



Year: 10

Topic 1.1 CELLS AND MOVEMENT ACROSS CELL MEMBRANES

Knowledge and Understanding to be developed

How scientific methods and theories develop over time by considering the understanding of cell structure in relation to the development of the microscope.

Making and recording observations when examining plant and animal cells.

Correct manipulation of apparatus, the accuracy of measurements and health and safety considerations when investigating factors affecting enzyme action.

Translation of information between graphical and numerical forms, the construction and interpretation of frequency tables and diagrams, bar charts and histograms and the use of a scatter diagram to identify a correlation between two variables.

Key Terms to be learned this topic:

Mitochondria multicellular diffusion

Osmosis visking tubing enzyme

concentration gradient amino acids

selectively permeable active transport

enzyme-substrate complex denature

**Learning Objectives and Outcomes:
Students should be able to :**

- (a) the structure of animal and plant cells, including drawing and labelling diagrams and the function of the following parts: cell membrane, cytoplasm, nucleus, mitochondria, cell wall, chloroplast, vacuole
- (b) the use of a light microscope to view animal and plant cells
- (c) the differentiation of cells in multicellular organisms to become adapted for specific functions - specialised cells
- (d) the levels of organisation within organisms: tissues are groups of similar cells with a similar function and organs may comprise several tissues performing specific functions; organs are organised into organ systems, which work together to form organisms
- (e) diffusion as the movement of substances down a concentration gradient; the role of the cell membrane in diffusion; visking tubing as a model of living material; the results of Visking tubing experiments in terms of membrane pore and particle size
- (f) diffusion as a passive process, allowing only certain substances to pass through the cell membrane in this way, most importantly oxygen and carbon dioxide
- (g) osmosis as the diffusion of water through a selectively permeable membrane from a region of high water (low solute) concentration to a region of low water (high solute) concentration
- (h) **active transport as an active process whereby substances can enter cells against a concentration gradient**
- (i) enzyme control of chemical reactions in cells; enzymes are proteins made by living cells, which speed up/catalyse the rate of chemical reactions
- (j) **how different enzymes are composed of different amino acids linked to form a chain which is then folded into a specific shape**
- (k) how the specific shape of the active site of an enzyme enables it to function, a simple understanding of 'lock and key' modelling and be able to interpret enzyme activity in terms of molecular collisions **resulting in the formation of enzyme-substrate complexes**
- (l) the effect of temperature and pH on enzyme activity including the effect of boiling which denatures most enzymes