

## Weekly intervention key facts:

### **Bio 1: B1 Key Biological Concepts**

1. Magnification means how many times larger an image is compared to the actual size.
2. The total magnification of a microscope is worked out by multiplying the magnification of the eyepiece lens (the one you look down) by the magnification of the objective lens (the one the light travels up through).
3. Resolution means smallest distance between two points that can still be seen as two points. The greater the resolution the clearer the distinction between two objects and greater detail will be visible.
4. There are a number of prefixes for units in biology that go before the term metre, you need to understand these and be able to utilise them in calculations as standard form:
  - a) milli ( $10^{-3}$ ) – one thousandth of a metre
  - b) micro ( $10^{-6}$ ) – one millionth of a metre
  - c) nano ( $10^{-9}$ ) – one billionth of a metre
  - d) pico ( $10^{-12}$ ) – one trillionth of a metre
5. Each of the following types of cell contain these organelles (sub cell structures)

Animal cells – nucleus, cell membrane, mitochondria and ribosomes  
Plant cells – nucleus, cell membrane, cell wall, chloroplasts, mitochondria, vacuole and ribosomes  
Bacteria – chromosomal DNA, plasmid DNA, cell membrane, ribosomes and flagella
6. A diploid nucleus is one that contains two sets of parental chromosomes and is found in all body cells. In humans this means there are 46 chromosomes.
7. A haploid nucleus contains only one set of chromosomes, these are only found in sex cells/gametes. In humans this means that there are 23 chromosomes.
8. The acrosome of a sperm cells contains enzymes that digest the egg cell membrane, this allows the sperm access to the egg cell nucleus for the two nuclei to fuse (fertilisation)
9. Enzymes are biological catalysts they speed up chemical reactions by lowering the activation energy required to start a reaction.

10. Enzymes can either breakdown large substrate molecules (polymers) or synthesis (join up) smaller substrate molecules (monomers) to create a polymer.
11. The active site is a specifically shaped region of the enzyme molecule into which a complementary shaped substrate molecule can fit. Each enzyme is specific to a certain substrate.
12. If temperature or pH are increased from an optimum condition, or if pressure becomes too high or low then the enzyme can become denatured. The active site changes shape and is no longer complementary to the substrate. The rate of reaction will drop and could reach zero.
13. If enzyme or substrate concentrations are low they will act as a limiting factor and the rate of reaction will be low. Increasing one would increase the rate of reaction until the other then became the limiting factor.
14. Fluids have continual motion and move in random directions from an area of high concentration to an area of low concentration, we call this diffusion.
15. Osmosis is the movement of water molecules from an area of high water molecule concentration (or low solute concentration) to an area of low water molecule concentration (or high solute concentration) across a partially permeable membrane.
16. Active transport is used to move substances against a diffusion gradient i.e. from an area of already high concentration to an area of low concentration. This requires the use of energy. Active transport is used by plant root hair cells to absorb mineral salts from the soil.