

Subject Overview 2022-23

MYP Sciences

Grade 6

Unit title	Key Concept	Related concept(s)	Global context	Statement of Inquiry	ATL Skills and Learner Profile	Content and Service Learning	Summative Assessment & MYP Objectives
Pre-unit – Health & Safety (1 weeks) Term 1 Sept					Caring	Classroom rules and expectations Lab safety – Students identify safety issues in pictures demonstrating lab scenarios. Hazard Symbols – Illustrating hazard activities, crossword and poster, Methane bubbles demonstration. Risk assessment – How to write a risk assessment Using a Bunsen burner – Investigating a Bunsen burner, lighting a Bunsen burner, differentiated worksheets, Safety training certificate awarded at the end of the pre-unit. Further use of available Twinkl resources and learning videos to consolidate learning. Introduction to MYP Science criteria with examples.	Risk Assessment for lighting a bunsen burner.
Unit 1 - What do scientists do? (8 weeks) Term 1 Physics Sept - Oct	Relationships	Evidence	Identity and relationships Exploration - Teams	A scientist means to gather evidence about similarity and difference in nature to help us understand how things are related.	Learner Profile Inquirer Thinking: Creative Thinking Skills <ul style="list-style-type: none"> Use brainstorming and visual diagrams to generate new ideas and inquiries Make guesses, ask “what if” questions and generate testable hypotheses Thinking: Critical Thinking Skills <ul style="list-style-type: none"> Gather and organize relevant information to formulate an argument <ul style="list-style-type: none"> Interpret data Research: Information Literacy Skills <ul style="list-style-type: none"> Process data and report results Revise understanding based on new information and evidence Self- Management Skills: Reflection skills <ul style="list-style-type: none"> Identify strengths and weaknesses of personal learning strategies (self-assessment) 	Discuss how to think and work scientifically Formulate inquiry questions that can lead to scientific investigation Identify variables Classify variables as independent or dependent for a given experimental investigation Design a method to conduct the experiment. Present data collected in a graph. Analyze the data & explain patterns. List the main features of a scientific laboratory Formulate rules for safe laboratory practice Evaluate the hypothesis and the method. Infer based on the results of the experiment. Service Learning Students take action by researching various scientists, their life history, challenges & accomplishments. They will make posters of their favorite scientist.	Summative: Students research, design and carry out experiments collect data, analyze interpret & evaluate. Criterion B: Inquiring and designing Criteria C: Processing and Evaluating Writing a lab report.

<p>Unit 2 – How do living things work? (6 weeks)</p> <p>Term 1</p> <p>Biology</p> <p>Nov - Dec</p>	Relationships	Form, Function	Globalization and Sustainability	By understanding the relationships between the necessities of life and the specialized forms and functions of living things, we can take decisions and actions for healthier and more sustainable lifestyles.	<p>Learner Profile Communicator</p> <p>Communication skills</p> <ul style="list-style-type: none"> Organize and depict information logically <p>Thinking: Creative Thinking Skills</p> <ul style="list-style-type: none"> Use brainstorming and visual diagrams to generate new ideas and inquiries 	<p>Outline and give examples of the characteristics of all living things Outline and give examples of the necessities of all living things Outline and give examples of some specialized structures of different species Outline and make inferences about the relationship between specialized structures and their functions Compare and contrast specialized characteristics of different species Compare and contrast specialized necessities of different species Describe how we are able to use our understanding of living things in order to take decisions and actions that impact life Describe how our decisions and actions are limited by the characteristics of living things.</p>	<p>Summative:</p> <p>Criteria D: : Reflecting on the impacts of science – Research based presentation</p>
<p>Unit 3 – What changes? (5 weeks)</p> <p>Term 2</p> <p>Chemistry</p> <p>Jan - Feb</p>	Change	Form, Transformation	Fairness and development	Science enables us to change the form of matter into useful materials that can make the world a better place.	<p>Learner Profile Inquirer</p> <p>Thinking: Critical Thinking Skills</p> <ul style="list-style-type: none"> Interpret data <p>Research: Information Literacy Skills</p> <ul style="list-style-type: none"> Process data and report results. Make connections between various sources of information. <p>Self- Management Skills: Reflection skills</p> <ul style="list-style-type: none"> Identify strengths and weaknesses of personal learning strategies (self-assessment) 	<p>Classify materials as natural or artificial Suggest uses for both natural and artificial materials Outline the three principal states of matter in terms of their physical properties Identify physical changes and describe changes of physical state as: melting, boiling, condensing, freezing Classify mixtures, suspensions, solutions and pure substances Define solution, solute, solvent Explain dissolving as a physical process of binding a solid, liquid or gas to another liquid Demonstrate separation techniques for mixtures and suspensions that exploit the properties of the substances Outline the use of evaporation and condensation in separation of solutions Identify chemical and biotic chemical changes such as burning, oxidation, decomposition <i>Some students could:</i> Explain chemical change in terms of reactant elements and molecules Describe variant mixtures such as colloids, crystals</p>	<p>Summative:</p> <p>Students research, design and carry out experiments collect data, analyze interpret & evaluate.</p> <p>Criterion B: Inquiring and designing</p> <p>Criteria C: Processing and Evaluating</p> <p>Writing a lab report.</p>
<p>Unit 4 – What makes changes happen? (5 weeks)</p> <p>Physics</p> <p>Term 2</p> <p>Feb - Mar</p>	Change	Energy	Globalization and Sustainability	Through controlling energy we can make changes happen that have an impact on the way people live now and in the future.	<p>Learner Profile Principled</p> <p>Communication skills</p> <ul style="list-style-type: none"> Organize and depict information logically <p>Thinking: Transfer Skills</p> <ul style="list-style-type: none"> Apply skills and knowledge in unfamiliar situations <p>Thinking: Critical Thinking Skills</p> <ul style="list-style-type: none"> Draw reasonable conclusions and generalizations <p>Research: Information Literacy Skills</p>	<p>Describe a range of observed processes such as combustion, temperature change, electricity generation and chemical reactions in terms of energy changes Classify phenomena in terms of the energy changes involved Classify kinds of energy as either potential or kinetic Define temperature as a measure of thermal (internal) energy in a body Describe solid, liquid and gas states of matter in terms of thermal energy Describe thermal (internal) energy in terms of the kinetic energy of particles Explain heat as an exchange of thermal energy between bodies Describe heat transfer processes: conduction, convection, radiation</p>	<p>Summative:</p> <p>Students read the article to answer questions about how we can save money and save the planet. They then research a chosen method of preventing heat loss in households.</p> <p>Criteria A: Knowing and understanding</p> <p>Criteria D: Reflecting on the impacts of science</p>

					<ul style="list-style-type: none"> • Access information to be informed and inform others • Create references and citations, use footnotes/endnotes and construct a bibliography according to recognized conventions Social: Collaboration Skills <ul style="list-style-type: none"> • Practice empathy Communication skills <ul style="list-style-type: none"> • Use appropriate forms of writing for different purposes and audiences 	Describe the properties of thermal conductors and insulators Identify as useful or wasted energy exchanged in physical systems Apply understanding of energy change, transfer and loss to suggest ways in which energy loss can be minimized in a variety of everyday situations Some students could: Outline the principle of energy conservation in terms of heat loss Outline heat transfer processes of conduction, convection and radiation in terms of particle motion and radiant energy transfer Suggest a relationship between heat transfer and temperature change for bodies of different materials and mass	
Unit 5 – How can we study the living world? April - May (5 weeks) Biology Term 3 April - May	Systems	Interaction, balance	Scientific and technical innovation Exploration – The biological revolution	Scientists have developed methods and tools to understand and maintain the interactions that keep ecosystems in balance.	Learner Profile Thinkers Thinking: Creative Thinking Skills <ul style="list-style-type: none"> • Use brainstorming and visual diagrams to generate new ideas and inquiries • Make guesses, ask “what if” questions and generate testable hypotheses Thinking: Critical Thinking Skills <ul style="list-style-type: none"> • Interpret data Research: Information Literacy Skills <ul style="list-style-type: none"> • Process data and report results. Self- Management Skills: Organization <ul style="list-style-type: none"> • Plan short- and long-term assignments; meet deadlines. 	State the characteristics of all ecosystems Describe differences between various ecosystems Define ‘ecosystem’ Define and give examples of populations Define and give examples of habitats Define and give examples of abiotic and biotic factors in ecosystems Define ‘biome’ State the main biomes of the world Describe , compare and contrast different biomes according to their abiotic and biotic factors and interactions State and describe interactions between organisms in healthy ecosystems Outline scientific innovations that have helped to keep ecosystems healthy and in balance	Summative: Students design and construct their own mesocosm. Criteria B: Planning and designing. Criteria C: Processing and Evaluating Project based learning
Unit 6 – Where do we fit into the world? (4 weeks) Chemistry Term 3 June - July	Systems	Environment, Models	Orientation in space and time Exploration - Scale	We have learnt about our place in the systems that affect life on Earth through looking beyond into space and making models.	Learner Profile Reflective Research: Information Literacy Skills <ul style="list-style-type: none"> • Access information to be informed and inform others • Create references and citations, use footnotes/endnotes and construct a bibliography according to recognized conventions Social: Collaboration Skills <ul style="list-style-type: none"> • Practice empathy Communication skills <ul style="list-style-type: none"> • Use appropriate forms of writing for different purposes and audiences 	Organize objects in the Solar System as planets, natural satellites, comets, asteroids Describe the main regions of the Earth system: geosphere (and lithosphere), hydrosphere (and Cryosphere), atmosphere, biosphere (androsphere) Identify and describe the main regions of the Earth’s interior: inner core, outer core, mantle, crust Evaluate geological and paleontological evidence for the formation and development of the Earth Identify and describe the main regions of the atmosphere: Troposphere, Stratosphere, Mesosphere, Thermosphere, Exosphere Identify and describe the main regions and forms of water in the hydrosphere: oceans, atmospheric vapour, ice, underground water, and groundwater Evaluate the impact of space exploration on our understanding of the Solar System Some students could: Summarize theories about the origins of the Solar System and the formation of planets and satellites Outline the principal geological eons in the development of the Earth: Precambrian (Hadean, Archean, Proterozoic) and Paleozoic	Summative assessment Take action! Into space? Students inquire into the relationship between the advent of space research, our understanding of the inter-relationship of Earth’s systems, our place in them and impact on the Earth. Criteria D: Reflecting on the impacts of science. Criteria A: Knowing and understanding Project based learning

