

# **Lloyd Williamson Schools – IGCSE Cambridge Biology (Years 10 and 11)**

## **Scheme of work**

### **Syllabus Aims**

The syllabus aims listed below describe the educational purposes of a course based on the IGCSE syllabus.

- provide an enjoyable and worthwhile educational experience for all learners
- enable learners to acquire sufficient knowledge and understanding of the technological world and develop an informed interest in scientific matters.
- allow learners to recognise that science is evidence-based and understand the usefulness, and the limitations, of scientific method

### **Assessment Objectives**

#### **AO1: Knowledge with understanding**

Candidates should be able to demonstrate knowledge and understanding of:

- scientific phenomena, facts, laws, definitions, concepts and theories
- scientific vocabulary, terminology and conventions (including symbols, quantities and units)
- scientific instruments and apparatus, including techniques of operation and aspects of safety
- scientific and technological applications with their social, economic and environmental implications.

#### **AO2: Handling information and problem solving**

Candidates should be able, in words or using other written forms of presentation (i.e. symbolic, graphical and numerical), to:

- locate, select, organise and present information from a variety of sources
- translate information from one form to another
- manipulate numerical and other data
- use information to identify patterns, report trends and draw inferences
- present reasoned explanations for phenomena, patterns and relationships
- make predictions and hypotheses
- solve problems, including some of a quantitative nature.

#### **AO3: Experimental skills and investigations**

Candidates should be able to:

- demonstrate knowledge of how to safely use techniques, apparatus and materials (including following a sequence of instructions where appropriate); plan experiments and investigations; make and record observations, measurements and estimates; and interpret and evaluate experimental observations and data

<b>Term</b>	<b>Topic</b>	<b>Sub-topic</b>	<b>Criteria/Resources</b>
Yr10 – Autumn	B1 Characteristics of living organisms	<i>Movement, respiration, sensitivity, growth, reproduction, excretion, and nutrition</i>	Core
	B2 Cells	B2.1 Cell Structure <ul style="list-style-type: none"> <li>• Animals</li> <li>• Plants</li> </ul> B2.2 Movement in and out of cells <ul style="list-style-type: none"> <li>• Diffusion</li> </ul>	Core Supplement: <ul style="list-style-type: none"> <li>• Specialised cells</li> <li>• Osmosis</li> </ul>
	B3 Biological molecules	<ul style="list-style-type: none"> <li>• Carbohydrates, fats, proteins</li> <li>• Starch, glycogen from glucose</li> <li>• Proteins from amino acids</li> <li>• Fats and oils from fatty acids and glycerol</li> <li>• Tests for starch, sugars, proteins, and fats</li> <li>• Water as a solvent</li> </ul>	Core
	B4 Enzymes	<ul style="list-style-type: none"> <li>• Enzymes as proteins</li> <li>• Effects of temperature and pH on enzymes</li> </ul>	Core and supplement
Yr10 – Spring	B5 Plant nutrition	<ul style="list-style-type: none"> <li>• Photosynthesis</li> <li>• Factors affecting photosynthesis</li> <li>• Importance of nitrates and magnesium ions</li> </ul>	Core and supplement
	B6 Animal nutrition	B6.1 Diet <ul style="list-style-type: none"> <li>• Balanced diet</li> </ul> B6.2 Alimentary canal <ul style="list-style-type: none"> <li>• Associated organs and functions</li> <li>• <i>Ingestion, digestion, absorption, assimilation, and egestion</i></li> </ul> B6.3 Digestion <ul style="list-style-type: none"> <li>• Human teeth: types and structure</li> </ul>	Core Supplement: <ul style="list-style-type: none"> <li>• Malnutrition and deficiency</li> <li>• Dental decay</li> <li>• Digestive enzymes</li> <li>• Structure of villi</li> </ul>

	B7 Transport	<p>B7.1 Transport in plants</p> <ul style="list-style-type: none"> <li>• Xylem and phloem</li> <li>• Transpiration and translocation</li> </ul> <p>B7.2 Transport in mammals</p> <ul style="list-style-type: none"> <li>• Circulatory system</li> <li>• Heart, blood, and blood vessels</li> </ul>	Core and supplement
	B8 Gas exchange and respiration	<p>B8.1 Gas exchange</p> <ul style="list-style-type: none"> <li>• Respiratory system</li> </ul> <p>B8.2 Respiration</p> <ul style="list-style-type: none"> <li>• Aerobic, anaerobic respiration</li> </ul>	Core and supplement
Yr10 – Summer	B10 Reproduction	<p>B10.1 Asexual and sexual reproduction</p> <p>B10.2 Sexual reproduction in plants</p> <ul style="list-style-type: none"> <li>• Structure and parts of flowers; fertilisation</li> <li>• Pollination: cross pollination and self-pollination</li> <li>• Germination</li> </ul> <p>B10.3 Sexual reproduction in humans</p> <ul style="list-style-type: none"> <li>• Male and female reproductive systems</li> <li>• Fertilisation</li> <li>• Menstrual cycle</li> <li>• Human immunodeficiency syndrome (HIV)</li> <li>• Sexually transmitted infections (STIs)</li> </ul>	Core and supplement
<b>SUMMER VACATIONS</b>			
Yr11 – Autumn	B9 Coordination and response	<p>B9.1 Nervous control in humans</p> <ul style="list-style-type: none"> <li>• Nervous system and nerve impulses</li> <li>• Reflex action, voluntary and involuntary actions</li> </ul> <p>B9.3 Hormones</p> <ul style="list-style-type: none"> <li>• Hormones and glands</li> <li>• Examples of hormones (adrenaline)</li> </ul> <p>B9.4 Homeostasis</p> <p>B9.5 Tropic responses</p> <ul style="list-style-type: none"> <li>• Gravitropism and phototropism</li> </ul>	<p>Core Supplement:</p> <p>B9.2 Sense organs</p> <ul style="list-style-type: none"> <li>• Structure of eye and functions</li> <li>• Pupil reflex and seeing</li> </ul> <p>B9.5 Tropism</p> <ul style="list-style-type: none"> <li>• Tropism: auxins</li> </ul>

	B12 Organisms and their environment	<ul style="list-style-type: none"> <li>• Interpretation of food chains and food webs</li> </ul>	Supplement <ul style="list-style-type: none"> <li>• Ecosystems</li> <li>• Trophic levels</li> </ul>
	B13 Human influences on ecosystems	<ul style="list-style-type: none"> <li>• Carbon cycle</li> <li>• Deforestation</li> <li>• Pollution</li> </ul>	Supplement <ul style="list-style-type: none"> <li>• Combustion of fossil fuel</li> <li>• Eutrophication of water</li> </ul>
Yr11 – Spring 1	B11 Inheritance	B11.1 Chromosomes and genes <ul style="list-style-type: none"> <li>• Inheritance</li> <li>• Chromosomes, DNA and genes</li> <li>• Alleles and inheritance of sex in humans</li> </ul> B11.3 Monohybrid inheritance <ul style="list-style-type: none"> <li>• Define: Genotype and phenotype; homozygous and heterozygous; dominant and recessive</li> <li>• Punnett squares</li> </ul> B11.4 Variation and selection <ul style="list-style-type: none"> <li>• Variation</li> <li>• Natural selection</li> <li>• Selective breeding</li> </ul>	Core Supplement: B11.2 Cell Division <ul style="list-style-type: none"> <li>• Mitosis and meiosis</li> </ul>