



OVERVIEW INTEGRATED SCIENCES GRADE 8

Unit title and teaching hours	Key concept	Related concepts	Global context	Statement of inquiry	Objectives	ATL skills	Content
Body systems 35	Systems	Consequences function	Identities and relationships	The choices we make in our lifestyle have an impact on how our body systems function, on who we are and on how we relate to our environment.	A B C D	<p>Communication: Use and interpret a range of discipline-specific terms and symbols</p> <p>Social: Exercise leadership and take on a variety of roles within groups; Listen actively to other perspectives and ideas</p> <p>Self-management: Set goals that are challenging and realistic; Self-motivation: practise analysing and attributing causes for failure, Practise managing self-talk, Practise positive thinking</p> <p>Research: Process data and report results; Create references and citations, use footnotes/endnotes and construct a bibliography according to recognized conventions</p> <p>Thinking: Gather and organize relevant information to formulate an argument, Research skills: access information to be informed and inform others, seek a range of perspectives from varied sources</p>	<p>cell structures (i.e. ribosomes, mitochondria, cell membrane)</p> <p>molecules that make up or are used by cell structures</p> <p>four macronutrients (carbohydrates, proteins, lipids and fibre)</p> <p>component parts of each macronutrient (amino acids, fatty acids, etc.)</p> <p>role of each of the macronutrients in healthy body function</p> <p>healthy sources of each of the macronutrients</p> <p>role of enzymes in digestion</p> <p>benefits and limitations of different types of diets</p> <p>common digestive disorders</p> <p>photosynthesis</p> <p>cellular respiration</p> <p>role of carbohydrates (glucose) in cellular respiration</p> <p>function of the human circulatory system</p> <p>parts of a heart on a diagram</p> <p>components of blood.(red blood cells, white b.c., platelets and plasma)</p> <p>function of the different types of circulation: pulmonary and systemic circuits.</p> <p>investigate circulation</p> <p>basic components of the respiratory system and know their functions.</p> <p>gaseous exchange</p> <p>smoking and health</p> <p>diffusion as a movement from area of high to low concentration.</p> <p>basic structures and functions of neurons</p> <p>role of acetylcholine in the flight or flight response</p> <p>characteristics of bones</p> <p>different types of bone</p>



<p>Matter</p> <p>Chemical reactions</p> <p>Acids and Alkalis</p> <p>40 hours</p>	<p>Change</p>	<p>Models Patterns</p>	<p>Scientific and technical Innovation</p>	<p>By changing matter we can identify patterns in properties that help us to make models, and the models help us invent new kinds of material.</p>	<p>A,B,C,D</p> <p>All strands</p>	<p>Information literacy skills Critical-thinking skills Creative-thinking skills Transfer skills</p>	<p>Conservation of mass in chemical reactions Chemical reactions in terms of word equations Balancing a chemical equation Metals and non-metals in terms of their physical properties Reactivity series and patterns within the periodic table- the reactivity series of metals Different types of chemical reaction: combustion, thermal decomposition, oxidation (and reduction), displacement Uses of metals in terms of their physical properties Extension: The use of chemical processes to extract a metal from its ore- Predictions about chemical reactions using chemical formulae The properties of acids and alkalis in terms of their reactions with: metals, carbonate and alkali: acid + metal, acid + carbonate, acid + alkali Indicators: The use of indicators to measure acidity and alkalinity The pH scale Neutralization reactions- Chemical reactions using chemical formulae Extension: the formation of ions in solution by acids and alkalis</p>
<p>Energy, Work, Power, Machines</p> <p>18 hours</p>	<p>Change</p>	<p>Energy Movement</p>	<p>Scientific and technical innovation</p>	<p>Machines have revolutionized life by making it easier to change energy from stored forms to movement and back again.</p>	<p>A,B,C,D all strands</p>	<p>Communication skills Information literacy skills Media literacy skills: Critical-thinking skills</p>	<p>(Underlined words indicate a learning objective carried over from MYP Sciences by Concept 1, chapter 4) <u>Energy units</u> The use of energy as work in some machines <u>Energy changes</u> in a range of observed processes (combustion, temperature change, electricity generation and chemical reactions) Phenomena and energy changes involved Kinds of energy (potential and kinetic) Energy change: transfer and loss/minimizing energy loss Simple machines : levers, pulleys and gears Function of simple machines in terms of: <ul style="list-style-type: none"> forces of effort and load, and distance of action </p>



