Mattia lau GCSE Biology Rev

Topic 1: key biological concepts

Magnification means how many times larger an image is compared to the actual size

The total magnification of a microscope is worked out by multiplying the magnification of the eyepiece lens by the magnification of the objective lens

Resolution means the smallest distance between two points that can still be two points

There are many prefixes for units in biology that go before the term meter, you need to understand these and be able to utilize them in calculations in standard form

Plant cells contain a nucleus, cell membrane, cell wall, chloroplasts, mitochondria, permanent vacuole and ribosomes

Animal cells contain a nucleus, cell membrane, mitochondria and ribosomes.

Bacteria contain chromosomal DNA, plasmid DNA, cell membrane ribosomes and flagella.

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

A haploid nucleus contains only one set of chromosomes, these are found in sex cells/gametes. In humans this means that there are 23 chromosomes.

The acrosome of a sperm cell contains enzymes that digest the egg cell membrane, this allows the sperm to access the egg nucleus for the two nuclei to fuse and become a zygote

Enzymes are biological catalysts which speed up chemical reactions by lowering the activation energy required to start a reaction.

Enzymes can either breakdown large substrate molecules (polymers) or synthesis (join up) smaller substrate molecules to create a polymer.

The active site is specifically shaped region of the enzyme molecule into which a complementary shaped substrate molecule can fit. Each enzyme is specific to a certain substrate.

If temperature of pH is increased from an optimum condition, or if pressure becomes to 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.

Fluids have continual motion and move in random directions from an area of high concentration to an are of low concentration, we call this diffusion

Osmosis is the movement of water molecules form an area of high water molecule concentration to an area of low water molecule concentration across a partially permeable membrane.

Active transport is used to move substances against a diffusion gradient from an area of 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.

To use a light microscope, you firs need to prepare the specimen on a glass slide.

Ciliated epithelial cells are found in oviducts and trachea are adapted with cilia to move from side to side to move the ovum along the oviduct. Lots of mitochondria to release energy to move cilia.

All cells need molecules to stay alive. As well as oxygen for respiration, cells need the building blocks to make larger molecules.

Lots of larger molecules in cells are called polymers- large molecules made of repeating subunits called monomers.

Proteins are large molecules that are needed for growth and repair. They are made of amino acid

Carbohydrates are needed for glucose and to make plant cell walls. They are large molecules made of lots of starch molecules joined together

Lipids are needed for long term energy storage and protection of organs. They are made from fatty acids and glycerine.

Digestion is when large molecules are broken into smaller molecules

Synthesis is when smaller molecules are combined to make larger molecules.

Different enzymes include

Amylase which digest starch into glucose and is found in saliva and the small intestine

Catalase breaks down hydrogen peroxide into oxygen and water and is found in most cells

Starch synthase synthesizes starch from glucose and is found in plant cells

DNA polymerase does synthesis of DNA from its monomers and is found in the nucleus of all cells

Enzymes have a specific 3D shape made by a long chain of amino acids folding it on itself

Each enzyme has a specific shaped active site that is complementary to the substrate. This means that the substrate fits into the active site. The substrate is the reactant

One model of how enzymes work is the lock and key model. The substrate fits into the active site like a key fitting into a lock

Some enzymes are digestive enzymes. – one substrate will fit into the active site and be broken down into smaller molecules. Other enzymes perform synthesis – two or more molecules will enter the active site and be joined together. After the reaction, the new products leave the active site and the enzyme is available to react with another substrate.

At a very low temperatures enzyme do not work very quickly. This is because the molecules have low kinetic energy so do not collide very frequently. As the temperature increases from zero the rate of enzymes action will increase as more collisions between the enzymes and the substrate happen.

Enzymes can be damaged by changed in pH and high temperatures. This is because the bonds holding the amino acids together can weaken so the protein and its active site change shape.

When this happens, the enzyme becomes denatured and it will no longer fit in the substrate

The human population increases as technology develops and how previously humans were constantly moving and working to survive and presently humans have become lazy and began to settle. The predicted population is stated to rise then settle out

Increasing the amount of fish and meat we eat will lead to an increase demand in the future which could lead to a decrease in food security

Problems with monoculture include rural depopulation which could lead to

A buildup of pests a disease

Soil degradation

This can cause rapid spread of susceptible to pathogens

Could lead to economical failure

The water cycle- rivers flow into lakes and into oceans which get evaporated to form clouds and condensate back to the rivers and lakes