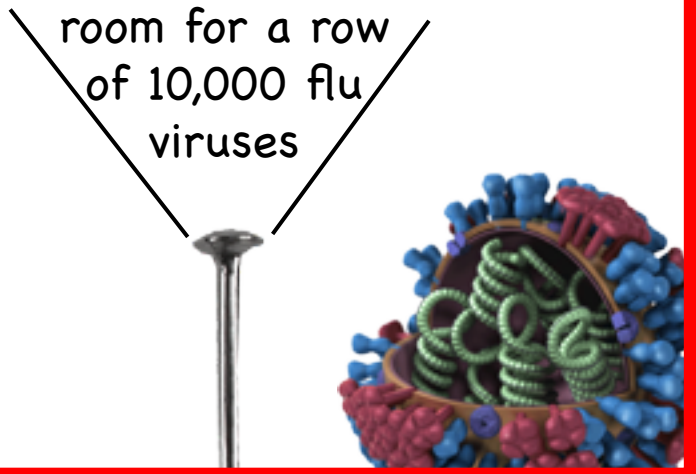
Small Organisms

A couple of card activities to help with scale around organisms that are too small to see. This is work in progress and we would welcome suggestions.

The head of a pin is about one millimetre across

room for a row of 10,000 flu viruses



GERMS AND THE IMMUNE SYSTEM: GETTING A SENSE OF SCALE

To get a grip on just how small the world we are describing really is, we have to use our imaginations...

If you can picture the flat end of a pin, that is about 1mm across. This is a measure we can all relate to. To us this seems small, but when we are talking about germs and the workings of the immune system, we have to think really really small!

- If we placed some bacteria-eating white blood cells ('macrophages') end-to-end across the flat end of a pin we would have room for 50 of them in a line.
- If we did the same for a typical bacterium (called E. coli) we would have room for 500.
- If we did the same again for a typical virus (such as the ones that give us 'flu) we would have room for 10,000 in a line!
- ...and if we did the same yet again for an antibody molecule (an important part of immune defence) we would find room for perhaps 100,000 in a line, that stretched for just 1 millimetre!

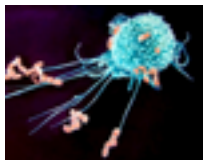
Looking at things another way...

If we made our antibody molecule 1cm long (and hence visible)...
...our virus would be 10cm long
...our bacterium would be 200cm (2m) long
...our macrophage would be 20m long!
...and an average-sized human being would be about 1800km (over 1000 miles) tall!!! (This is above twice the length of the island of Great Britain!)
As you can see, we have to really change our perspective to understand how small these things are!

Cards for sorting

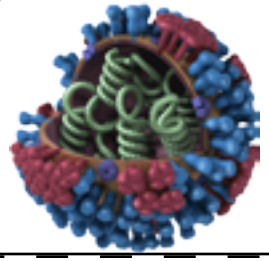
The head of a pin is about one millimetre across

room for a row of 50 macrophages

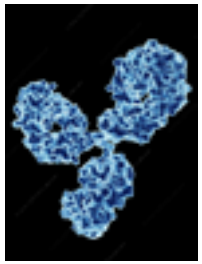


room for a row of 500 e-coli bacteria

room for a row of 10,000 flu viruses



room for a row of 100,000 antibody molecules



Cut out the cards along the dotted lines and mix them up.

If an antibody molecule measured one centimetre

Then a bacterium would measure two metres

A human being would be 1800km or one thousand miles tall.

Then a virus would measure ten centimetres

A macrophage would measure twenty metres