							<p>force-magnifying and distance-magnifying levers</p> <p>Applications of simple machines</p> <p>Power as the rate of changing of energy/units</p> <p>Energy = power × time</p> <p>Work done by some simple machines</p> <p>Useful/wasted energy exchanged in physical systems</p> <p>Efficiency = $\frac{\text{work out}}{\text{energy in}}$ or efficiency = $\frac{\text{power out}}{\text{power in}}$</p> <p>(compare machines)</p> <p>Chemical changes (endothermic /exothermic) and the direction of heat flow between the environment and the reactants-Energy difference between reactants and products in endothermic and exothermic chemical changes</p> <p>Combustion</p> <p>Energy in the universe</p> <p>Efficiency is always < 1 (explaining in terms of heat loss)</p>
<p>Electricity and Magnetism</p> <p>18 hours</p>	Relationships	Form Balance Transformation	Orientation in space and time	Electrical and magnetic forces fill space as fields; understanding their form and relationships allows us to transform energy in useful ways.	B,C,D All strands	<p>Information literacy skills</p> <p>Critical-thinking skills</p> <p>Creative-thinking skills</p> <p>Transfer skills</p>	<p>Forces in terms of electrical and magnetic forces/interactions</p> <p>Basic properties of magnetic fields: polarity, strength, variation</p> <p>Earth's magnetic field interaction with magnetic materials and charged particles</p> <p>Types of electric charge, static electric</p> <p>The properties of electric and magnetic fields</p> <p>Electric current -Flow of electrons and work done-Units</p> <p>Conventional and real current flow</p> <p>Simple series and parallel circuits</p> <p>Circuits diagrams</p> <p>Electrical conductors and insulators</p> <p>Potential difference, or voltage/Units</p> <p>Currents and voltages in circuits</p> <p>Resistance and conductivity/Units</p> <p>Physical properties of conductors and conduction of current through a circuit</p> <p>Resistance and obstructions to the flow of free electrons</p>



<p>Optics and Waves Transmission of information</p> <p>18 hours</p>	<p>Systems</p>	<p>Energy Interaction</p>	<p>Personal and cultural expression</p>	<p>We interact and express ourselves through systems that manipulate information as different forms of energy.</p>	<p>A,B,C,D all strands</p>	<p>Communication skills Collaboration skills Information literacy skills: Critical-thinking skills</p>	<p>History of information transmission: visual/sound, analogue telegraphy, radio telegraphy, analogue telephony, mobile digital telephony, internet Ray diagrams showing the effects of plane, concave (diverging) and convex (converging) mirrors Simple lens and mirror systems Formation of images/ properties Properties of images: magnification, diminished image, lateral inversion, real and virtual images Total internal reflection in terms of the refractive properties of different optical media Ray diagrams to show total internal reflection The use of total internal reflection in fibre optic signal transmission Production and reception of radio waves Analogue information systems: LPs, magnetic audio tape Encoding of information digitally using binary numbers Applications of digital information encoding: bar/QR codes, TV remotes, DVD/Blu-ray The use of binary information to store information in computer memory Principal elements of digital information networks: router/modem, server The operation of a cellphone system The technique of amplitude modulation to encode information in waves Application of amplitude modulation to simple information systems: Morse code, radio, fibre optic transmission The technique of frequency modulation to encode information in waves Advantages of frequency modulation over amplitude modulation in the transmission of information</p>
<p>Environmental Chemistry and cycles</p> <p>14 hours</p>	<p>Systems</p>	<p>Balance</p>	<p>Globalization and sustainability</p>	<p>Balancing the chemical inputs and outputs of Earth's systems is a prerequisite to sustain an</p>	<p>A,B,C,D All strands</p>	<p>Communication skills Collaboration skills Organization skills Information literacy skills Critical-thinking skills Transfer skills</p>	<p>Earth's changing atmosphere Processes carried out by living organisms (photosynthesis and denitrification) Experimental testing using cobalt(II) chloride paper that air contains water vapour</p>

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environment that is hospitable to human life.

Determine atmospheric composition and extraction processes
Earth's systems : Biosphere, Hydrosphere, Lithosphere and Atmosphere (characteristics of gases, atmospheric composition)
The greenhouse effect
The carbon cycle(emissions and environmental implications)
The Nitrogen cycle, and nutrient (phosphate) cycles
Anthropogenic carbon emissions- carbon footprint calculators
Feasibility of populating another planet, either by providing technical solutions or terraforming its systems
Emissions caused by the combustion of different solid fuels
Impacts, on an organism or mineral, of dissolved pollutants in water
Environmental footprints of brands of bottled drinking water (suggest alternatives)
Ammonium sulfate, as an example of a fertilizer
How different cycles of the Earth are linked
The catalytic cycle of ozone depletion
The Montreal protocol that contributed to its success
Extended: Relationship between radicals and other chemical species, such as atoms, molecules and ions