Dimensions	Big questions of biology	Themes	Summary of Themes
Practices of Biology (Biology as a science)	How do we study the biological world?	Asking questions about the biological world	The study of the biological world can be prompted by asking questions, some of which are more amenable to scientific investigation than others. Biologists try to answer questions by developing explanations based on evidence from data, observations and measurements, provided by scientific enquiries.
		Planning practical experiments and investigative work	Biologists plan scientific enquiries, including practical experiments and investigative work, to collect data in a variety of settings, including in the field, in a safe, ethical and repeatable way. Scientific enquiries may aim to answer a question, or test a hypothesis or prediction, about a biological phenomenon.
		Carrying out practical experiments and investigative work	Biologists collect data in a variety of settings, including in the field, using practical experiments and investigative work. They work safely, ethically and in an objective and repeatable way.
		Analysing, interpreting and evaluating data	Before biologists can make inferences and draw conclusions, the data they have collected have to be processed, interpreted, analysed and evaluated, which may be done qualitatively or quantitatively.
		Developing explanations, classification systems and models	A cycle of collecting and analysing data provides evidence that enables biologists to develop and improve scientific explanations, classification systems and models. These can help to make sense of biological phenomena and answer questions about the biological world.
		Communicating information and engaging in evidence-based arguments	Biologists communicate about their work with a range of audiences within and beyond the scientific community, to facilitate evidence-informed debate and decision-making.
Concepts of Biology (Core concepts of biology)	What are organisms and what are they made of?	Defining life	All living organisms need particular things to stay alive and they carry out characteristic processes as part of a life cycle. Life is a property that emerges when biological structures are organised and work together in an integrated way to support the functioning of an organism.
		Cell structure and function	*This theme is introduced at age 11-14*. All organisms are made up of cells. There are similarities and differences between prokaryotic and eukaryotic cells. Our understanding of cell structures and their functions has been developed using microscopy.
		Tissues, organs and systems	Humans, other animals and plants are made up of parts, including tissues, organs and organ systems, adapted for distinct functions; these parts work together to help the organism stay alive.
		Biochemistry	*This theme is introduced at age 11-14*. Chemical reactions that make and break down substances take place all the time in living organisms. Photosynthesis and cellular respiration are important chemical processes that occur within living cells. The rate of many chemical reactions in living organisms is controlled by enzymes.
	How do organisms grow and reproduce?	Reproduction, growth and development	Reproduction is one of the characteristic life processes of living organisms, in which they produce new individuals of the same kind. Different types of living organisms have different life cycles and reproductive strategies, and change as they grow and age.
		Inheritance and the genome	*This theme is introduced at age 11-14*. Each generation of organisms inherits characteristics from the one before, which arise from genetic information stored in the DNA of the genome and are affected by the environment. Understanding the genome has important implications for healthcare, biotechnology, agriculture and classification.
	Why are organisms so different?	Variation, adaptation, evolution	Organisms have become adapted in different ways to survive within different environments. The characteristics of groups of living things change over generations through a process of evolution by natural selection.
		Classification	Organisms can be identified and classified into a hierarchy of groups based on their similarities and differences, which helps us make sense of the great diversity of organisms, living and extinct.
	How do organisms stay healthy?	Physical and mental health	Humans and other animals have physical and mental health, which range from good to ill health. The physical and mental health of an individual organism results from interactions between the organism's body, behaviour, environment and other organisms. Ill health can be treated in various ways.
		Health and human lifestyles	The risk of an individual developing non-communicable diseases depends on interacting factors including the information stored in their genome, their environment and aspects of their lifestyle. A number of lifestyle factors affect physical and mental health in positive and negative ways.
		Health and infectious disease	Some diseases in humans, other animals and plants are infectious, caused by a variety of pathogens. Effective prevention or treatment of a communicable disease depends on identification of the disease, the pathogen causing it and how it is spread.
	How do organisms live together?	Interdependence of organisms	Organisms living in the same place interact. All living organisms need food and other nutrients to stay alive; plants make their own food while animals, including humans, eat other organisms. Feeding relationships are one aspect of interdependence within ecosystems.
		Environmental interactions and processes	Organisms interact with the environments in which they live. These environments change over time and this affects the organisms that live there in positive and negative ways.
		Biodiversity and human impacts	Human actions affect a range of local and global habitats, and the organisms that live there, in both positive and negative ways. Some of our actions affect organisms that we depend on for food and other resources.
Applications of Biology (Biology in the world)	How do people use biological knowledge?	Developing applications to promote health and environmental wellbeing	Biological knowledge is applied to develop new products, technologies and processes intended to promote health and wellbeing, and which improve the ways in which we interact sustainably with our environment.
		Evaluating impacts of biological knowledge and its applications	When considering the use of biological knowledge, we must weigh up the benefits, risks and ethical issues associated with its use, to enable evidence-based decisions to be made.
		Influencing society	Biological knowledge can change the behaviour of individuals and groups of people, including organisations and governments. It enables them to make decisions based on understanding and evidence, which may affect the wellbeing of people, other organisms and the environment.