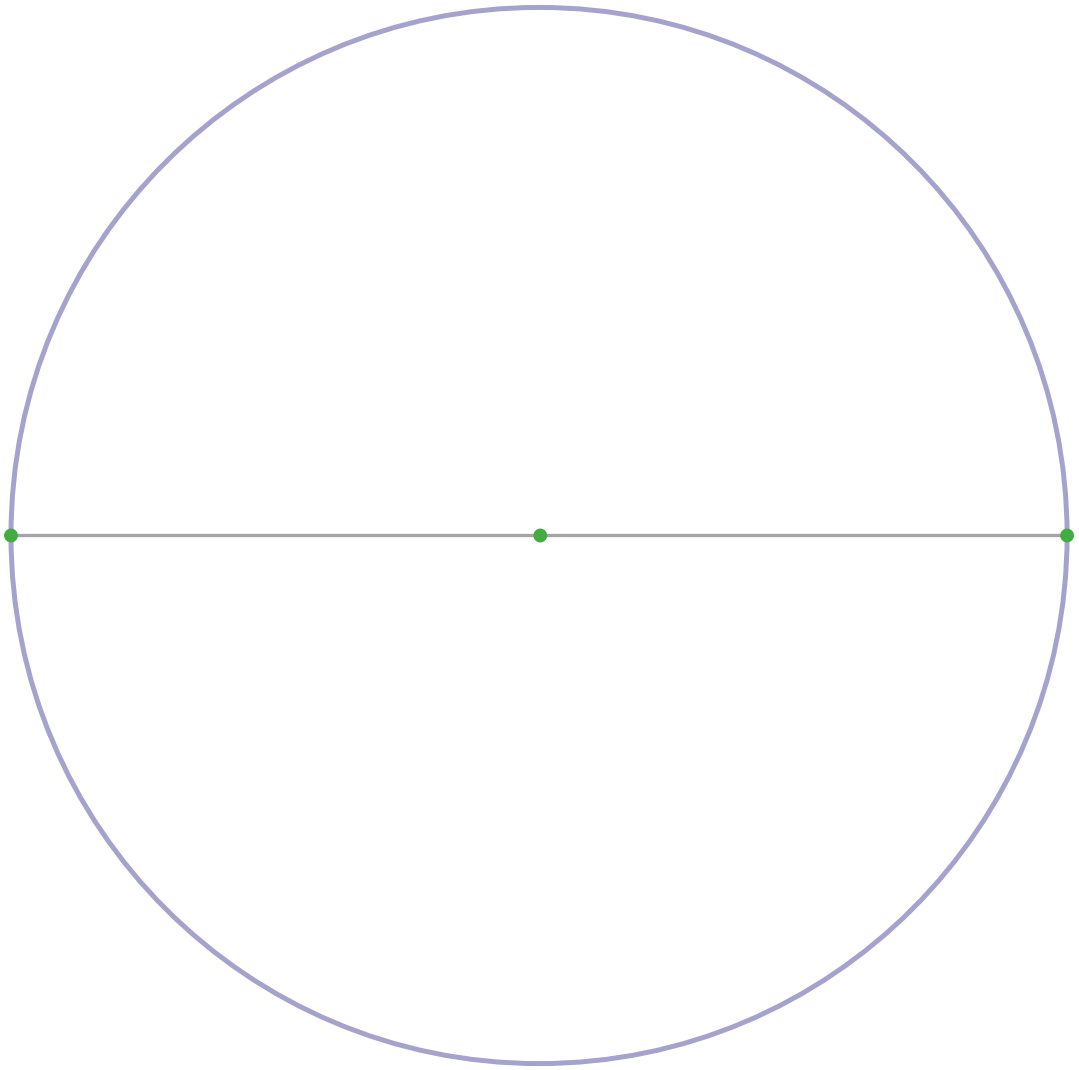
STEP 11 Colour the flower

Complete the drawing by colouring the six petals. You can add subtle details to your petals such as the thin branching lines of veins seen in some petals.



