

Learning Standards

Unit title/ statement of inquiry	Knowledge Content Students are expected to know the following...	Concepts	Curricular Competencies Students are expected to do the following...
Health and nutrition It is important to be able to critically analyse and evaluate evidence from health related studies so that informed decisions can be made to achieve a healthy balanced life. 13 weeks	- list the components of a balanced diet and one function of each: carbohydrate, lipid, protein, vitamins, minerals, fibre and water - understand the difference between monomers, macromolecules and polymers - describe the structure of proteins in terms of chains of amino acids and explain the almost infinite number of possible proteins - Give examples of the many functions of proteins in the body (enzymes, antibodies, muscle, transport, hair, nails.... etc) - Describe the causes and symptoms of kwashiorkor and marasmus - explain the role of enzymes include specificity, active site and denaturation (pH and Temperature) - state the sources of carbohydrates in food and give some examples of different types of carbohydrates (including glucose, deoxyribose, lactose, sucrose, cellulose, starch and glycogen) - State that carbohydrate can be stored in the liver as glycogen in limited quantities - define cell respiration and understand the importance of this reaction for living organisms - compare aerobic and anaerobic cell respiration in humans, including word and symbol equations and an understanding of when each type of respiration is used - define homeostasis, and give examples of factors which must be controlled within limits in the body (blood glucose, temperature, water) - describe the control of blood glucose by the liver and pancreas, and the roles of insulin and glucagon - describe the causes and consequences of diabetes type I and II and understand reasons for an increase in prevalence of type II diabetes - define epidemiology and understand the complexities of gathering and analysing data in scientific investigations that involve humans - define correlation and understand that correlation does not necessarily show a causal relationship - Evaluate the findings of health related studies - describe the general structure of a triglyceride (glycerol and 3 fatty acids) - describe different types of fatty acids: saturated,	Relationships Evidence	Knowing and understanding - Explain scientific knowledge - Apply scientific knowledge and understanding to solve problems set in familiar and unfamiliar situations - Analyse and evaluate information to make scientifically supported judgments. Inquiring and designing - Explain a problem or question to be tested by a scientific investigation - Formulate a testable hypothesis and explain it using scientific reasoning - Explain how to manipulate the variables, and explain how data will be collected - Design scientific investigations. Processing and evaluating - Present collected and transformed data - Interpret data and explain results using scientific reasoning - Evaluate the validity of a hypothesis based on the outcome of the scientific investigation - Evaluate the validity of the method - Explain improvements or extensions to the method. Reflecting on the impact of science - Explain the ways in which science is applied and used to address a specific problem or issue - Discuss and evaluate the various implications of the use of science and its application in solving a specific problem or issue - Apply scientific language effectively - Document the work of others and sources of information used.

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	unsaturated (monounsaturated, polyunsaturated, cis and trans) and give examples of how the structural differences affect the nature and properties of these lipids - state the functions of lipids and their sources in food - describe how an excess intake of macromolecules can be converted into lipids and stored as adipose tissue which is an unlimited storage tissue - describe coronary heart disease and understand the associated risk factors		
Humans and the environment As a consequence of an increased demand for food and resources, the balance of our natural environment is under threat. 11 weeks	- understand the meaning of the following terms: ecology, species, population, community, ecosystem, biome and biodiversity - distinguish between abiotic and biotic factors within an ecosystem and understand their effects on the community - describe the temperature, rainfall and vegetation that characterize the major biomes of the Earth (tundra, coniferous forest, broadleaf forest, tropical forest, grassland and desert) - describe the changes in biodiversity, abiotic and biotic factors associated with succession from bare rock to forest (including an understanding of pioneer species and climax communities) - list various factors that alter the progress of succession - understand the process of photosynthesis including the intake of carbon dioxide through the stomata, absorption of water in the roots by osmosis and the absorption of light by chlorophyll - state the word and symbol equation of photosynthesis - state the word equation for aerobic respiration - identify the different types of cells in a leaf (palisade mesophyll, spongy mesophyll, lower epidermis, upper epidermis and guard cells). - list some materials that glucose can be converted into after it has been made by photosynthesis - describe and explain how light intensity, carbon dioxide concentration and temperature affect the rate of photosynthesis (including the concept of limiting factors) - understand that mineral ions are absorbed from the soil by the roots, and are needed in order to make components such as proteins, DNA and chlorophyll (due to their chemical compositions) - understand the life cycle of a plant (including germination, structure of a flower, pollination, fertilization, formation of a fruit and seed dispersal) - describe the process of germination and state the conditions necessary (water, oxygen, warmth) - define (primary) productivity and explain the differences in	Change Consequences Environment	

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	- productivity between biomes - describe the flow of energy in a food chain and explain why energy is lost between trophic levels and how this limits its length - identify the trophic levels of organisms in a food chain, and to know the terms herbivore, carnivore, producer, primary consumer, secondary consumer and tertiary consumer - describe the sigmoid population growth curve and understand the limits to the population at each stage (lag, exponential and stationary) including the term carrying capacity - understand the consequences of an increased human population on land use - define and list common causes of extinction and risk factors for endangered species - understand the role of conservation to maintain biodiversity and prevent extinction		
Bioethics The manipulation of natural biological processes through medical technology generates differing perspectives and ethical debate. 14 weeks	- distinguish between asexual and sexual reproduction and the advantages of each - state and understand the function of the processes of mitosis and meiosis, including the types of cells produced by each and the functions of each type of cell division (no detail on different stages, copying or movement of chromosomes) - describe the structures and functions of the female and male reproductive systems - describe the menstrual cycle - the thickness of the uterus lining at each stage, and the events occurring inside the ovary - state the role of each of the four hormones involved (FSH, estrogen, LH, progesterone) - outline the events of fertilization, pregnancy (role of placenta and amniotic sac) and birth - Evaluate three different methods of contraception - understand the process of reproductive cloning, using Dolly the sheep as an example - describe the structure of DNA. Include polymers of nucleotides made of sugar, phosphate and base; base pairing (A-T, C-G); and double helix - understand that DNA is used as a code for making proteins, and the idea that three bases code for one amino acid (no details of transcription and translation are required) - understand that the code is universal and that there are 64 possible codes for only 20 possible amino acids - understand that a change in the base sequence of DNA	Perspective Consequences	

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- could lead to a change in the amino acids that make up a protein and therefore an alteration in its functionality
- define allele, gene and chromosome
 - understand that variation is a result of genetic differences (in alleles and genes) and the environment
 - understand the process of natural selection and how this leads to evolution
 - understand the principle of genetic modification and use examples to illustrate the advantages of this process. No detail of the mechanism is required
 - show an understanding of the main stages of life
 - understand the importance of telomeres in the process of ageing
 - describe at least one example of a disease associated with ageing (e.g. Alzheimer's, Parkinson's)
 - Discuss the ethical debates surrounding euthanasia and why there are different perspectives