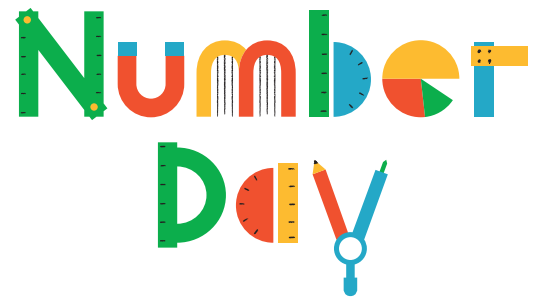


# WISH UPON A STAR



## How to raise money

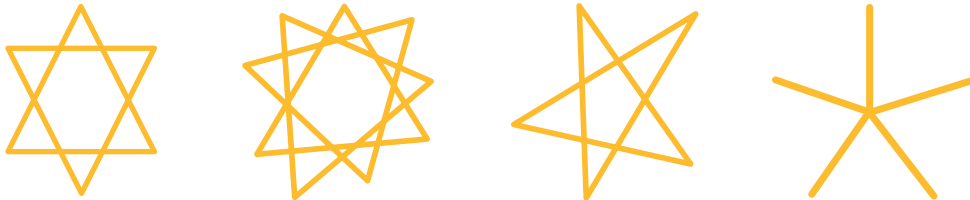
Stars can have a special meaning to children. Pupils can be sponsored for how many different stars they can create. Alternatively, parents and carers can make a donation.

## Learning opportunities

In this activity, children work to see how many different types of 'star' they can draw. This allows children to explore shape, symmetry and properties of numbers in a creative setting. It's also a problem solving task in which you can encourage skills such as systematic working and perseverance.

## How to play:

1. Ask a few children to come up and draw different stars on the board. And talk together about the different stars, spotting similarities and differences.

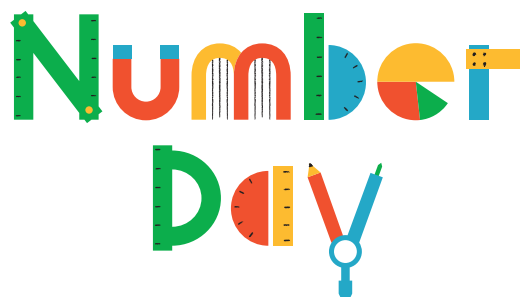


2. Talk about what 'counts' as a star together.

- a. A good way to explore this is to draw some shapes that are not stars and ask the children to discuss this (e.g. a circle has no points sticking out; a V only has two points and they aren't in a regular pattern). To help: Collins dictionary defines a star as follows: 'You can refer to a shape or an object as a star when it has four, five, or more points sticking out of it in a regular pattern.'
  - b. This is a chance to revise 'regular' and 'irregular' shapes: children should be familiar with the idea of a 'regular pentagon' but what does 'sticking out in a regular pattern' mean? Two important ideas are that the points should look the same and be the same distance apart. You could also talk about symmetry if you have introduced this idea before – are stars symmetrical? (Yes, but different stars have different types of symmetry).
  - c. Decide as a group if you are going to allow only straight lines or whether you will also allow curved lines for your stars.
3. Hand out the main activity sheets – ask children to work in pairs or small groups. How many different stars can each group discover? Let them know that worksheet two has useful shapes to help if needed.



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4. While you are working, encourage conversations about:

- The shapes children are using to construct stars (triangles, squares, pentagons, etc).
- The shapes they can see in the stars they have made (the hexagon in the centre of the six pointed star, for example).
- The methods the groups are using to ensure they don't miss any possible stars (have they got a system in place, e.g. finding all the stars with seven points first).
- Star 'families' – like the stars that are made by drawing just one continuous line, or the stars that are like asterisks (made of lines not polygons). How many stars in a 'family' can they find?
- Some star families relate to ideas like multiplication. Ask the children what all the stars made of overlapping triangles have in common (the number of points will always be in the three times tables).

5. Hints for teachers

- The asterisk-style star family is the easiest to find, if anyone is getting stuck. Suggest drawing one with three lines crossed in the middle, then four, then five.
- Use the activity sheet to give children hints, e.g. 'What shape is that star made of? Squares? What happens if you try a star like that but with triangles?'
- There are loads more types of stars than are illustrated on this sheet – especially if you allow curvy lines. So don't be surprised if the children surprise you!

## Extension ideas

- You could ask children to try to work out why there are more stars with some numbers of points than other numbers of points.
- Set a child a challenge to find all the twelve pointed stars made using only straight lines. How can they be sure they have found them all? (There is a way to work out that you have drawn all the straight line stars with a particular number of points, but you have to set some pretty tight rules for what is and isn't allowed. The rules are: no curvy lines, only regular shapes to be used, and the centres of all the shapes in the star must be on top of each other).

The answer to these two questions is connected to factorisation. Numbers that have more different factors will have more possible stars. The example below for five and eight explains this:

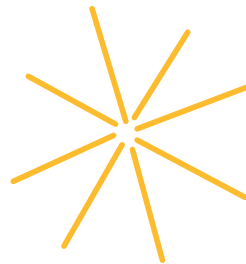
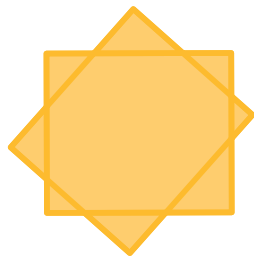
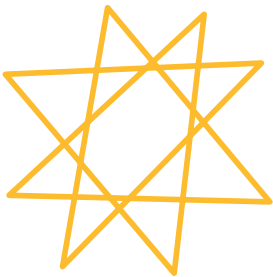
1. You can draw a five pointed star with five short lines or one long line – and the factors of five are 5 and 1.



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2. You can draw an eight pointed star with one long line, two squares, four lines that cross over the centre of the star, or (though this is a little bit of a cheat as it looks the same as the four line star!) eight short lines. The factors of eight are 1,2,4 and 8.



3. You can't draw a five or an eight pointed star using triangles, because three is not a factor of five or eight. (Try setting a child the challenge of drawing a five pointed star with triangles whose centres are all in the same place – when they can't do it, ask them to explain why).

This worksheet has been adapted from a Maths on Toast activity.  
To find more activities online, [www.mathsontost.org.uk](http://www.mathsontost.org.uk)