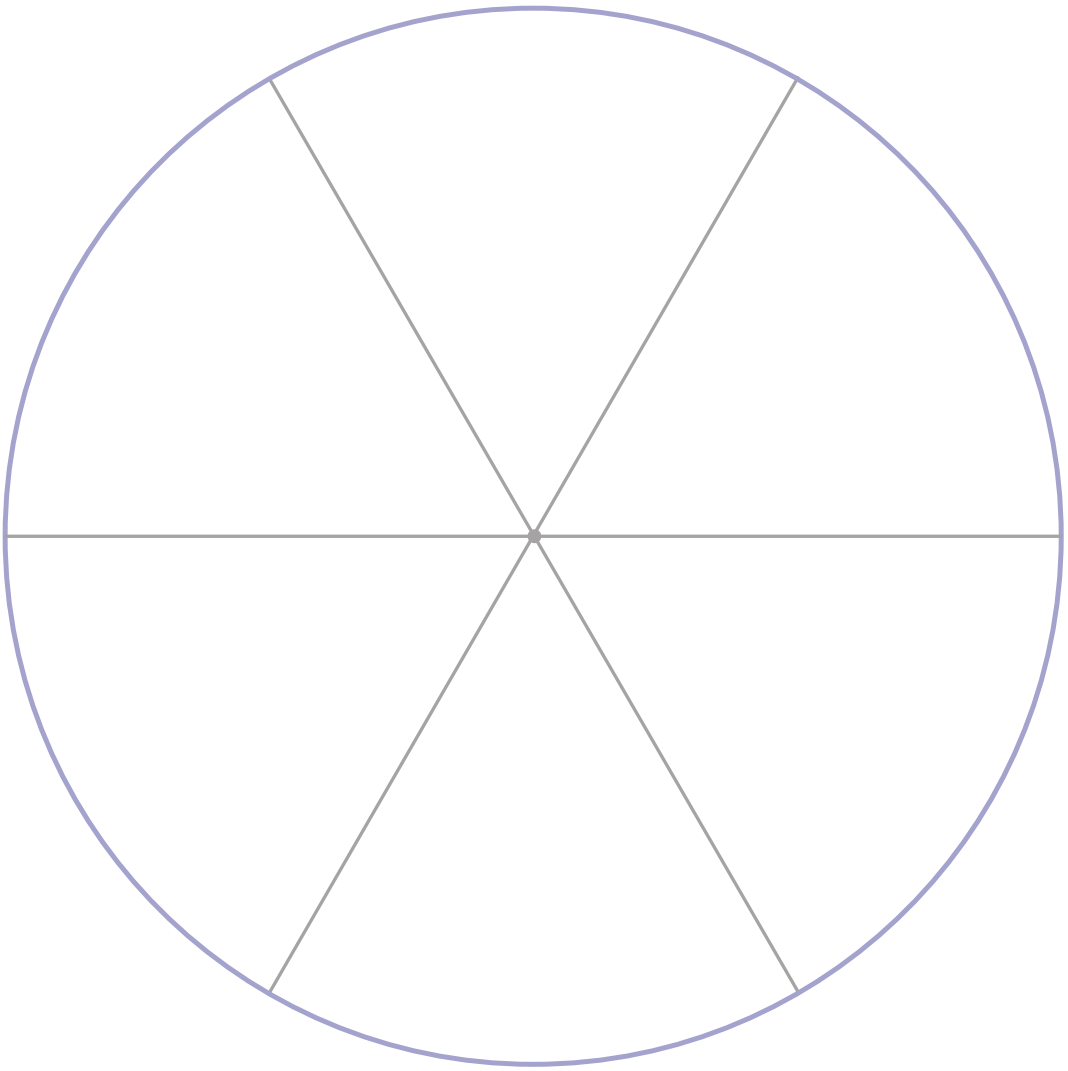
PHOTOCOPIABLE RESOURCE 5A

If using this template, start following the instructions from Step 2.



PHOTOCOPIABLE RESOURCE 5B

Template for drawing a six-petalled flower (Steps 4-11)



GEOMETRY ACTIVITY 6

ENQUIRY OF LEARNING What can we learn about the geometry of flowers?

