

Level	Cells	Organisation	Material and Energy	Interactions and Interdependence	Genetics and Evolution	Health, Disease and Medicine
9		a) Assess the advantages and disadvantages of using dialysis, organ transplant and mechanical devices.				a) Detail the process of making monoclonal antibodies engineered by scientists.
8	a) Explain how bacteria multiply using the process of binary fission. b) Evaluate how to investigate culturing microorganisms using the aseptic technique.	a) Examine the process of accommodation in the human eye and how it works to focus on near and distant objects linking to the structures of the eye and their functions.		a) Examine the effects of increasing meat consumption on global food security.	a) Evaluate the impact of Gregor Mendel's discoveries in genetics during the 19 <sup>th</sup> century. b) Evaluate the potential risks of cloning animal cells, plant tissue and cuttings.	a) Elaborate the uses of monoclonal antibodies to treat cancer and determine pregnancy.
7	a) Evaluate the uses of stem cells. b) Evaluate the role of enzyme controlled reactions in industry.	a) Explain the importance of hormones in human fertility including contraception and fertility. b) Explain methods used to map regions of the brain to particular functions. c) Evaluate the difficulties of investigating and treating brain disorders. d) Evaluate methods used to correct vision defects including lenses and laser technology. e) Explain how dialysis machines filter the blood during kidney failure. f) Explain how the types of tropism determine the direction of plant growth.	a) Explain how to calculate mean efficiency of biomass transfer between trophic levels from interpreting data.	a) Explain the positive and negative human interactions within ecosystems. b) Evaluate the impacts of fish rearing and factory farming on food production and security.	a) Evaluate the uses of modern biotechnology. b) Explain how DNA can be used in the synthesis of proteins and chains of amino acids. c) Explain how mutations could lead to a change in the synthesis and function of proteins. d) Explain the processes of plant tissue and animal cell cloning. e) Explain the process of speciation linking to isolating barriers, variation and natural selection.	a) Explain the role of the immune system in fighting disease. b) Explain mechanical and chemical adaptations of plants to help them defend against diseases.
6	a) Describe the role of stem cells in animals and meristems and plants.	a) Explain the role of homeostasis in maintaining a constant internal environment including temperature regulation and blood glucose levels. b) Describe how the structure of the eye changes in different light levels. c) Explain how the body responds to high and low body temperatures. d) Describe the process by which the kidneys remove unwanted substances from the body and return useful substances to the	a) Compare and contrast the similarities and difference of aerobic and anaerobic respiration, including symbol equations and their effects for the organism. b) Explain the need for transport systems in multicellular organisms. c) Explain the role of photosynthesis in the carbon cycle and for producing biomass in plants. d) Describe how biogas is produced using decay and conditions required for producing biogas.	a) Explain how materials are cycled through abiotic and biotic components of an ecosystem. b) Explain how decomposers play an important role in ecosystems. c) Describe examples of environmental changes that affect food production.	a) Identify the potential impact of genomics on medicine. b) Demonstrate single gene inheritance using genetic crosses. E.g. sex determination and cystic fibrosis. c) Explain the process of natural selection and how it leads to extinction. d) Describe the process of genetically modifying organisms. e) Explain how the DNA bases in a gene code for a specific chain of amino acids.	a) Describe methods of reducing the spread of infectious diseases. b) Describe the process of discovery and development of new medicines. c) Explain the impact of lifestyle factors on the incidence of non-communicable diseases. d) Describe how mineral deficiency can affect the health of plants.

