IB Biology A
Curriculum Guide for Unit 2: Cell biology

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 o f 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.