						Evaluate evidence for the existence of chemicals necessary for life – notably water – in other parts of the Solar System	
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MYP Sciences

Grade 7

Unit title	Key Concept	Related concept(s)	Global context	Statement of Inquiry	ATL Skills and Learner Profile	Content and Service Learning	Summative Assessment & MYP Objectives
Pre-unit – Health & Safety (3 weeks)						Classroom rules and expectations Lab safety – Students identify safety issues in pictures demonstrating lab scenarios. Hazard Symbols – Illustrating hazard activities, crossword and poster, Methane bubbles demonstration. Risk assessment – How to write a risk assessment Using a Bunsen burner – Investigating a Bunsen burner, lighting a Bunsen burner, differentiated worksheets, Safety training certificate awarded at the end of the pre-unit. Further use of available Twinkl resources and learning videos to consolidate learning. Introduction to MYP Science criteria with examples.	Risk Assessment for lighting a Bunsen burner.
Unit 1 - Where are we now and where might we be going? (6 weeks) Biology and Physics	Relationships	Movement Models	Orientation in space and time Exploration – Turning points and “big history”	Through making <i>models</i> of the world we have understood how <i>place and time relate to motion</i> and we have made the world seem a smaller place.	Learner Profile Reflective Communication skills <ul style="list-style-type: none"> Organize and depict information logically Thinking: Transfer Skills <ul style="list-style-type: none"> Apply skills and knowledge in unfamiliar situations Thinking: Critical Thinking Skills <ul style="list-style-type: none"> Draw reasonable conclusions and generalizations 	Outline how a coordinate system is used to specify location Determine the distance between two points using coordinates State that distance is measured in metres State that displacement accounts for direction of travel $\frac{\text{distance}}{\text{time}}$ Apply the relationship average speed = $\frac{\text{distance}}{\text{time}}$ State that speed is measured in m s^{-1} Explain that any change in velocity – whether caused by change in speed or in direction – is an acceleration State that acceleration is measured in m s^{-2} State that force is measured in newtons Outline that matter is kept together by electrostatic attraction and kept apart by electrostatic repulsion Describe force systems in terms of force arrows to show size and direction of forces Explain that unbalanced forces cause motion or deformation Outline the relationship between force, mass and acceleration Some students could: $a = \frac{F}{m}$ Apply the relationship $a = \frac{F}{m}$ to determine accelerations Outline Einstein’s theory that the greatest possible velocity is the speed of light in a vacuum, c State the value of c as close to 300 million m s^{-1}	Summative: Students apply their knowledge and understanding to solve Newtons law’s problems. Criteria A: Knowing and understanding
Unit 2 - How do we map matter? (5 weeks) Chemistry	Change	Models Patterns		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.	Learner Profile Knowledgeable Thinking: Creative Thinking Skills <ul style="list-style-type: none"> Use brainstorming and visual diagrams to 	Classify materials as elements, mixtures, molecules Outline the structures of compounds and polymers Describe the main features of the periodic table Outline atomic structure in terms of nuclei, electrons and their respective electric charges Explain conservation of mass in chemical reactions	Summative: Stomachache - This is a full investigation in which students use the stimulus context of food scientists working to test the

					<p>generate new ideas and inquiries</p> <ul style="list-style-type: none"> • Make guesses, ask “what if” questions and generate testable hypotheses <p>Thinking: Critical Thinking Skills</p> <ul style="list-style-type: none"> • Interpret data <p>Research: Information Literacy Skills</p> <ul style="list-style-type: none"> • Process data and report results 	<p>Outline chemical reactions in terms of word equations</p> <p>Distinguish metals and non-metals in terms of their physical properties</p> <p>Identify reactivity series and patterns within the periodic table</p> <p>Outline different types of chemical reaction: combustion, thermal decomposition, oxidation (and reduction), displacement</p> <p>Explain uses of metals in terms of their physical properties</p> <p>Describe how chemical processes can be used to extract a metal from its ore</p> <p>Describe the properties of acids and alkalis in terms of their reactions: acid + metal, acid + carbonate, acid + alkali</p> <p>Describe the use of indicators to measure acidity and alkalinity, and outline the pH scale</p> <p><i>Some students could:</i></p> <p>Make predictions about chemical reactions using chemical formulae</p> <p>Determine the chemical formula of a compound using ion valency</p> <p>Describe the formation of ions in solution by acids and alkalis</p>	<p>effectiveness of indigestion remedies.</p> <p>Criteria B: Planning and designing.</p>
<p>Unit 3 - Who are we? (5 weeks)</p> <p>Biology</p>	Relationships	Evidence, Patterns	Identities and relationships	<p>Because scientists understand the relationships between genes and inherited characteristics, we can use genetic patterns as evidence for identification and decision making.</p> <p>Exploration - Physical, psychological and social development</p>	<p>Learner Profile</p> <p>Principled</p> <p>Research: Information Literacy Skills</p> <ul style="list-style-type: none"> • Access information to be informed and inform others • Create references and citations, use footnotes/endnotes and construct a bibliography according to recognized conventions <p>Thinking: Critical thinking Skills</p> <ul style="list-style-type: none"> • Gather and organize information to formulate an argument. <p>Communication skills</p> <ul style="list-style-type: none"> • Use appropriate forms of writing for different purposes and audiences 	<p>Define DNA</p> <p>Define genes</p> <p>Describe the relationship between inherited characteristics and genes</p> <p>Give examples of the relationship between inherited characteristics and genes</p> <p>State the number of chromosomes that humans have</p> <p>Identify some characteristics of human chromosomes</p> <p>Define genome</p> <p>Define karyotype</p> <p>Describe how genes and characteristics are inherited</p> <p>Evaluate our ability to and the possibility of modifying the genes that make up the human genome</p> <p>Identify and describe the phases of mitosis and meiosis</p> <p>Describe the role of mitosis and meiosis in growth, reproduction, and inheritance of traits</p> <p>Compare and contrast the processes of mitosis and meiosis</p> <p>Define trait, allele dominant, recessive, homozygous, and heterozygous</p> <p>Distinguish between and identify dominant and recessive traits and alleles</p> <p>Describe how genetic patterns identified</p> <p>Justify how individuals can be identified through inherited characteristics and genetic patterns using a Punnett Square</p> <p>Define DNA fingerprint</p> <p>Describe how gel electrophoresis works to identify a person's DNA fingerprint</p> <p>Justify and evaluate the extent to which legal cases should depend on identifying people through DNA</p> <p>Analyse and evaluate DNA evidence in order to make judgments about a person's identity</p>	<p>Summative:</p> <p>Students write a journalistic 'opinion piece' about using DNA evidence to make legal decisions, supporting their opinion with scientific evidence and reasoning and demonstrating an understanding of the relationship between genetic patterns and inherited characteristics.</p> <p>Criteria D: Reflecting on the impacts of science.</p>