		<p>blood.</p> <p>e) Describe how Auxin controls growth in plants.</p> <p>f) Outline the commercial uses of plant hormones.</p>	<p>e) Explain why there are losses of biomass at each trophic level in a food chain.</p>		<p>f) Identify how mutations affect DNA of an organism.</p>	
5	<p>a) Classify cells as eukaryotic and prokaryotic based upon structure.</p> <p>b) Identify the factors that affect the rate of enzyme controlled reactions.</p>	<p>a) Describe the function of a reflex arc.</p> <p>b) Describe where hormones are made and how they are transported around the body.</p> <p>c) Establish the main regions of the brain and their functions</p> <p>d) Describe the structure and function of the eye</p> <p>e) Discuss how the body's thermoregulatory centre monitors and controls body temperature.</p>	<p>a) Explain the process of anaerobic respiration in humans and microorganisms including fermentation.</p> <p>b) State the relationship between structure and function of the human circulatory system.</p> <p>c) Explain how different affect the rate of photosynthesis.</p>	<p>a) Describe the role of decomposers in the cycling of materials.</p> <p>b) Explain the importance of biodiversity.</p>	<p>a) Define the term genome.</p> <p>b) Describe how the genome influences the phenotype of an individual.</p> <p>c) Describe the process of selective breeding in agriculture.</p>	<p>a) Describe how the body defends against pathogens.</p> <p>b) Outline the symptoms of plants with disease.</p>
4	<p>a) State the uses of enzymes in organisms.</p>	<p>a) Outline the role of homeostasis.</p> <p>b) Explain the roles of tissues and organs in the digestive system including adaptations.</p> <p>c) Describe the mechanism of breathing including the pressure model and measure lung volume.</p>	<p>a) Describe the process of anaerobic respiration including the word equation</p> <p>b) Identify the different trophic levels in a food chain.</p>	<p>a) Identify biotic and abiotic factors in an ecosystem.</p> <p>b) Describe methods of measuring distribution and abundance.</p>	<p>a) Explain the importance of maintaining biodiversity and summarise the use of gene banks.</p> <p>b) Describe the types of evidence that support evolution.</p>	<p>a) Describe different communicable and non-communicable diseases.</p> <p>b) Identify different types of pathogens that can cause disease and damage in plant.</p>
3	<p>a) Describe the adaptations of specialised cells in animals, plant and unicellular organisms.</p> <p>b) Describe the function of muscles and how they work together with the skeleton to provide movement, including the measurement of force exerted by muscles.</p> <p>c) Calculate the energy requirements in a healthy diet and discuss the consequences of an imbalance diet.</p>	<p>a) Describe the hierarchical organisation of multicellular organisms.</p> <p>b) Describe the function of muscles and how they work together with the skeleton to provide movement, including the measurement of force exerted by muscles.</p> <p>c) Identify different parts of the human nervous system.</p> <p>d) Identify the role of hormones in the body.</p>	<p>a) Describe how plants make carbohydrates by photosynthesis and gain minerals and water from the soil.</p> <p>b) Describe the process of gas exchange in humans and the effects of exercise, asthma and smoking.</p> <p>c) Describe how leaves are adapted for photosynthesis.</p>	<p>a) Discuss how organisms are affected by the accumulation of toxic materials in the environment.</p> <p>b) Identify the positive and negative human interactions within ecosystems.</p> <p>c) Define the term biodiversity.</p>	<p>a) Simply model the structure of chromosomes and DNA, stating the role of scientists in the development of the DNA model.</p> <p>b) Recognise the reasons of variation between individuals and between species and categorise variation as continuous and discontinuous.</p> <p>c) Describe the reasons for natural selection and extinction</p>	<p>a) Understand the relationship between health and disease.</p> <p>b) Identify lifestyle factors that influence health.</p> <p>c) Calculate the energy requirements in a healthy diet and discuss the consequences of an imbalance diet.</p>
2	<p>a) Identify the role of diffusion in the movement of material in and out of cells with</p>	<p>a) Describe the structure and function of the human skeleton to include support,</p>	<p>a) State the role of leaf stomata on gas exchange in plants.</p> <p>b) Identify different tissues,</p>	<p>a) Simply state the dependence between photosynthetic and non-photosynthetic</p>	<p>a) State that heredity is the process by which genetic information is passed from one</p>	<p>a) Identify that pathogens can be bacteria, viruses or fungi.</p> <p>b) Describe the effects of</p>

	<p>examples.</p> <p>b) State the function of cellular organelles.</p> <p>c) Demonstrate how to use a microscope.</p>	<p>protection and making blood cells.</p> <p>b) Describe reproduction in humans including male and female reproductive systems, menstrual cycle and gametes and fertilisation.</p>	<p>organs and organ systems in animals and plants.</p>	<p>organisms.</p> <p>b) Describe the interdependence of organisms in an ecosystem with regards to food webs.</p> <p>c) State the importance of plant reproduction through insect pollination for food security</p>	<p>generation to the next.</p> <p>b) Describe the difference between species</p>	<p>recreational drugs on behaviour and health.</p>
1	<p>a) Compare and contrast animal and plant cells.</p> <p>b) Identify key parts of a microscope.</p>	<p>a) Identify different methods of seed dispersal and describe simply reproduction in flowering plants and pollination.</p>	<p>a) State the purpose of photosynthesis and identify the reactants and products of photosynthesis with a word equation.</p> <p>b) State the purpose of aerobic respiration and identify the reactants and products with a word equation.</p>	<p>a) Use keys to identify species.</p> <p>b) Describe basic adaptations for animals and plants in their habitat.</p>		<p>a) Identify the structure of plant and animal cells and state the function of their key components.</p>
E3	<p>a) Identify different parts of plants and animal cells.</p>	<p>a) Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.</p> <p>b) Describe the life process of reproduction in some plants and animals.</p> <p>c) Describe the changes as humans develop to old age.</p> <p>d) Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</p> <p>e) Describe the ways in which nutrients and water are transported within animals, including humans.</p>		<p>a) Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals.</p> <p>b) Give reasons for classifying plants and animals based on specific characteristics.</p>	<p>a) Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.</p> <p>b) Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.</p> <p>c) Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</p>	<p>a) Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.</p>
E2		<p>a) Describe the simple functions of the basic parts of the digestive system in humans</p> <p>b) Identify the different types of teeth in humans and their simple functions.</p>		<p>a) Recognise that living things can be grouped in a variety of ways.</p> <p>b) Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.</p> <p>c) Recognise that</p>		

				<p>environments can change and that this can sometimes pose dangers to living things.</p> <p>d) Construct and interpret a variety of food chains, identifying producers, predators and prey.</p>		
E1		<p>a) Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.</p> <p>b) Investigate the way in which water is transported within plants.</p> <p>c) Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</p> <p>d) Identify that humans and some other animals have skeletons and muscles for support, protection and movement.</p>				<p>a) Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant.</p> <p>b) Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat.</p>