Biology

YEAR 7 – MASTERY CURRICULUM

B1.1 Cells
- This unit introduces students to cells as the building blocks of all living things, under the big idea 'Cells are alive'.
- Students will learn that all living things are composed of cells, both singly and in multicellular organisms, working together as tissues, organs and organ systems.
- They will learn that cells become specialised in order to carry out their function and will study different cells under a light microscope.

B1.2 Reproduction
- This unit introduces students to their first specialised organ system, under the big idea 'characteristics are inherited'.
- Students will learn that all organisms reproduce and be introduced to some of the ways that different organisms do this.
- Students will learn about the role of the reproductive system in the onset of puberty and have the opportunity to study some of the changes that take place.

B1.3 Interdependence
- This unit introduces students to the concept of interdependence, under the big idea 'Organisms are Interdependent'.
- Students will be introduced to key ecological terminology and the structure of ecosystems. Students will learn how we can investigate different ecosystems using sampling methods and learn when and how each sampling method can be used.
- Students will learn about feeding relationships and develop an understanding of how organisms within a food chain or food web are interdependent.

YEAR 8 – MASTERY CURRICULUM

B2.1 Tissues and Organs
- This unit introduces students to a number of new mammalian organ systems, under the big idea 'bodies are systems'.
- Students will learn how movement is coordinated by the interaction of the muscular and skeletal systems. Students will study the structure and function of the skeletal system and learn how muscles work in antagonistic pairs to exert force on the skeletal system.
- Students will then learn about the structure and function of the breathing system and consider the use of a model for representing the volume and pressure changes that occur during inhalation and exhalation.

B2.2 Photosynthesis and Respiration
- This unit introduces students to biochemistry, beginning with respiration.
- Students will learn the basic processes of aerobic and anaerobic respiration and the role they play in releasing energy for organisms to use.
- This unit also introduces students to photosynthesis. Students will review the organs of the plant and consider how they aid the process of photosynthesis.
- Students will also study non-photosynthetic plants and consider how plants recycle resources within biomes.

B2.3 Life Diversity
- This unit introduces students to the types of variation and how this leads to diversity under the big idea 'species show variation'.
- Students will learn that variation is caused by inherited characteristics and interaction with the environment.
- Students will be provided with the opportunity to investigate continuous and discontinuous variation within their class and draw frequency tables or graphs to represent this.

YEAR 9 – MASTERY CURRICULUM

B3.1 Growth and Differentiation
- In this unit, students will develop their understanding of cell structure and specialisation.
- Students will learn to classify cells as eukaryotic or prokaryotic according to some basic features and revisit the function of the main sub-cellular structures.
- Students will have another opportunity to use microscopes to investigate cells and learn how scientists now use electron microscopes to study cells in more detail.
- Students will also have the opportunity to investigate bacterial growth using agar and develop their skills in using aseptic techniques.

B3.2 Human Interaction
- In this unit students will be introduced to the concept of biodiversity and learn why it is so important for the survival of organisms as part of the big idea 'organisms are interdependent'.
- Students will learn about the variety of ways that the global human population is affecting the environment; including how different types of pollution and the destruction of habitats is reducing biodiversity.

B3.3 Genetics
- In this unit, students will revisit the concept of reproduction and build on this to learn how characteristics are inherited.
- They will study the benefits of different types of reproduction to different organisms. They will be introduced to the process of meiosis and how this gives rise to the gametes of different organisms.
- Students will be formally introduced to heredity and learn how the scientific community developed an understanding of inheritance over time.

B2.4 Nutrition
- This unit introduces students to the digestive system as an example of an organ system.
- Students will learn the structure and function of the digestive system and the role that each organ plays.
- Students will be introduced to enzymes as biological catalysts, and learn the roles of bile, enzymes, acid and bacteria and their importance to digestion and gut health.

YEAR 10 – INTERLEAVED CURRICULUM

B4.1 The Digestive System
- Students build upon prior learning of the digestive system to delve deeper into the difference between mechanical and chemical digestion
- Students explore how the content of food can be determined practically and how the factors affecting enzyme activity can be investigated

B4.2 Circulation and Respiration
- Students expand their knowledge of the breathing system to include how it is adapted to maximise gas exchange
- Students are introduced to the cardiovascular system and learn how cardiovascular disease is an example of a non-communicable disease
- Students explore the link between respiration, metabolism and exercise

B4.3 Plants and Material Cycling
- Students further their knowledge of plant biology to include understanding of the structure and function of the xylem and phloem
- Students explore how the plant is adapted for the transport of substances needed for and produced by photosynthesis
- Students investigate the rate of photosynthesis
- Students learn about how materials are cycled in the atmosphere/ environment

B4.4 Health and Disease
- Students learn about different examples of communicable diseases and how they spread
- Students explore both the specific and non-specific responses that our bodies use to fight infection

B4.5 Ecology
- Students learn how an ecosystem is organised and factors that affect both the ecosystem and organisms living in it
- The relationship of predator and prey is explored and how this changes over time
- Students explore the impact of environmental change and how farming, biotechnology and food security are affected

YEAR 11 –INTERLEAVED CURRICULUM

B5.1 Feedback and Control
- Students learn about the nervous system, its structure and function and how this enables the body to coordinate response
- Students learn about the different systems involved in maintaining homeostasis, the chemicals they produce and the changes they cause

B5.2 Controlling Reproduction
- Students learn to distinguish between sexual and asexual reproduction
- Students explore the role of hormones in bringing about change in the body such as during the menstrual cycle

B5.3 Controlling Nature
- Students learn how technology allows for the manipulation of DNA and genomes to bring about desired changes and a range of beneficial outcomes.

B5.4 Evolution
- Students learn the process of evolution by natural selection as an example of how scientific ideas change over time in light of new evidence.
- Students explore how organisms are classified based upon their features

Revision of Biology – PPE's used to identify priority areas.

FORTIS Academy