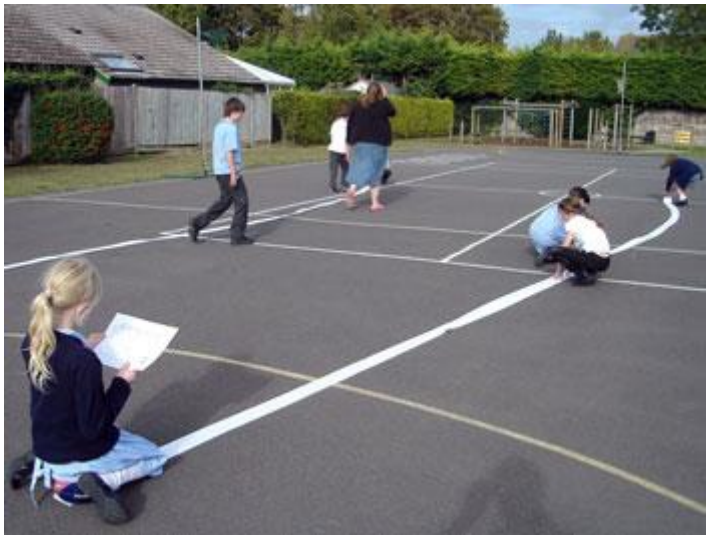
Model of the solar system

Can you make a model of the solar system, so that both the sizes of the planets and their distances from each other and the Sun are all to scale?

This is not a straightforward problem, since although the planets are very big, their diameters are much, much smaller than the distances between them and the Sun.



Getting started

Collect the following resources:

- a toilet roll (unused and complete!)
- a large blow-up ball (the bigger the better, to represent the Sun)
- a range of spherical (or nearly spherical) objects, ranging in size from a mustard seed up to small to medium-sized balls
- a large space - big enough to take an unrolled toilet roll, preferably indoors, since even a very slight breeze will move the toilet roll and small objects on it

The unrolled toilet roll will represent the distance from the sun - to be placed at one end - to the outermost planet.

Hint: Pluto is now classified as a dwarf planet rather than a planet. If you include it, you increase the distance you need to work with from 4,500 million km to 5,900 million km. It is probably best not to include it!

Scaling the distances in the solar system

Use the ‘Planetary Data DIY’ document to help you decide how you are going to make your model. You could:

- make each piece of toilet paper a particular distance, say, 20 million km
- divide the total distance between the Sun and Neptune by the number of pieces in your toilet roll
- divide the total distance between the Sun and Neptune by the length of the toilet roll

Or you may have your own ideas about how you want to scale your model.

Mark where each planet will go on the toilet roll.

Scaling the planets

Using the ‘Planetary Data’ document, start by putting the planets in order of size. Then pick objects to represent each planet.

Put the objects in the right places on the toilet roll.

- Which is the biggest planet?
- Which is the smallest?
- Which planets are closest together?
- Which are furthest apart?

Improving your model

If you wanted to use the same scale as you used for your toilet roll solar system to make models of the planets, how big would the biggest planet be? How big would the smallest be? Is this a practical scale for a model solar system?

If you made the smallest planet so that it had a diameter of 1cm, how big would the distance from the sun to Neptune need to be? How about if you represented the smallest planet with a mustard seed?

If you can, decide on a scale which will allow you to represent both the distances and the diameters of the planets. Find a long enough roll of paper (perhaps two or more toilet rolls stuck together), then either find suitable objects for each of the planets, or make them from modelling clay, papier mache, or similar.

If there isn't room to do this, you will need to agree that your planets and distances have to have a different scale. So how will you scale the size of your planets?

If you make your own planets, find out what colour they appear to be, and paint them.