						<p><i>Some students could:</i> Evaluate our ability to modify the genes that make up the human genome, and the possibility of doing so Research, analyse and justify external factors that affect gene function Research and analyse unusual genetic traits</p> <p>Service learning</p> <p>For their Summative assessment, students write a journalistic 'opinion piece' about using DNA evidence to make legal decisions, supporting their opinion with scientific evidence and reasoning and demonstrating an understanding of the relationship between genetic patterns and inherited characteristics.</p>	
<p>Unit 4 - What does a wave tell us? (5 weeks)</p> <p>Physics</p>	Relationships	Form, Energy	<p>Personal and cultural expression</p> <p>Exploration – Analysis and argument</p>	<p>Understanding the relationships between different forms of wave energy helps us better communicate and express our thoughts.</p>	<p>Learner Profile</p> <p>Inquirer</p> <p>Thinking: Critical Thinking Skills</p> <ul style="list-style-type: none"> • Practise observing carefully in order to recognise problems • Gather and organize relevant information to formulate an argument • Evaluate evidence and arguments • Draw reasonable conclusions and generalizations • Interpret data <p>Research: Information Literacy Skills</p> <ul style="list-style-type: none"> • Collect, record and verify data • Collect and analyse data to identify solutions and make informed decisions • Make connections between various sources of information. 	<p><i>All students should:</i> Outline the properties of oscillatory motion around an equilibrium point Describe longitudinal and transverse wave motion Describe a wave in terms of the key dimensions of wavelength, frequency and amplitude Outline the relationship between the speed of waves and the properties of media Summarize the subjective experience of brightness and colour in terms of the dimensions of a light wave Describe the phenomenon of reflection in terms of a ray model Describe the phenomenon of refraction in terms of a ray model Outline the names and function of the principal parts of the human eye Describe how the eye forms an inverted image Compare the eye to a camera Outline the principal regions of the electromagnetic spectrum Outline how the Earth's atmosphere protects us by filtering out dangerous radiations from the Sun and deep space Explain the phenomenon of white light in terms of addition of frequencies Explain the colour of a surface in terms of subtraction and selective reflection of frequencies Explain the transmission of sound through media as a longitudinal vibration with compression and rarefaction Outline the function of the human ear as a sound detector Describe the subjective experience of sound in terms of pitch and volume Outline the use of sound for echo location and ultrasonic imaging Describe the measurement of sound amplitude using the decibel scale Outline the frequency-dependency of loudness for the human ear Explain how sound loudness can be reduced using different materials</p> <p><i>Some students could:</i></p>	<p>Summative:</p> <p>Students investigate the sound absorption properties of different materials, or different thicknesses of material, and then to apply their findings to the real-life problem of noise reduction near an airport.</p> <p>Criteria B: Planning and designing</p> <p>Criteria C: Processing and evaluating</p>

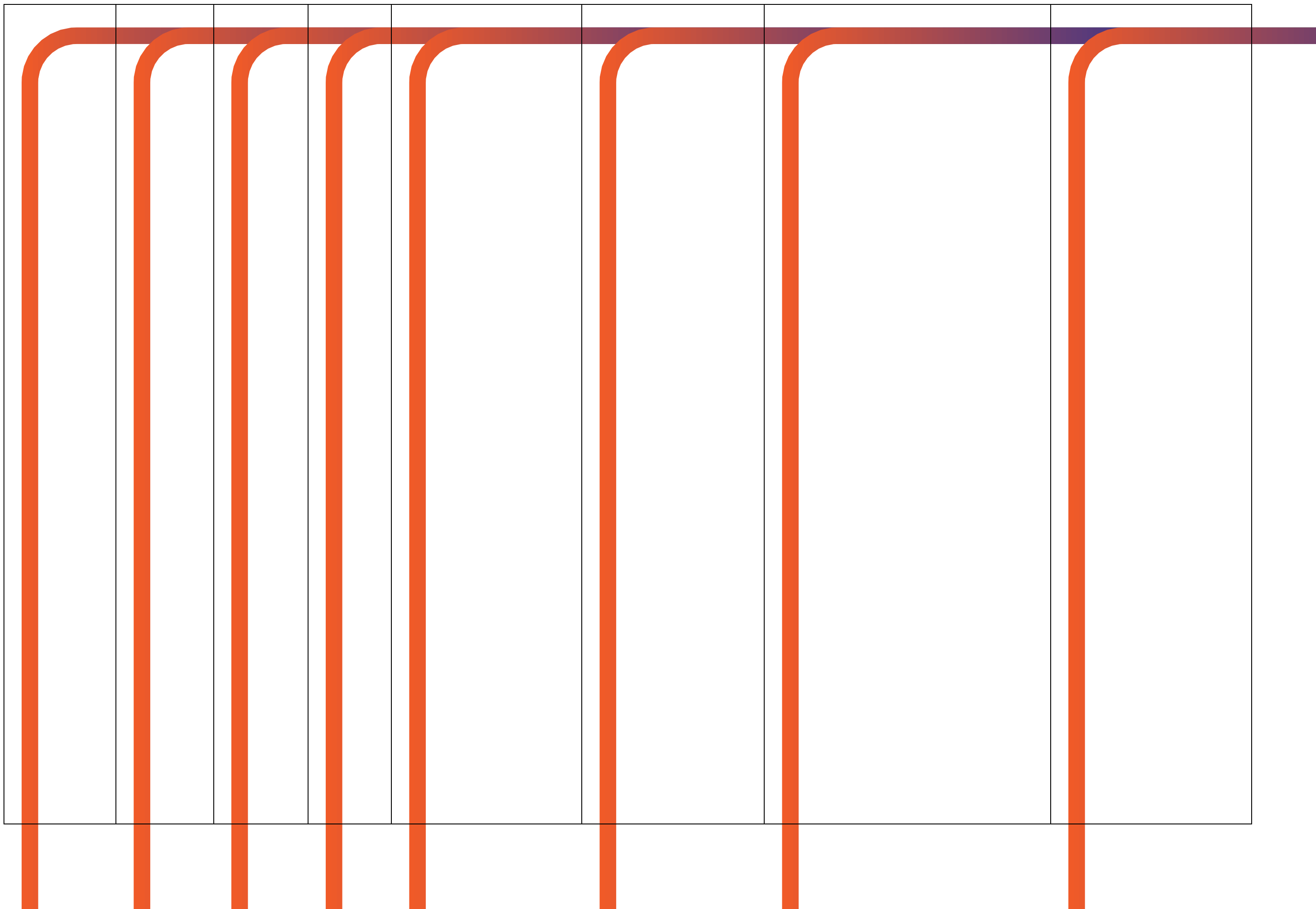
						<p>Outline the relationship between the speed of waves and the properties of media Describe how the eye forms an inverted image Describe the measurement of sound amplitude using the decibel scale Outline the frequency-dependency of loudness for the human ear</p> <p>Service learning</p> <p>For their summative assessment, students investigate the sound absorption properties of different materials, or different thicknesses of material, and then to apply their findings to the real-life problem of noise reduction near an airport.</p>	
<p>Unit 5 - How does our planet work? (5 weeks)</p> <p>Physics & Chemistry</p>	Systems	Models, Patterns	<p>Globalization and sustainability</p> <p>Exploration - Systems, Opportunity, Consequences and responsibility, Models</p>	<p>Modelling interactions between Earth's systems allows us to understand patterns that we can use to secure or improve human experiences.</p>	<p>Learner Profile</p> <p>Reflective, Thinker</p> <p>Research: Information Literacy Skills</p> <ul style="list-style-type: none"> • Access information to be informed and inform others • <p>Thinking: Critical thinking skills:</p> <ul style="list-style-type: none"> • Gather and organize relevant information to formulate an argument • Evaluate evidence and arguments 	<p>Describe the characteristics of a system Define the ecospheres: biosphere, hydrosphere, geosphere, and atmosphere Describe the natural systems that maintain life on Earth Describe how the ecospheres interact Identify the processes and events that contribute to the current conditions on Earth List cycles of matter, including the water cycle Compare and contrast cycles of matter Outline how energy flows through the ecospheres Analyse a climatograph Organize climate data to create a climatograph Identify and outline some patterns in climate and weather around the world Compare and contrast climate data from different cities Outline the unique properties of water that have an influence on climate and weather Define leeward and windward Describe the rain shadow effect Design and conduct an investigation to determine how the temperatures in water, air and earth vary over time Outline the plate tectonic theory Define convergent, divergent and transform boundaries Describe the effects of plate movement Distinguish between convergent, divergent and transform boundaries List different types of seismic activity around the world Describe how early warning systems work Evaluate the use of early warning systems Describe Pangaea Describe how models help people understand different Earth systems</p> <p><i>Some students could:</i> Research and analyse how the movement of water can transform the surface of the Earth Analyse a climatograph Research, analyse and hypothesize about the climate of different regions around the world</p>	<p>Summative:</p> <p>Students research, build and test Solar power car.</p> <p>Criteria C: Processing and evaluating</p> <p>Criteria D: Reflecting on the impacts of science</p>

