BBC BITESIZE

GCSE Biology – Cell Size - Transcript

Cells are the building blocks of all life but they're not all the same size. Plant and animal cells are different sizes depending on their function, and we can measure that difference.

These are cheek cells. They are animal cells, and while they look big under the microscope they're only approximately 50 micrometres across. So 20 would fit between a 1 millimetre division on your ruler!

Some cells, like egg cells, are about twice as big as these cheek cells, and others like red blood cells are around 10 times smaller.

Bacteria are about 100 times smaller; you can see them here next to a cheek cell. Viruses are around 1000 times smaller than these cells.

To help compare between sizes, scientists measure cell size in standard form. They use unit metres and multiples of 10.

If one number is 10 times bigger or smaller than another, we call this 1 order of magnitude. If it is 100 times, then it's 2 orders of magnitude.

A coastal redwood, the largest living tree, is 100 metres tall, so 9 orders of magnitude larger than a virus at just 100nm tall. That's 1 billion times larger. Instead of writing out all these zeroes, it can be written using powers of ten as $10^{9.}$

To keep track of these really small numbers we use prefixes. So one thousand times smaller than a metre is a millimetre. One million times smaller than a metre is a micrometre. One billion times smaller than a metre is a nanometre.

Most cells are between 1 to 100 micrometres, too small to see with the naked eye, so we use a light microscope, and any smaller than this we need to use an electron microscope to see them.

To calculate orders of magnitude we have to make sure both values are in the same units. In this case, when comparing bacteria and viruses, we are going to use nanometres, then we divide the larger number by the smaller number. We then divide the answer by 10 to give the order of magnitude.

This gives us 1 order of magnitude between a virus and a bacterium.

I hope you now know 10^{6} times more about cell size!