Curriculum Content Science - Biology Year 10

Content - Big ideas

CB1: Key Biological Concepts (cont.): Enzymes

Big Question: Why are enzymes essential for life?

Learning Outcomes:

- Describe and explain the function of enzymes, giving examples
- Discuss the factors that affect enzyme mechanism of action and make predictions about experimental outcomes

CB2: Cells & Control

Big Question: How do cells grow, develop, divide and differentiate?

Learning Outcomes:

- Describe the steps in mitosis and relate the malfunctioning of this process with the development of tumor cells
- Describe cell growth and differentiation in both plants and animals
- Explain what stem cells are and discuss the ethics related to their therapeutic applications
- State the components of the human nervous system, describe nerve transmission, reflex arcs and the activity of synapses

CB3: Genetics

Big Question: How do our genes and the environment give us our unique characteristics?

Learning Outcomes:

- Describe meiosis and the production of gametes and zygotes
- Describe the structure of DNA and relate this to genes and alleles
- Carry out genetic crosses and make predictions about inheritance probabilities
- Define a gene mutation and understand what the Human Genone Project is
- Explain the genetic and environmental causes of variation, giving examples of each

CB5: Health, Disease and the Development of Medicines

Big Question: What is health and what are the consequences of ill-health?

- Describe health and relate this to communicable and non-communicable diseases
- Describe the effects of malnutrition and a poor diet on health, including liver cirrhosis, cardiovascular disease and the effects of smoking
- Name common pathogens of the 4 main types (bacteria, virus, fungi and protist), describe how they are spread, the diseases they cause and how transmission can be prevented
- Describe and explain the structure and function of the human immune system
- Describe the function of antibiotics and how new drugs are developed

CB9: Ecosystems & Material Cycles

Big Question: How do organisms interact within an ecosystem?

- Describe and explain ecosystems and interdependence
- Explain the difference between parasitism and mutualism and give examples of each
- Describe biodiversity, understand the impact of humans on biodiversity and the importance of preserving it
- Describing the cycling of water, carbon and nitrogen in ecosystems

Prior learning

- Enzymes in human digestion
- The structure of the cell and storage of genetic material in the nucleus; including the structure and function of specialized cells and prokaryotic cells
- The major food groups, the importance of a healthy balanced diet and the potential to develop deficiency diseases; the effect of drugs on life processes
- The process of photosynthesis; ecosystems, food chains and webs and the interdependence or organisms in ecosystems.

Global/IOM/Subject Links

Global & IOM links:

- Agriculture, Biosphere, Health & Medicine

Subject:

- Rates of reaction – Chemistry, Maths & D/T
- Diet & health – D/T
- Ethics – RS
- Ecosystems - Geography

Subject specific skills development

- Understanding the difference between a correlation and a causal effect
- Calculating rates of reaction

Practical skills

- Use of quantitative and qualitative techniques to record and evaluate enzyme activity (required practical)
- Use of biochemistry practical techniques to extract DNA
- Use of quadrats and transects to estimate population size and the effect of abiotic factors on communities (required practical)