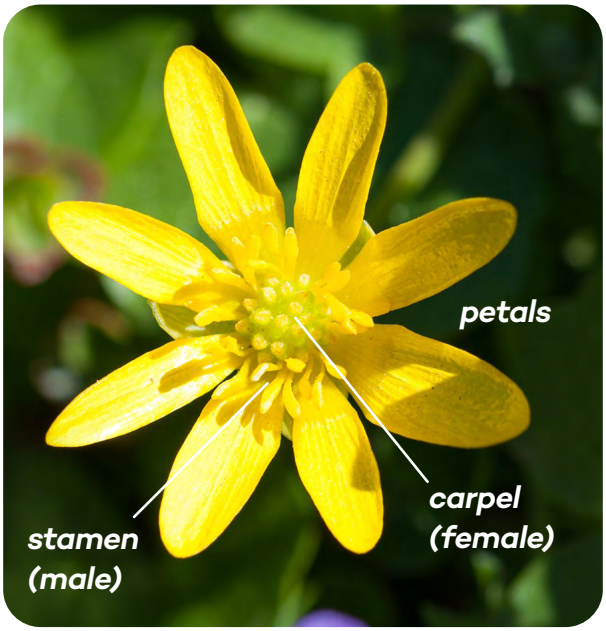
LEARNING QUESTION How can I draw an eight-petalled flower?

This activity can be used to support learning about flowering plants in science, to introduce the principle of the Cycle or the principle of Diversity to students, or as a standalone project.

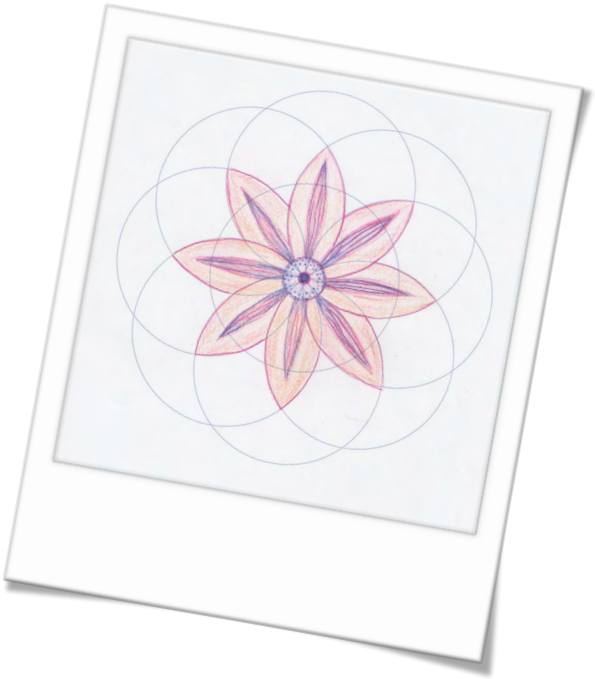
In this activity, students use a compass and a ruler to explore the geometry of eight-petalled flowers, using the example of clematis and lesser celandine as stimuli for learning. The activity can be simplified if time is short, or for students requiring additional support by providing copies of Resource 6A and starting from Step 2. Alternatively, students can use the template on Resource 6B to draw an eight-petalled flower freehand, without completing the compass work in Steps 1-9.

YOU WILL NEED

An HB pencil
Compass
Ruler
Template or A4 paper
A good quality eraser
Coloured pencils
Flower images
Optional: copies of Resource 6A and 6B



Left: clematis
Right: lesser celandine

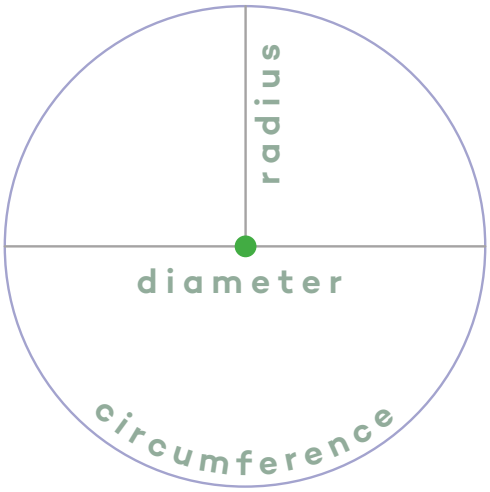


DID YOU KNOW?

Clematis flowers are known for their large, showy blooms that come in a variety of colours, including purple, pink, red, white, and blue. There are over 300 species of clematis. The name 'clematis' comes from the Greek word 'klema', which means 'climbing plant'.

