

IB Biology A

Curriculum Guide for Unit 2: Cell biology (IB Standard Level: Topic 1)

Essential Ideas:

- The evolution of multicellular organisms allowed cell specialization and cell replacement.
- Eukaryotes have a much more complex cell structure than prokaryotes.
- The structure of biological membranes makes them fluid and dynamic.
- Membranes control the composition of cells by active and passive transport.

Understandings:

- According to the cell theory, living organisms are composed of cells.
- Organisms consisting of only one cell carry out all functions of life in that cell.
- Multicellular organisms have properties that emerge from the interaction of their cellular components.
- Specialized tissues can develop by cell differentiation in multicellular organisms.
- Prokaryotes have a simple cell structure without compartmentalization.
- Eukaryotes have a compartmentalized cell structure.
- Phospholipids form bilayers in water due to the amphipathic properties of phospholipid molecules.
- Membrane proteins are diverse in terms of structure, position in the membrane and function.
- Particles move across membranes by simple diffusion, facilitated diffusion, osmosis and active transport.

Applications and skills:

- Skill: use of a light microscope to investigate the structure of cells and tissues, with drawing of cells. Calculation of the magnification of drawings and the actual size of structures and ultrastructures shown in drawings or micrographs.
- Skill: interpretation of electron micrographs to identify organelles and deduce the function of specialized cells.
- Skill: estimation of osmolarity in tissues by bathing samples in hypotonic and hypertonic solutions.