						<p>Research, analyse and hypothesize about the presence of the rain shadow effect</p> <p>Evaluate the use of early warning systems</p>	
<p>Unit 6 - How do we respond to our world? (4 weeks)</p> <p>Biology</p>	Change	Consequence	<p>Scientific and technical innovation</p> <p>Exploration - Adaptation</p>	<p>Scientific innovations designed to enhance our ability to perceive and respond to change in our surroundings have consequences on our survival.</p>	<p>Learner Profile</p> <p>Thinker</p> <p>Thinking: Transfer Skills</p> <ul style="list-style-type: none"> Apply skills and knowledge in unfamiliar situations <p>Thinking: Critical Thinking Skills</p> <ul style="list-style-type: none"> Draw reasonable conclusions and generalizations Gather and organize relevant information to formulate an argument 	<p>List the sense organs and their functions</p> <p>Describe how the sense organs function</p> <p>Define stimulus</p> <p>Justify the importance of different senses in terms of long-term survival of the species</p> <p>Describe the role of the central nervous system in our perception of and response to different stimuli</p> <p>Define neuron</p> <p>Define nerve</p> <p>Match sense organs to their related stimuli</p> <p>Describe the stimulus response mechanism</p> <p>Describe the importance of sensory neurons, motor neurons, glands, and muscles in the perception of and response to stimuli</p> <p>Analyse and justify typical responses to stimuli and the advantages of such responses on the long-term survival of the species</p> <p>Describe other (non- human) organisms respond to different stimuli</p> <p>Design and carry out an investigation to test how a plant or invertebrate animal responds to stimuli</p> <p>Define natural selection</p> <p>List 3 factors that allow for the process of natural selection</p> <p>Describe the process of natural selection</p> <p>Describe the process of adaptation</p> <p><i>Some students could:</i></p> <p>Analyse and justify typical responses to stimuli and the advantages of such responses on the long-term survival of the species</p> <p>Research and analyse how organisms other than humans respond to stimuli</p> <p>Research, analyse and justify adaptations that have resulted from the process of natural selection</p>	<p>Summative:</p> <p>Students consider the possible advantages of the typical responses that come from the central nervous system, using the visible thinking strategy of 'What makes you say that?' to explain their thinking.</p> <p>Criteria A: Knowing and understanding</p>

MYP Sciences

Grade 8

Unit title	Key Concept	Related concept(s)	Global context	Statement of Inquiry	ATL Skills and Learner Profile	Content and Service Learning	Summative Assessment & MYP Objectives
Pre-unit – Health & Safety (1 week)						<p>Classroom rules and expectations Lab safety – Students identify safety issues in pictures demonstrating lab scenarios. Hazard Symbols – Illustrating hazard activities, crossword and poster, Methane bubbles demonstration. Risk assessment – How to write a risk assessment Using a Bunsen burner – Investigating a Bunsen burner, lighting a Bunsen burner, differentiated worksheets, Safety training certificate awarded at the end of the pre-unit. Further use of available Twinkl resources and learning videos to consolidate learning. Introduction to MYP Science criteria with examples.</p>	Risk Assessment for lighting a Bunsen burner.



<p>Unit 2 How do we make it work? (5 weeks)</p> <p>Physics/Chemistry</p> <p>Remove the content if you feel it is too much.</p>	<p>Change</p>	<p>Energy, Movement</p>	<p>Scientific and technical innovation</p> <p>Exploration – Systems</p>	<p>Scientific innovations have revolutionized life by making it easier to change energy forms in different systems.</p>	<p>Learner Profile</p> <p>Thinker</p> <p>Communication skills</p> <ul style="list-style-type: none"> Organize and depict information logically <p>Thinking: Transfer Skills</p> <ul style="list-style-type: none"> Apply skills and knowledge in unfamiliar situations <p>Thinking: Critical Thinking Skills</p> <ul style="list-style-type: none"> Draw reasonable conclusions and generalizations 	<p>Recall that energy is measured in joules^{1.4}</p> <p>Describe the use of energy as work in some machines</p> <p>Describe a range of observed processes such as combustion, temperature change, electricity generation and chemical reactions in terms of energy changes^{1.4}</p> <p>Classify phenomena in terms of the energy changes involved^{1.4}</p> <p>Classify kinds of energy as either potential or kinetic^{1.4}</p> <p>Apply understanding of energy change, transfer and loss to suggest ways in which energy loss can be minimized in a variety of everyday situations^{1.4}</p> <p>Analyse simple machines such as levers, pulleys and gears</p> <p>Summarize the function of simple machines in terms of forces of effort and load, and distance of action</p> <p>Identify force-magnifying and distance-magnifying levers</p> <p>Outline some possible applications of simple machines</p> <p>Recall that power is the rate of changing energy and is measured in watts</p> <p>Apply the relationship</p> $\text{energy} = \text{power} \times \text{time}$ <p>to compare the work done by some simple machines</p> <p>Identify energy exchanged in physical systems as useful or wasted^{1.4}</p> <p>Apply the relationship</p> $\text{efficiency} = \frac{\text{work out}}{\text{energy in}}$ <p>or</p> $\text{efficiency} = \frac{\text{power out}}{\text{power in}}$ <p>to compare machines</p> <p>Describe chemical changes as endothermic or exothermic according to the direction of heat flow between the environment and the reactants</p> <p>Summarize the energy difference between reactants and products in endothermic and exothermic chemical changes</p> <p>Describe combustion as an exothermic chemical change involving oxygen and a fuel</p>	<p>Summative:</p> <p>Criteria B: Planning and designing.</p> <p>Criteria C: Processing and evaluating</p>
<p>Unit 3 - What should I eat? (6 weeks)</p> <p>Biology</p>	<p>Relationships</p>	<p>Consequences Function</p>	<p>Scientific and technological innovation</p> <p>Exploration – Models and solutions</p>	<p>The relationship between models and their functions depends on the consequences of how scientifically the components blend in.</p>	<p>Learner Profile</p> <p>Balanced</p> <p>Thinking: Creative Thinking Skills</p> <ul style="list-style-type: none"> Use brainstorming and visual diagrams to generate new ideas and inquiries 	<p>Describe the relationship between what we consume and our health</p> <p>Identify important cell structures (i.e. ribosomes, mitochondria, cell membrane)</p> <p>Identify the molecules that make up or are used by cell structures</p> <p>Identify the four macronutrients (carbohydrates, proteins, lipids and fibre)</p> <p>Identify the component parts of each macronutrient (amino acids, fatty acids, etc.)</p>	<p>Summative:</p> <p>Criteria A: Knowing and understanding</p> <p>Criteria D: Reflecting on the impacts of science</p>

					<ul style="list-style-type: none"> • Make guesses, ask “what if” questions and generate testable hypotheses <p>Thinking: Critical Thinking Skills</p> <ul style="list-style-type: none"> • Interpret data <p>Research: Information Literacy Skills</p> <ul style="list-style-type: none"> • Process data and report results <p>Self- Management Skills: Reflection skills</p> <ul style="list-style-type: none"> • Reflect upon a scientific investigation to determine sources of error and evaluate their impact. 	<p>Describe the role of each of the macronutrients in healthy body function Distinguish between the functions of each of the macronutrients Identify healthy sources of each of the macronutrients Describe the role of enzymes in digestion Compare and contrast the molecular characteristics of the three types of fat Justify the benefits and limitations of different types of diets Describe common digestive disorders Describe the relationship between food choices and digestive disorders Create visual representations of data related to amino acids found in different foods Describe the process of photosynthesis Describe the process of cellular respiration Identify the role of carbohydrates (glucose) in cellular respiration Identify foods that would supply the body with the quickest source of energy Identify scientific understanding and developments that impact the function and performance of the human body Discuss the relationship between industrially produced foods and supplements and good health Discuss the scientific basis of nutritional supplements an health</p>	
<p>Unit 4 - How do we put electricity and magnetism to work?</p> <p>(5 weeks)</p> <p>Physics</p>	Relationships	Form Balance Transformation	Orientation in space and time Exploration - Scale	Electrical and magnetic forces fill space as fields; understanding their form and relationships allows us to transform energy in useful ways.	<p>Learner Profile</p> <p>Thinker</p> <p>Thinking: Creative Thinking Skills</p> <ul style="list-style-type: none"> • Use brainstorming and visual diagrams to generate new ideas and inquiries • Make guesses, ask “what if” questions and generate testable hypotheses <p>Thinking: Critical Thinking Skills</p> <ul style="list-style-type: none"> • Interpret data <p>Research: Information Literacy Skills</p> <ul style="list-style-type: none"> • Process data and report results • Revise understanding based on new information and evidence 	<p>Classify observed forces in terms of electrical and magnetic interactions Outline the basic properties of magnetic fields: polarity, strength, variation Outline the interaction of the Earth’s magnetic field with magnetic materials and charged particles State that negative electric charge is carried by electrons, positive electric charge is carried by protons Explain how a surplus or deficit of electrons leads to a static electric charge Outline and compare the properties of electric and magnetic fields Outline how moving electric charge produces an electric current Describe how the flow of electrons is used to do work State that electric current is measured in amperes Outline how to use switches in simple series and parallel circuits Describe how current varies in different parts of series and parallel circuits Explain the distinction between conventional and real current flow Identify electrical conductors and insulators Describe how energy in an electric circuit is measured as potential difference, or voltage, and is measured in volts</p>	<p>Summative:</p> <p>Criteria B: Planning and designing.</p> <p>Criteria C: Processing and evaluating</p>