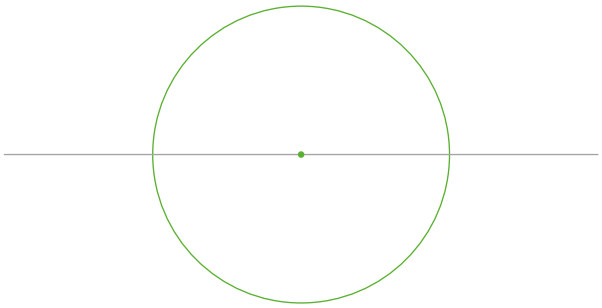
THE CIRCLE

This activity is great for familiarising students with the parts of a circle, as these are used to guide the geometric construction in this activity. Working with a compass relies on finding points of overlap or intersection to complete each step in the process.



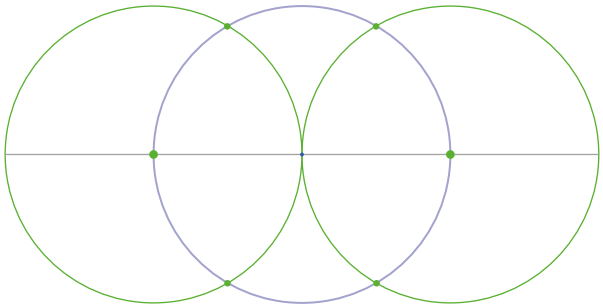
STEP 1

Draw a line across the centre of the page and mark the centre of that line. Placing the point of the compass on this centre point, draw a circle with a radius of 4cm.



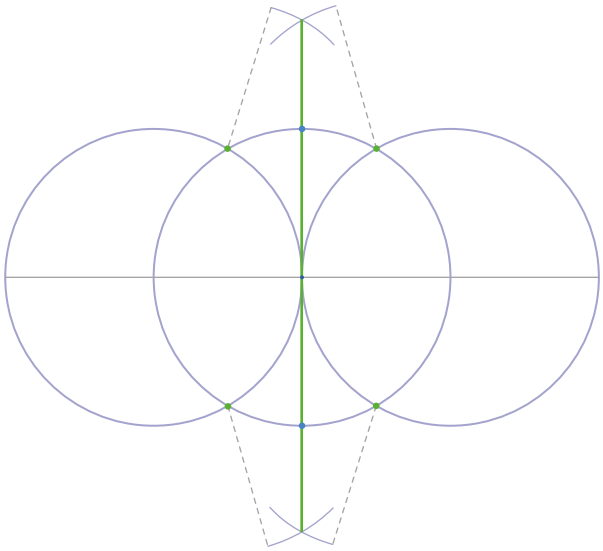
STEP 2 Draw two further circles

Mark the two points at which the horizontal line cuts through the circumference of the circle using two dots. Check that the radius of the compass is still set to 4cm, then place the compass point on each of the two dots in turn to draw two further circles, as shown below.



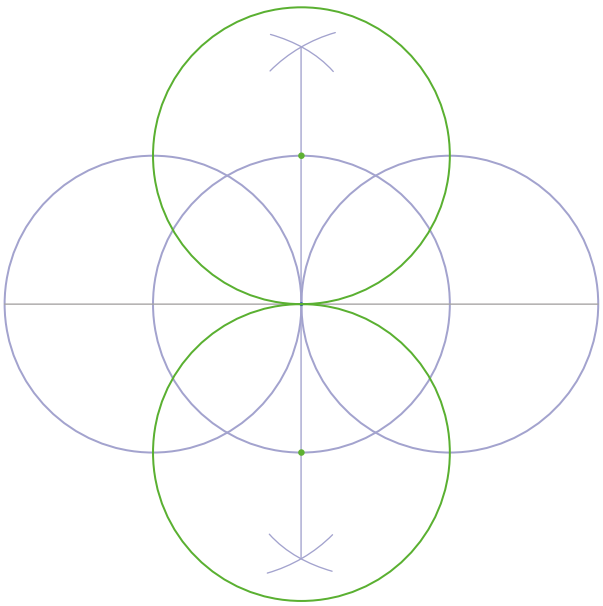
STEP 3 Draw a vertical line

Use a dot to mark the two points at which the central circle intersects the circles to either side of it at the top of your drawing. With the radius of the compass still set to 4cm, place your compass point on one dot and draw an arc roughly over the centre of the central circle. Do the same from the other dot. Repeat the process on the bottom half of the drawing. Use a ruler to draw a line connecting the points at which the arcs cross at the top and bottom of the drawing and passing through the centre point of the central circle.



