

# ST. JOSEPH'S COLLEGE

## Department of Biology

### Secondary 3 (2024-25)

#### Teaching Syllabus

S3	Content	Remarks
1 <sup>st</sup> Term	- Introduction to biology (Aristo Bk1A Ch1)	<i>Knowledge needing attention:</i> <ul style="list-style-type: none"> <li>- Characteristics of life</li> <li>- Brief introduction to branches of biology and its significance</li> <li>- Career in biology</li> <li>- Brief review of the scientific method</li> </ul>
	- Molecules of life (Aristo Bk1A Ch2) (excluding biochemical tests)	<i>Knowledge needing attention:</i> <ul style="list-style-type: none"> <li>- Chemical constituents of organisms (structure and function)</li> <li>- Relate functions of water to high specific heat capacity, high latent heat of vaporisation, and ice floating on water</li> </ul>
	- Cellular organization (Aristo Bk1A Ch3)	<i>Knowledge needing attention:</i> <ul style="list-style-type: none"> <li>- Cell theory</li> <li>- Types of microscopes and their features</li> <li>- Distinguishing images from light microscope, TEM and SEM</li> <li>- Linear magnification vs number of cells observed (optional)</li> <li>- Sub-cellular structures and in which types of cells they can / cannot be found</li> <li>- Mitochondria releases energy by respiration in the form of ATP molecules (and heat)</li> <li>- Animal cells vs plant cells</li> <li>- Prokaryotic cells vs eukaryotic cells</li> <li>- Levels of organization</li> </ul> <i>Practical / Investigative skills:</i> <ul style="list-style-type: none"> <li>- Steps in using light microscope</li> <li>- Preparation of temporary mounts</li> <li>- Basic rules in biological drawing and labelling of structures</li> </ul> <i>Special exam skills:</i> <ul style="list-style-type: none"> <li>- “with reference to...”</li> </ul>
	- Movement of substances across the cell membrane (Aristo Bk1A Ch4)	<i>Knowledge needing attention:</i>

		<ul style="list-style-type: none"> <li>- Membrane structure and meaning of fluid mosaic model</li> <li>- Authentic examples of membrane proteins</li> <li>- Diffusion, osmosis, active transport</li> <li>- Rate of osmosis vs equilibrium position</li> <li>- Cells of the same tissue may have slightly different water potential</li> <li>- Brief idea of endocytosis, exocytosis and facilitated diffusion</li> <li>- Basic concepts of polar, non-polar, hydrophilic, hydrophobic</li> </ul> <p><i>Practical / Investigative skills:</i></p> <ul style="list-style-type: none"> <li>- Drawing of a plasmolysed plant cell</li> <li>- Red blood cells burst to release haemoglobin when they are placed in hypotonic solution, staining solution red and the cells can no longer be observed under light microscope</li> <li>- More on SI (independent variable, dependent variable, controlled variables, control setup, reliability, assumptions, representation of results in table form, conclusion)</li> <li>- Importance of measuring percentage change instead of absolute change</li> </ul> <p><i>Special exam skills:</i></p> <ul style="list-style-type: none"> <li>- Graph plotting and reading of x-intercept</li> </ul>
<b>2<sup>nd</sup> Term</b>	<ul style="list-style-type: none"> <li>- Metabolism and enzymes (Aristo Bk1A Ch5)</li> </ul>	<p><i>Knowledge needing attention:</i></p> <ul style="list-style-type: none"> <li>- Energy level diagram</li> <li>- Specificity of enzymes</li> <li>- Rate of reaction can be given by the slope of curve of total amount against time</li> <li>- Relative rate of reaction can be given by the reciprocal of time taken for reaction completion</li> </ul> <p><i>Practical / Investigative skills:</i></p> <ul style="list-style-type: none"> <li>- Using milk agar plate to compare enzyme activity</li> <li>- Revision on SI (hypothesis vs prediction, independent variable, dependent variable, controlled variables, control setup, etc.)</li> </ul> <p><i>Special exam skills:</i></p> <ul style="list-style-type: none"> <li>- Describe and explain changes shown in a curve</li> <li>- Revision on graph plotting</li> </ul>
	<ul style="list-style-type: none"> <li>- Food and Humans (Aristo Bk1B Ch6)</li> </ul>	<p><i>Knowledge needing attention:</i></p>

	<ul style="list-style-type: none"> <li>- Food substances and deficiency diseases</li> <li>- Procedure of food tests (in textbook Ch2)</li> <li>- Balanced diet</li> <li>- Weight gain and weight loss is explained by comparing energy intake and energy output</li> </ul> <p><i>Practical / Investigative skills:</i></p> <ul style="list-style-type: none"> <li>- Observation of colour change of iodine solution, Benedict's solution and DCPIP solution (but not the food sample to be tested) in food tests</li> </ul> <p><i>Special exam skills:</i></p> <ul style="list-style-type: none"> <li>- Describe observations</li> <li>- Describe procedures of food tests</li> <li>- "With reference to...", "deduce..."</li> </ul>
<ul style="list-style-type: none"> <li>- Nutrition in humans (Aristo Bk1B Ch7)</li> </ul>	<p><i>Knowledge needing attention:</i></p> <ul style="list-style-type: none"> <li>- Processes of human nutrition</li> <li>- Drawing of tooth structure</li> <li>- Revision: transport of materials across membrane</li> </ul> <p><i>Practical / Investigative skills:</i></p> <ul style="list-style-type: none"> <li>- Observe microscopic slides of ileum</li> </ul>