						<p>Measure the currents and voltages in circuits containing different conductors</p> <p>Explain resistance as an inverse measure of the conductive properties of a material</p> <p>State that resistance is measured in ohms (Ω)</p> <p><i>Some students could:</i></p> <p>Outline how the bulk physical properties of conductors affect the conduction of current through a circuit</p> <p>Summarize resistance as caused through obstructions to the flow of free electrons</p>	
<p>Unit 5 - How can we connect?</p> <p>(5 weeks)</p> <p>Physics</p>	Systems	Energy Interaction	<p>Personal and cultural expression</p> <p>Exploration – Fields and disciplines</p>	We interact and express ourselves through systems that manipulate information as different forms of energy.	<p>Learner Profile</p> <p>Communicator</p> <p>Communication skills</p> <ul style="list-style-type: none"> Organize and depict information logically <p>Thinking: Transfer Skills</p> <ul style="list-style-type: none"> Apply skills and knowledge in unfamiliar situations <p>Thinking: Critical Thinking Skills</p> <ul style="list-style-type: none"> Draw reasonable conclusions and generalizations <p>Research: Information Literacy Skills</p> <ul style="list-style-type: none"> Access information to be informed and inform others Create references and citations, use footnotes/endnotes and construct a bibliography according to recognized conventions <p>Communication skills</p> <p>Use appropriate forms of writing for different purposes and audiences</p>	<p>Identify the key media in the history of information transmission: visual/sound, analogue telegraphy, radio telegraphy, analogue telephony, mobile digital telephony, internet</p> <p>Draw ray diagrams showing the effects of plane, concave (diverging) and convex (converging) mirrors</p> <p>Describe the formation of images, and their properties, by simple lens and mirror systems</p> <p>Define the properties of images: magnification, diminished image, lateral inversion, real and virtual images</p> <p>Outline the phenomenon of total internal reflection in terms of the refractive properties of different optical media</p> <p>Draw ray diagrams to show total internal reflection</p> <p>Describe the use of total internal reflection in fibre optic signal transmission</p> <p>Outline the production and reception of radio waves</p> <p>Outline the function of some analogue information systems: LPs, magnetic audio tape</p> <p>Explain the encoding of information digitally using binary numbers</p> <p>Describe some applications of digital information encoding: bar/QR codes, TV remotes, DVD/BluRay</p> <p>Outline the use of binary information to store information in computer memory</p> <p>Outline the principal elements of digital information networks: router/modem, server</p> <p>Outline the operation of a cell phone system</p> <p>Justify the arguments for responsible digital citizenry</p>	Criteria A: Knowledge and Understanding.
<p>Unit 6 - How do our bodies work?</p> <p>(4 weeks)</p> <p>Biology</p>	Systems	Balance Function, interactions	<p>Personal and cultural expression</p> <p>Exploration – Philosophies and ways of life</p>	Ways and philosophies of life within systems will be maximally functional due to balanced interactions	<p>Learner Profile</p> <p>Communicator</p> <p>Communication skills</p> <ul style="list-style-type: none"> Organize and depict information logically <p>Thinking: Transfer Skills</p> <ul style="list-style-type: none"> Apply skills and knowledge in unfamiliar situations <p>Thinking: Critical Thinking Skills</p> <ul style="list-style-type: none"> Draw reasonable conclusions and generalizations 	<p>Recall the basic structures and functions of neurons</p> <p>Define neurotransmitters</p> <p>List a few common neurotransmitters</p> <p>Describe the role of neurotransmitters in signalling between cells</p> <p>Describe how signals are sent and received between neurons and other cells</p> <p>State the role of acetylcholine in the flight or flight response</p> <p>Discuss how different substances and conditions in our bodies can change how our signals are sent between cells</p> <p>Describe the characteristics of bones</p> <p>Distinguish between the different types of bone</p>	Criteria D: Reflecting on the impact of science

						<p>Identify factors that can affect the health and physical integrity of bones</p> <p>State and identify the three types of muscle cells</p> <p>Compare and contrast the three types of muscle cells</p> <p>Identify the molecules involved in muscle cell contraction</p> <p>Identify the cell structures involved in muscle cell contraction</p> <p>Distinguish between fast twitch and slow twitch muscle fibers</p> <p>Identify the components of the male and female reproductive systems</p> <p>Compare and contrast the functions of estrogen and testosterone in males and females</p> <p>State the roles of different hormones in the male and female reproductive system</p> <p>Recall the process of meiosis</p> <p>Define gametes</p> <p>Compare and contrast male and female gametes</p> <p>Describe the process of fertilization</p> <p>Outline the process of fetal development</p> <p>Discuss when it is possible for a female to become pregnant</p> <p>Distinguish between the reproductive process in humans and other mammals</p> <p>State factors that contribute to peoples' decisions to reproduce or not reproduce</p> <p>Describe different types of human interactions</p> <p>Discuss the strengths and challenges of different types of human interactions</p>	
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MYP Biology

Grade 9

Unit title	Key Concept	Related concept(s)	Global context	Statement of Inquiry	ATL Skills and Learner Profile	Content	Summative Assessment & MYP Objectives
Unit 1 - How is Life Organized? (5 weeks)	Relationships	Functions	Orientation in space and time Exploration – Turning points and “big history”	Balanced Relationships between varied functional systems leads to a better organizational structure.	<p>Learner Profile</p> <p>Thinker</p> <p>Research: Information Literacy Skills</p> <ul style="list-style-type: none"> Access information to be informed and inform others Create references and citations, use footnotes/endnotes and construct a bibliography according to recognized conventions <p>Social: Collaboration Skills</p> <ul style="list-style-type: none"> Considering the global impacts of sciences on others 	<p>State the characteristics that make something alive or not.</p> <p>Describe the characteristics that determine whether something is alive or not. Interpret information about viruses to make scientifically supported judgments about whether viruses are alive or not.</p> <p>Explain the relationship between the structure of a cell and its function.</p> <p>Draw and label diagrams of cells using a microscope.</p> <p>Describe and explain the function of different organelles.</p> <p>Describe the differences between cells, tissues, organs and organ systems Explain the implications of only using physical characteristics to classify organisms.</p> <p>Explain why it is important to use the same method of classification throughout the scientific community.</p> <p>Explain Linnaeus' binomial classification system.</p> <p>Lab Activities: Wet mount of an onion cell</p>	<p>Summative:</p> <p>Criteria D: Reflecting on the Impact of science</p>

					<p>Communication skills</p> <ul style="list-style-type: none"> Use appropriate forms of writing for different purposes and audiences 	<p>Edible cell lab</p>	
<p>Unit 2 - What Chemical Processes Support Life</p> <p>(6 weeks)</p>	Systems	Energy, Transformation	<p>Scientific and technical innovation</p> <p>Exploration – Model & Adaptation</p>	<p>There is a scientific approach towards understanding a system in terms of adaptation and transformation.</p>	<p>Learner Profile</p> <p>Inquirer</p> <p>Thinking: Creative Thinking Skills</p> <ul style="list-style-type: none"> Make guesses, ask “what if” questions and generate testable hypotheses <p>Thinking: Critical Thinking Skills</p> <ul style="list-style-type: none"> Plan a logical procedure to investigate a research question Interpret data 	<p>Respiration</p> <p>State the word equations for anaerobic respiration in yeast, plants and humans</p> <p>Outline the differences between respiration and combustion</p> <p>Explain how substances required for photosynthesis enter the leaf</p> <p>State the word and chemical equations for photosynthesis</p> <p>Explain each part of the starch test using scientific reasoning. (no chemicals for the lab)</p> <p>Outline the experiments that can be carried out to indicate that light, carbon dioxide and chlorophyll are needed for photosynthesis.</p> <p>Outline the role of limiting factors in photosynthesis</p> <p>Describe and explain an experiment that shows how light intensity affects rate of photosynthesis</p> <p>Describe and explain an experiment that shows that plants carry out both photosynthesis and respiration</p> <p>Describe and explain the relationship between structure and function in enzymes</p> <p>+Outline an experiment that investigates the effect of enzyme concentration on rate of reaction</p> <p>Outline an experiment that investigates the effect of temperature on the rate of reaction (doing it in chemistry)</p>	<p>Summative:</p> <p>Lab Report:</p> <p>Criteria B: Planning and designing.</p> <p>Criteria C: Processing and evaluating</p>
<p>Unit 3 - How Do Organisms Sustain Themselves?</p> <p>(5 weeks)</p>	Systems	Function & Interaction	<p>Orientation in space & time.</p> <p>Explorations to develop:</p> <p>Exchange & interactions</p>	<p>Relationships between systems are revealed by similarities and differences between the myriad of forms.</p>	<p>Learner Profile</p> <p>Knowledgeable</p> <p>Communication skills</p> <ul style="list-style-type: none"> Organize and depict information logically <p>Thinking: Transfer Skills</p> <ul style="list-style-type: none"> Apply skills and knowledge in unfamiliar situations <p>Thinking: Critical Thinking Skills</p> <ul style="list-style-type: none"> Draw reasonable conclusions and generalizations <p>Social: Collaboration Skills</p> <ul style="list-style-type: none"> Considering the global impacts of sciences on others 	<p>Outline an experiment that measures energy content in food</p> <p>Evaluate an experiment that measures energy content of food and explain improvements State the chemical composition of carbohydrates, lipids and proteins</p> <p>Outline food tests for starch, simple sugars, proteins and lipids.</p> <p>Explain the outcomes of food tests on unknown solutions Explain what is meant by the term ‘digestion’</p> <p>Describe the processes that occur in each part of the digestive system</p> <p>Describe the digestion of carbohydrates, proteins and lipids Explain the role of bile in digestion</p> <p>Describe and explain how the breathing system is adapted for gas exchange</p> <p>Explain the process of ventilation and how it draws air into and out from the lungs</p> <p>Describe the passage of blood around the body</p> <p>Describe and explain the structure and function of the heart State what is meant by the terms ‘diffusion’, ‘osmosis’ and ‘active transport’</p> <p>Outline how blood vessels are adapted to their function</p> <p>Outline how water travels from the soil to the leaves in plants</p>	<p>Summative:</p> <p>Criteria A: Knowing and understanding</p>