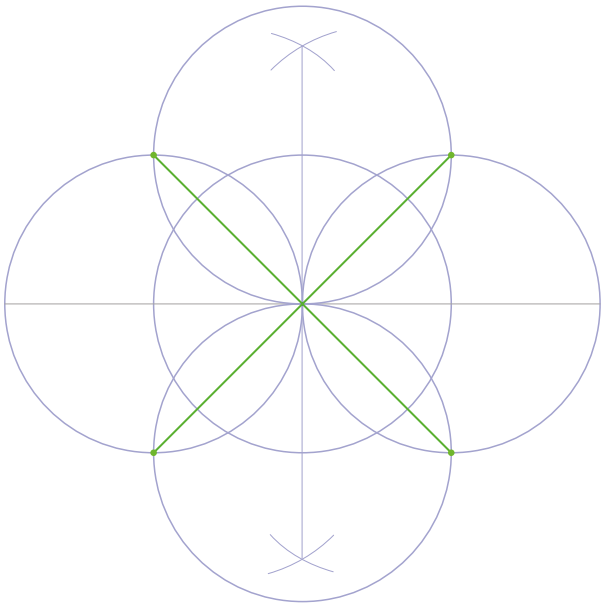
STEP 4 Draw two further circles

Use dots to mark the two points at which the vertical line cuts through the central circle. With the compass still set to a radius of 4cm, place the point of the compass on each dot in turn and draw two further circles. You now have a completed pattern of five overlapping circles.



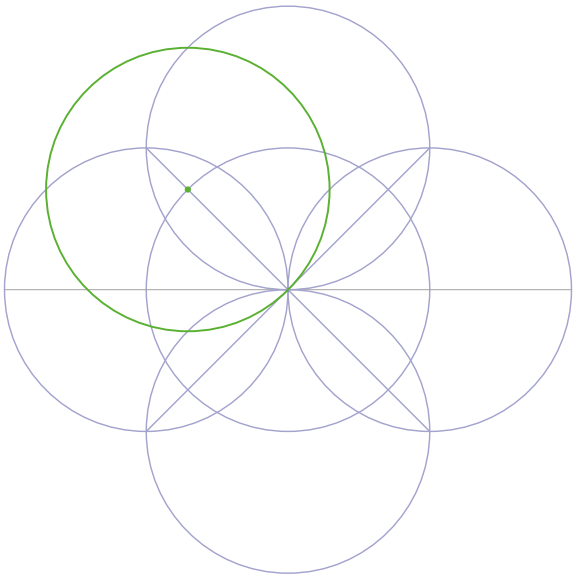
STEP 5 Draw the diagonals

Use a ruler to draw two diagonal lines connecting the opposite tips of the four petals, as shown below.



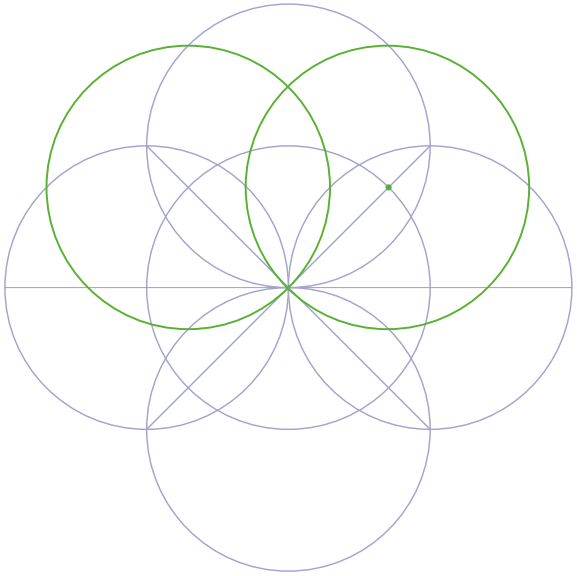
STEP 6 Draw a sixth circle

Use a dot to mark the point at which one of the diagonal lines intersects the first circle. Check that the point of the compass is still set to 4cm, then place the point of the compass on the dot and draw a sixth circle.



