**IB HL Biology II – Seniors Semester I**

**Topic 2 and 8**

**Topic 2: Cell Respiration**

* Define cell respiration.
* State that, in cell respiration, glucose in the cytoplasm is broken down by glycolysis into pyruvate, with a small yield of ATP.
* Explain that, during anaerobic cell respiration, pyruvate can be converted in the cytoplasm into lactate, or ethanol and carbon dioxide, with no further yield of ATP.
* Explain that, during aerobic cell respiration, pyruvate can be broken down in the mitochondrion into carbon dioxide and water with a large yield of ATP.

**Topic 2: Photosynthesis**

* State that photosynthesis involves the conversion of light energy into chemical energy.
* State that light from the Sun is composed of a range of wavelengths (colors).
* State that chlorophyll is the main photosynthetic pigment
* Outline the differences in absorption of red, blue and green light by chlorophyll.
* State that light energy is used to produce ATP, and to split water molecules (photolysis) to form oxygen and hydrogen.
* State that ATP and hydrogen (derived from the photolysis of water) are used to fix carbon dioxide to make organic molecules.
* Explain that the rate of photosynthesis can be measured directly by the production of oxygen or the uptake of carbon dioxide, or indirectly by an increase in biomass
* Outline the effects of temperature, light intensity and carbon dioxide concentration on the rate of photosynthesis

**Topic 8: Cell Respiration**

* State that oxidation involves the loss of electrons from an element, whereas reduction involves a gain of electrons; and that oxidation frequently involves gaining oxygen or losing hydrogen, whereas reduction frequently involves losing oxygen or gaining hydrogen.
* Outline the process of glycolysis, including phosphorylation, lysis, oxidation and ATP formation
* Draw and label a diagram showing the structure of a mitochondrion as seen in electron micrographs.
* Explain aerobic respiration, including the link reaction, the Krebs cycle, the role of NADH + H+, the electron transport chain and the role of oxygen.
* Explain oxidative phosphorylation in terms of chemiosmosis
* Explain the relationship between the structure of the mitochondrion and its function.

**Topic 8: Photosynthesis**

* Draw and label a diagram showing the structure of a chloroplast as seen in electron micrographs.
* State that photosynthesis consists of light-dependent and light-independent reactions.
* Explain the light-dependent reactions.
* Explain photophosphorylation in terms of chemiosmosis.
* Explain the light-independent reactions
* Explain the relationship between the structure of the chloroplast and its function.
* Explain the relationship between the action spectrum and the absorption spectrum of photosynthetic pigments in green plants.
* Explain the concept of limiting factors in photosynthesis, with reference to light intensity, temperature and concentration of carbon dioxide