<p>Unit 4 - What Issues do Larger Organisms face?</p> <p>(5 weeks)</p>	<p>Change</p>	<p>Form, Function.</p>	<p>Orientation in space and time.</p> <p>Explorations to develop:</p> <p>Constraints and adaptation.</p>	<p>Changes in form and function determine the distribution in space and time, leading to specific adaptations.</p>	<p>Learner Profile</p> <p>Thinker</p> <p>Thinking: Creative Thinking Skills</p> <ul style="list-style-type: none"> Use brainstorming and visual diagrams to generate new ideas and inquiries Make guesses, ask "what if" questions and generate testable hypotheses <p>Thinking: Critical Thinking Skills</p> <ul style="list-style-type: none"> Plan a logical procedure to investigate a research question <ul style="list-style-type: none"> Interpret data <p>Research: Information Literacy Skills</p> <ul style="list-style-type: none"> Process data and report results Revise understanding based on new information and evidence <p>Self- Management Skills: Reflection skills</p> <ul style="list-style-type: none"> Reflect upon a scientific investigation to determine sources of error and evaluate their impact. 	<p>Describe how an organism is adapted to the environment and explain how these adaptations aid survival</p> <p>Outline how surface area : volume ratio changes as organisms increase in size</p> <p>Outline how physical and behavioural adaptations help organisms overcome problems of size</p> <p>Describe and explain the factors that increase the rate of diffusion</p> <p>Explain why surface area:volume ratio changes as organisms increase in size</p> <p>Explain how physical and behavioural adaptations help organisms overcome problems of size</p>	<p>Summative:</p> <p>Lab Report</p> <p>Criteria B: Planning and designing.</p> <p>Criteria C: Processing and evaluating</p>
<p>Unit 5 - What Factors Affect Human Health?</p> <p>(5 weeks)</p>	<p>Relationships</p>	<p>Models, Patterns.</p>	<p>Identities and relationships</p> <p>Exploration – Health and well-being</p>	<p>Health is a consequence of relationships and interactions between catabolic & anabolic processes in a system.</p>	<p>Learner Profile</p> <p>Reflective</p> <p>Communication skills</p> <ul style="list-style-type: none"> Organize and depict information logically <p>Thinking: Transfer Skills</p> <ul style="list-style-type: none"> Apply skills and knowledge in unfamiliar situations <p>Thinking: Critical Thinking Skills</p> <ul style="list-style-type: none"> Draw reasonable conclusions and generalizations <p>Research: Information Literacy Skills</p> <ul style="list-style-type: none"> Access information to be informed and inform others Create references and citations, use footnotes/endnotes and construct a bibliography according to recognized conventions 	<p>Approaches to human welfare around the world Explain the factors in one's surroundings that contribute to human health</p> <p>Explain the factors within one's own body that contribute to human health</p> <p>Outline the relationship between different types of pathogens and their hosts</p> <p>Explain the immune response and symptoms such as fever, sneezing and coughing, and vomiting</p> <p>Explain the way science has been applied to address the issue of diseases, through the development of treatments such as antibiotics and vaccines</p> <p>Discuss and evaluate the use of antibiotics and vaccines for the treatment and prevention of diseases</p> <p>Analyse and evaluate information about antibiotics and vaccines to make scientifically supported judgments about their use in the treatment and prevention of disease</p> <p>From conclusions about the spread of disease based on information presented in models and graphs</p> <p>Describe the different types of diseases, including communicable; heritable or genetic; autoimmune; lifestyle; mental health Interpret and explain graphs that describe the trends in disease and life expectancy around the world</p> <p>Analyse and evaluate trends in disease prevalence and life expectancy to form scientifically supported</p>	<p>Summative:</p> <p>Criteria D: Reflecting on the impact of science</p>

					Social: Collaboration Skills <ul style="list-style-type: none"> Considering the global impacts of sciences on others Communication skills Use appropriate forms of writing for different purposes and audiences		
Unit 6 - How do characteristics pass from one generation to another? (5 weeks)	Systems	Consequences	Globalization & Sustainability Explorations to develop: Human impact on the environment.	Methods of achieving sustainability can be developed using models that explore differences between systems.	Learner Profile Open-minded Communication skills <ul style="list-style-type: none"> Organize and depict information logically Thinking: Transfer Skills <ul style="list-style-type: none"> Apply skills and knowledge in unfamiliar situations Thinking: Critical Thinking Skills <ul style="list-style-type: none"> Draw reasonable conclusions and generalizations 	Define the terms 'nucleus', 'chromosome', 'DNA', 'gene', 'allele' Describe the structure of DNA and outline how its structure relates to its function Describe the cause and effect of gene mutations Analyse genetic diagrams to calculate the ratio of expected genotypic and phenotypic outcomes Explain how outcomes of genetic crosses can be used to define parental genotypes Describe the difference between asexual and sexual reproduction Describe the process of mitosis Outline different life cycles for both vertebrates and invertebrates Explain the differences between asexual and sexual reproduction Outline how genes code for proteins Explain how mutations lead to a change in phenotype Explain how different life cycles adapt organisms to different environments	Summative: Criteria A: Knowing and understanding

MYP Chemistry

Grade 9

Unit title	Key Concept	Related concept(s)	Global context	Statement of Inquiry	ATL Skills and Learner Profile	Content	Summative Assessment & MYP Objectives
Pre-unit - Health & Safety, Lab equipment & safety rules (1 week) Term 1 Sept					Caring, knowledgeable	Classroom rules and expectations Lab safety – Students identify safety issues in pictures demonstrating lab scenarios. Hazard Symbols – Illustrating hazard activities, crossword and poster, Methane bubbles demonstration. Risk assessment – How to write a risk assessment Using a Bunsen burner – Investigating a Bunsen burner, lighting a Bunsen burner, differentiated worksheets, Safety training certificate awarded at the end of the pre-unit. Further use of available Twinkl resources and learning videos to consolidate learning. Introduction to MYP Science criteria with examples. e-assessments – Introduction & requirements	Activity: Getting acquainted with lab equipment, handling & skills to use them. Scientific terminology, notations & SI units.
Unit 1 - What is Matter? (5 weeks) Term 1 Sept - Oct	Change	Movement, Energy Transfer	Identities & Relationships Exploration – Moral reasoning and ethical judgement	The particle model of matter helps us to make sense of the world around us through understanding the changes that take place in the	Learner Profile Inquirer ATL Research: Information Literacy Skills <ul style="list-style-type: none"> Access information to be informed and inform others 	Apply measurement skills to a range of common substances Interpret complex text, using a three-level-guide Describe the states and properties of matter with reference to the spatial arrangement and movement of particles, and the processes occurring during changes of state State & explain the Kinetic theory of particles. Interpret the cooling/heating curve of water.	Summative: Criteria A: Knowing and understanding Criteria A – e-assessment style questions D – Reflecting on the impacts of Science