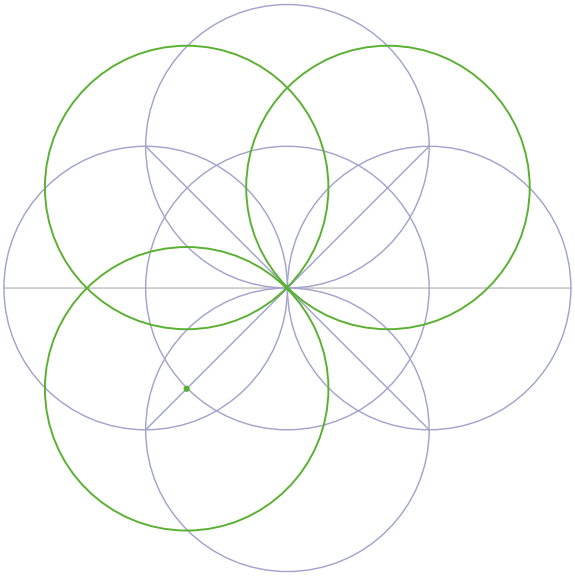
STEP 7 Draw a seventh circle

Repeat the process outlined in Step 6 to draw a seventh circle.



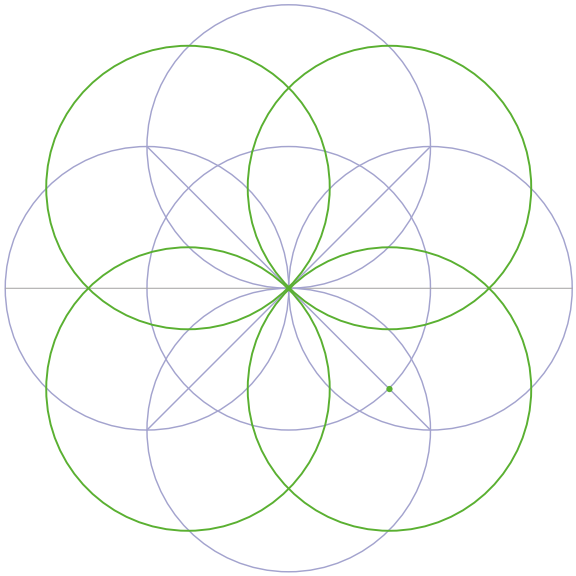
STEP 8 Draw an eighth circle

Repeat the process outlined in Step 6 to draw an eighth circle in the lower half of the drawing.



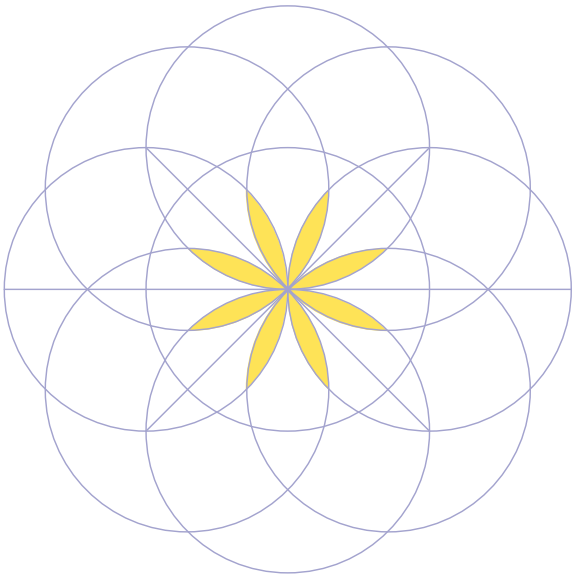
STEP 9 Draw a ninth circle

Repeat the process outlined in Step 6 to draw a ninth circle in the lower half of the drawing. You should now have eight circles evenly spaced around a central one.



