

Experiment shared by:
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WALDORF WINDOW STAR Geometry Investigation

Exploration – What is the same? What is different?

Have a look at the two origami stars below. What is the same about them and what is different about them?

Try to use mathematical language to explain your observations. As long as you can reason your argument anything goes! They can be very simple observations e.g. 'one has 6 points and the other has 8 points' or 'both stars are purple' to more complex observations such as 'I can see quadruple the number of squares in one star than in the other' or 'they both have an even order of rotational symmetry.'



Mathematical vocabulary which may help:

Polygon (regular/ irregular)

Triangle (isosceles, equilateral, scalene)

Quadrilateral (square, rectangle, trapezium)

Angles (right angle, obtuse, acute, degrees)

Symmetry (rotational, horizontal, vertical)

Creation – making your own window star – you will need:

- 8 Identical tissue paper/tracing paper squares
- Glue

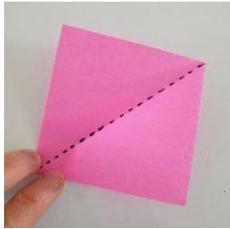
Investigation task:

- Additional tracing paper squares
- Pencil
- Plain paper
- Protractor
- Ruler

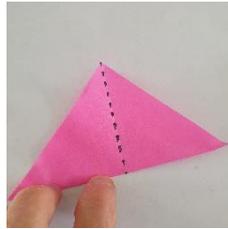


Instructions:

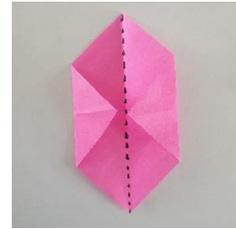
1: Fold square along the diagonal and then open.



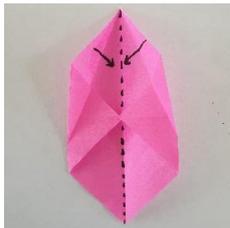
2: Fold along the diagonal in the other diagonal and open.



3: Fold the right point into the centre of the square and repeat on the other side so they meet.



4: Fold down the top right diagonal edge to the vertical centre line. Repeat on the other side.



5: Fold down the top point to meet the bottom of the previous fold.



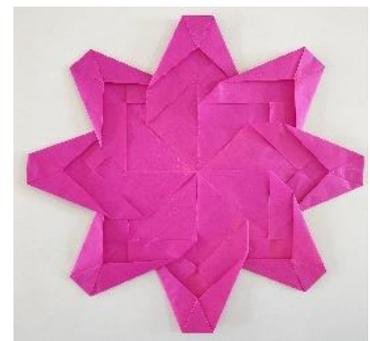
6: Glue down the point to hold securely in place.



7: Create 7 more modules. Now glue one on the next as shown in the image above.



8: Continue gluing each module. The final module will tuck under the first piece.



Investigate:

Now you have made the 8 pointed star, investigate what else you can do with the same pattern. Here are some suggestions:

Use different colours and look at the effect of overlapping them. You could even create a rainbow star!

Use 8 modules but rotate them 180 degrees before gluing them together. How is this star the same and how is it different?

Use more or less modules and think about how much you would need to overlap them by to make them fit together accurately. This will need some consideration of angles and fractions. For example, if I have 6 modules what fraction of the previous module will need to be covered when I glue them together. What if I had 12 modules?

There are lots of variations of the Waldorf Star. This is just one. All have different starting modules and can be made and connected in a variety of ways. This [website](#) has some to get you started. Although the instructions are not in English, the diagrams are really clear. There are a large number of video tutorials to follow on YouTube too.

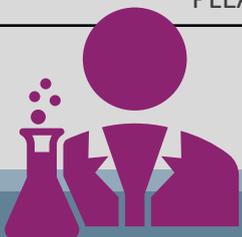
Enjoy investigating!

Share your results!

We'd love to see photos and videos of you doing the experiment. Please share on Twitter with hashtag #ExperimentsAtHome and tag in @STEM_HUBNMSEY

Thank you!

PLEASE ASK FOR ADULT PERMISSION AND/OR SUPERVISION WHEN REQUIRED.



We hope you have fun!