				number of particles in a given space, the spaces between particles, the movement of particles, and the cumulative effect on the energy of the particles during phase changes.	<ul style="list-style-type: none"> Create references and citations, use footnotes/endnotes and construct a bibliography according to recognized conventions Social: Collaboration Skills <ul style="list-style-type: none"> Considering the global impacts of sciences on others Communication skills <ul style="list-style-type: none"> Use appropriate forms of writing for different purposes and audiences Critical thinking skills	Calculate and estimate density from mass and volume data State examples of pure and impure substances Investigate , using controlled variables, the effects of impurities of the properties of pure substances Identify examples of physical and chemical changes Describe physical and chemical changes. List the physical & chemical characteristics.	Reflect on the impacts of science in the glassmaking industry and in the modern phenomenon of molecular gastronomy. Formative – Glass making Summative - Molecular gastronomy.
Unit 2 - How do we use matter? (7 weeks) Term 1 Oct – Nov - Dec	Change	Conditions	Personal & Cultural Expression Exploration – Analysis and argument	Improving the world around us while ensuring the longevity of natural resources is based on our understanding of the behaviour of matter, the optimum conditions for its use and the implications of changing those conditions.	Learner Profile Open-minded ATL Communication skills <ul style="list-style-type: none"> Organize and depict information logically Thinking: Transfer Skills <ul style="list-style-type: none"> Apply skills and knowledge in unfamiliar situations Thinking: Critical Thinking Skills <ul style="list-style-type: none"> Draw reasonable conclusions and generalizations 	Understand the classification of matter using a concept map. Suggest examples of pure matter & mixtures. Identify relationships between types of mixtures homogeneous & heterogenous (solutions, oils, alloys, emulsions) by building a concept map Investigate colloids using simple practical approaches: (a) identifying whether the continuous phase is oil or water, (b) inverting the emulsion and (c) observing an emulsion under a microscope at high magnification Demonstrate or explain a range of separation techniques including filtration, distillation, decanting funnel, evaporation & chromatography. Design an experiment to efficiently separate the components of a mixture. Determine using practical laboratory in which ink was used to write the message using the paper chromatography method.	Summative: Various problems allow for the application of the understanding of mixtures and separation processes in daily life, and the physical properties of the substances involved. Criteria B: Planning and designing. Criteria C: Processing and evaluating Formative – Separating technique lab Summative – Chromatography lab.
Unit 3 - How do we map matter? (6 week) Term 2 Jan - Feb	Systems	Patterns	Scientific and Technical Innovation Exploration – Models and Methods	Scientific & technological innovation has allowed us to identify patterns in the properties of chemical elements and so build systems to classify them.	Learner Profile Communicator ATL Communication skills <ul style="list-style-type: none"> Organize and depict information logically Thinking: Transfer Skills <ul style="list-style-type: none"> Apply skills and knowledge in unfamiliar situations Thinking: Critical Thinking Skills <ul style="list-style-type: none"> Draw reasonable conclusions and generalizations 	Identify properties of metals (for example, alkali metals, alkaline earth metals, rare earth metals) and non-metals (for example halogens and noble gases) Outline differences between atoms and ions, and protons, neutrons and electrons Investigate physical or chemical properties of a range of metals and non-metals State the origins of the names of some of the chemical elements Organize groups of elements on a standard (mediumlong) periodic table, identifying periodic trends within groups and periods Present a model or display that describes an alternative and chemically justified arrangement of groups of elements forming the periodic table Create a game based on the periodic table to help others learn about patterns in the periodic table	Summative: Various problems allow for the application of the understanding of mixtures and separation processes in daily life, and the physical properties of the substances involved. Criteria A: Knowing and understanding Criteria D: Reflecting on the impacts of science
Unit 4 - How do atoms bond? (Bonding) (6 weeks) Term 2	Relationships	Evidence	Identities & Relationships Exploration - Attitudes	Chemical & Physical properties provide evidence of the relationships both between and within atoms	Learner Profile Communicator ATL Thinking: Creative Thinking Skills	Describe properties of metals, ionic solids, covalent molecular substances and covalent molecular network solids Outline bonding relationships between groups of elements in the periodic table, developing understanding of periodic trends Identify examples of polar molecules (liquids)	Summative: Criteria B: Planning and designing. Criteria C: Processing and evaluating

Feb-March					<ul style="list-style-type: none"> Use brainstorming and visual diagrams to generate new ideas and inquiries Make guesses, ask "what if" questions and generate testable hypotheses <p>Thinking: Critical Thinking Skills</p> <ul style="list-style-type: none"> Plan a logical procedure to investigate a research question <ul style="list-style-type: none"> Interpret data <p>Research: Information Literacy Skills</p> <ul style="list-style-type: none"> Process data and report results⁴ Revise understanding based on new information and evidence <p>Self- Management Skills: Reflection skills</p> <ul style="list-style-type: none"> Reflect upon a scientific investigation to determine sources of error and evaluate their impact. 	<p>Suggest how inter- and intra-molecular forces explain different types of chemical interactions between particles (molecules, ions or atoms)</p> <p>Evaluate the bonding relationships between parts of a complex synthetic molecule and its function, presenting findings in a mode that reflects the audience who will use it</p> <p>State names and chemical formulas of molecules using IUPAC rules</p> <p>Identify the numbers of atoms of different elements represented in the symbolic representation of a chemical compound</p> <p>Present formulas for the chemical compounds by valency and chemical symbols Describe the relationship between the charge of an ion in solution and its migration towards the oppositely charged electrode Investigate how a measurable property of a slime changes in response to a condition that changes bonding between its molecules</p>	
Unit 5 - What are the impacts of chemical industry? Term 3 April - May	Change	Interactions	Globalization and sustainability Exploration – Human impact on the environment	The chemical industry has brought change that affects global interactions with positive and negative environmental impacts.	<p>Learner Profile</p> <p>Principled</p> <p>Research: Information Literacy Skills</p> <ul style="list-style-type: none"> Access information to be informed and inform others Create references and citations, use footnotes/endnotes and construct a bibliography according to recognized conventions <p>Social: Collaboration Skills</p> <ul style="list-style-type: none"> Considering the global impacts of sciences on others <p>Communication skills</p> <ul style="list-style-type: none"> Use appropriate forms of writing for different purposes and audiences 	<p>Case studies involving chemical environmental pollution</p> <p>Present relevant information in the local community about how wastes should be safely disposed of Investigate systematically combinations of ionic solutions for their potential to form precipitates (ionic compounds with low solubility), as an example of a type of chemical reaction</p> <p>Formulate balanced chemical equations 'by inspection' – balancing chemical equations is an application of the law of conservation of mass Identify colour changes associated with a range of indicators of acids and bases</p> <p>Describe the relationship between the pH scale and hydrogen ion concentration in a solution Investigate the relationship between the concentration of an acid or a base and the pH measured in a serial dilution Investigate acid–base reactions experimentally, for example: formation of salts, by reacting (a) acids and carbonates, (b) metal oxides and acids, and (c) metals with acids</p> <p>Compare the corrosive effects of acids and bases and identify examples of uses of salts Investigate how a factor affects the solubility of an ionic compound</p> <p>Service learning</p> <p>Students create a poster on responsible waste disposal as part of their Summative Assessment. This will involve extensive research, such as asking to speak to the owner/ manager and offering to help.</p>	<p>Summative:</p> <p>Individually, students research and promote how a category of waste can be disposed of safely.</p> <p>Criteria A: Knowing and understanding</p> <p>Criteria D: Reflecting on the impacts of science</p>
Unit 6 - What are the determines chemical change? Term 3 May - June- July	Change	Movement	Orientation in space and time Exploration – Displacement and exchange	Physical and chemical change requires the transfer of kinetic energy between particles of matter over time and affects the	<p>Learner Profile</p> <p>Thinker</p> <p>Thinking: Creative Thinking Skills</p> <ul style="list-style-type: none"> Use brainstorming and visual diagrams to generate new ideas and inquiries 	<p>Identify similarities between the movement of particles and familiar experiences with the motion of a ball Suggest how particle/kinetic theory may explain a range of familiar phenomena Interpret kinetic theory as described by the Maxwell–Boltzmann distribution curve to explain a range of phenomena involving state changes Identify and interpret evidence of diffusion in a gas Describe the effect</p>	<p>Summative:</p> <p>Investigate the effect of surface textures on the rate of a reaction.</p> <p>Criteria B: Planning and designing.</p> <p>Criteria C: Processing and evaluating</p>