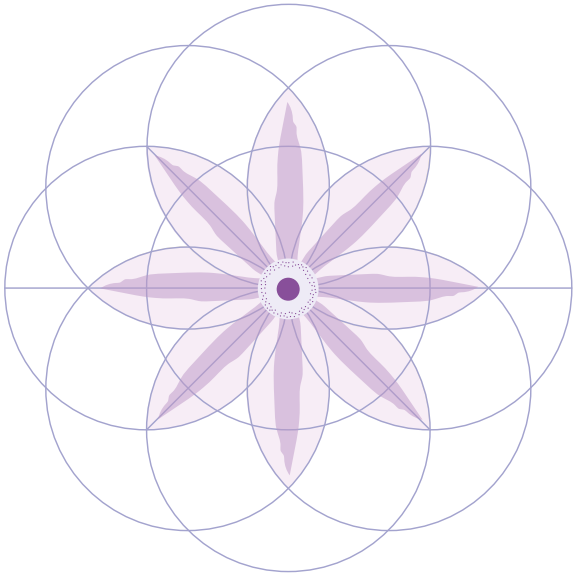
STEP 10 Locate the central petals

At the centre of the drawing, you will notice a set of eight, thin petals. These can be used as guidelines to recreate a delicate eight-petalled flower. Research the form of different eight-petalled flowers to see which might lend themselves well to this. By rounding off the tips of these petals, you could recreate a lesser celandine flower, for example.



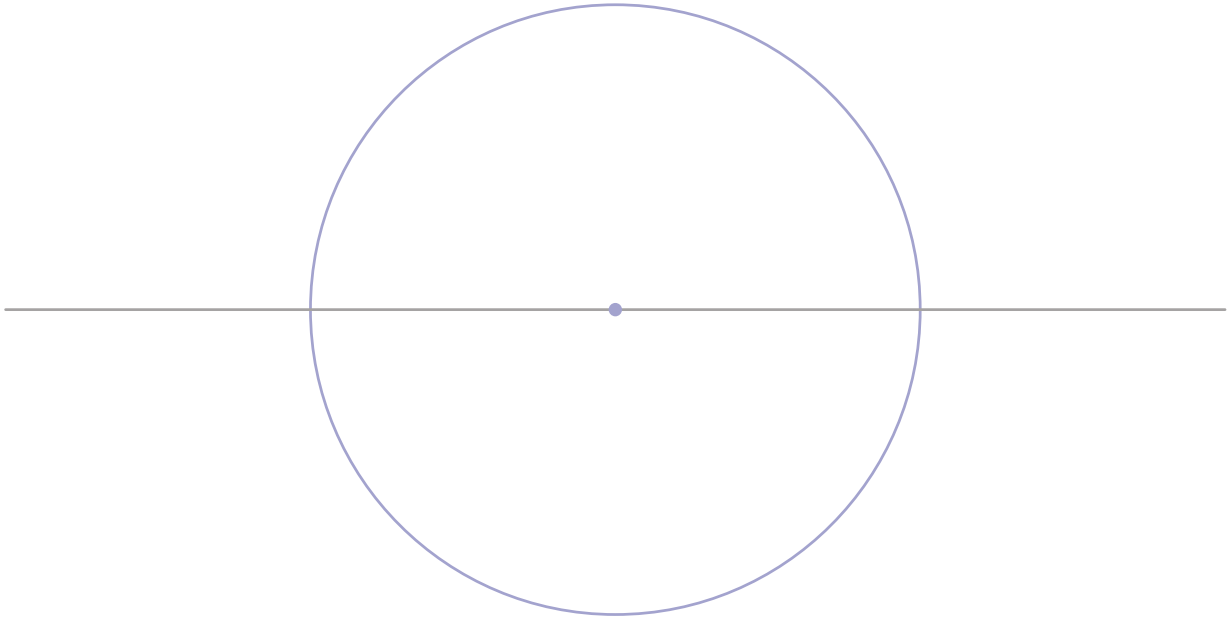
STEP 11 Locate the outer petals

Arranged outside the first set of petals, you will find a second set of eight petals. These larger petals look more like the petals of a clematis flower. Use pink and purple colours in varying shades to recreate this flower, using the outline of the outer petals in the drawing to guide you.



PHOTOCOPIABLE RESOURCE 6A

If using this template, start from Step 2.



PHOTOCOPIABLE RESOURCE 6B

Use this template to draw eight-petalled flowers freehand.