(6 weeks)				space they occupy.	<ul style="list-style-type: none"> • Make guesses, ask “what if” questions and generate testable hypotheses Thinking: Critical Thinking Skills <ul style="list-style-type: none"> • Plan a logical procedure to investigate a research question <ul style="list-style-type: none"> • Interpret data Research: Information Literacy Skills <ul style="list-style-type: none"> • Process data and report results⁴ • Revise understanding based on new information and evidence Self- Management Skills: Reflection skills <ul style="list-style-type: none"> • Reflect upon a scientific investigation to determine sources of error and evaluate their impact. 	of temperature on the rate of a reaction Investigate the effect of surface textures on the rate of a reaction Describe the mole concept and complete chemical calculations involving molar quantities Calculate the amounts (moles) of a variety of substances in further examples of types of chemical reaction: (a) gas produced during the decomposition of water by electrolysis (b) the synthesis reaction between oxygen and iron (c) moles of hydrogen ions, H ⁺ (aq), in an acid standardized using titration Formulate equations for exothermic and endothermic reactions, including ΔH	
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MYP Physics

Grade 9

Unit title	Key Concept	Related concept(s)	Global context	Statement of Inquiry	ATL Skills and Learner Profile	Content	Summative Assessment & MYP Objectives
Unit 1 - How far, how fast, how much faster? (5 weeks)	Relationships	Movement	Orientation in space and time Exploration - Displacement and exchange	To know where we are and where we are moving to we need to describe the relationship between space and time.	Learner Profile Knowledgeable Thinking: Creative Thinking Skills <ul style="list-style-type: none"> • Use brainstorming and visual diagrams to generate new ideas and inquiries • Make guesses, ask “what if” questions and generate testable hypotheses Thinking: Critical Thinking Skills <ul style="list-style-type: none"> • Plan a logical procedure to investigate a research question <ul style="list-style-type: none"> • Interpret data Research: Information Literacy Skills <ul style="list-style-type: none"> • Process data and report results⁴ • Revise understanding based on new information and evidence Self- Management Skills: Reflection skills <ul style="list-style-type: none"> • Reflect upon a scientific investigation to determine 	<ul style="list-style-type: none"> • Recall that distance is measured in metres (m), and speed in metres per second (m s⁻¹) • Define the terms distance and displacement • Apply the relationship average speed = distance/time • State that displacement accounts for direction of travel • Contrast and explain the difference between distance and displacement • Recall that any change in velocity – whether caused by change in speed or in direction – is an acceleration • Recall that acceleration is measured in metres per second squared (m s⁻²) • Define the terms speed, velocity and acceleration • Contrast and explain the difference between speed and velocity • Solve accelerations from changes in velocity and time • Analyse displacement–time graphs in terms of velocity • Solve problems using equations of motion (the SUVAT equations) for displacement, velocity and acceleration • Calculate stopping distances at varying speeds • Discuss the dangers of excessive vehicle speeds • Outline a range of safety features to reduce the fatality rate in vehicle crashes 	Summative: Lab Report Criteria A: Knowing and understanding Criteria B: Planning and designing. Criteria C: Processing and evaluating

					sources of error and evaluate their impact.		
Unit 4 - Amazing Structures (5 weeks)	Systems	form	Scientific and technical innovation Exploration - Methods	Natures forms have inspired us to use systems of force and to create innovative structures	Learner Profile Caring Thinking: Creative Thinking Skills <ul style="list-style-type: none"> Use brainstorming and visual diagrams to generate new ideas and inquiries Make guesses, ask “what if” questions and generate testable hypotheses Thinking: Critical Thinking Skills Plan a logical procedure to investigate a research question	<ul style="list-style-type: none"> Describe force systems in terms of force arrows to show size and direction of forces Apply vector diagrams to test whether forces are balanced or produce a resultant Apply vector diagrams to estimate size and direction of resultant forces Use vector diagrams to solve multiple force problems and calculate the resultant Describe the direction the frictional force acts Explain with vectors how to arrive at a net force of zero in 1 dimension Explain that unbalanced forces cause motion or deformation Define the law of moments Solve problems on the turning effect of a force Analyze the center of gravity of different objects Interpret force systems in terms of strong structural unit shapes: cantilevers and right-angled triangles, arches and equilateral triangles Describe how strong structural unit shapes deform under load Outline the variables that affect the choice of design in a structure, particularly in terms of physical properties of materials Explain strength of strong structural unit shapes in terms of force distribution 	Summative: Designing a Method: Investigating Balancing Points The real cost of human advancement in chemistry (Criterion D) Criteria B: Planning and designing.
Unit 3 - How Do Forces Interact? (5 weeks)	Relationships	Interactions	Identities and Relationships Exploration - Independence	By identifying relationships of similarity and difference we understand how force and matter interact.	Learner Profile Thinker Thinking: Critical Thinking Skills <ul style="list-style-type: none"> Interpret data Research: Information Literacy Skills <ul style="list-style-type: none"> Process data and report results Revise understanding based on new information and evidence Self- Management Skills: Reflection skills <ul style="list-style-type: none"> Reflect upon a scientific investigation to determine sources of error and evaluate their impact. 	<ul style="list-style-type: none"> Recall the names of the four ‘fundamental’ forces (electromagnetic, gravitational, strong nuclear and electroweak forces) State that force is measured in newtons (N) Interpret a range of examples for each of the four fundamental forces Analyse the four fundamental forces in terms of strength and distance of action Apply the reciprocal nature of distance–strength relationships to explain observations Discuss bar magnets and magnetic fields Recall that the Earth is a magnet with its own magnetic field Outline that matter is both kept together and kept apart by electrostatic attraction and repulsion Outline the difference between mass and weight Recall that strength of force fields is usually proportional to $1/d^2$ Outline the significance of the relative sizes of the gravitational and Coulomb constants Evaluate which of the four fundamental forces is the most useful to mankind. 	Summative: Data Collection: Investigating the Earths Gravitational Field Criteria C: Processing and evaluating
Unit 2 - Free to Move? (5 weeks)	Change	Movement	Fairness and Development Exploration - Security and freedom	Movement is change and our world have been changed by freedom of movement.	Learner Profile Open-minded Communication skills <ul style="list-style-type: none"> Organize and depict information logically Thinking: Transfer Skills	<ul style="list-style-type: none"> Recall that forces cause a change in shape or motion, direction or speed State Newton’s first law of motion. Recall the concept of inertia is a resistance to change in kinetic state Apply the concept of inertia to discuss motion of objects in the absence of force Summarize Newton’s first law of motion in terms of inertia 	Summative: Unit Test Criteria A: Knowing and understanding Criteria B: Planning and designing. Criteria C: Processing and evaluating

					<ul style="list-style-type: none"> Apply skills and knowledge in unfamiliar situations Thinking: Critical Thinking Skills <ul style="list-style-type: none"> Draw reasonable conclusions and generalizations 	<ul style="list-style-type: none"> State Newton's second law of motion. Explain how forces change motion and so cause acceleration Outline the changes in displacement, velocity and acceleration for objects in free-fall Outline the effects of resistive forces in gases and liquids Describe Newton's second law of motion in terms of momentum Describe the concept of momentum • State Newton's third law of motion. State that forces occur in action–reaction pairs Outline the law of conservation of momentum Analyze motion in terms of force pairs acting on different bodies 	
Unit 5 - How big is the world? (5 weeks)	Relationships	Patterns, Development	Identities and Relationships Exploration - Attitudes	We understand our own relationship to the Universe when we identify patterns at different scales.	Learner Profile Inquirer Communication skills <ul style="list-style-type: none"> Organize and depict information logically Thinking: Transfer Skills <ul style="list-style-type: none"> Apply skills and knowledge in unfamiliar situations Thinking: Critical Thinking Skills <ul style="list-style-type: none"> Draw reasonable conclusions and generalizations 	State the ranges of magnitude of distances, masses and times that occur in the universe, from smallest to greatest. • Recall the S.I. prefixes, units and scientific notation. • Describe how the magnification of different instruments has benefitted observations in resolution and developed understanding. • State ratios of quantities as differences of orders of magnitude. • Distinguish between accuracy and precision. • Demonstrate proper use of significant figures in scientific calculations. • Show the uncertainty of measurements. • Explain how the structure and arrangement of atoms can produce different materials and discuss the impacts this might have on the world. • Organize relevant information to formulate a testable hypothesis. • Explain how to manipulate variables. • Explain how sufficient, relevant data can be collected. • Recognize and evaluate propositions. • Evaluate evidence and arguments. • Consider ideas from multiple perspectives.	Summative: Topic Test Criteria D: Reflecting on the impacts of science
Unit 6 - How do we make life easier? (5 weeks)	Change	Development	Fairness and Development Human capability and development	Human life has been completely changed and developed through the use of machines that are created to transform energy and do useful work.	Learner Profile Caring Research: Information Literacy Skills <ul style="list-style-type: none"> Access information to be informed and inform others Create references and citations, use footnotes/endnotes and construct a bibliography according to recognized conventions Social: Collaboration Skills <ul style="list-style-type: none"> Considering the global impacts of sciences on others Communication skills <ul style="list-style-type: none"> Use appropriate forms of writing for different purposes and audiences 	Mechanical, chemical, electrical, magnetic, nuclear • Recall that the joule is the SI unit for energy • Explain the concepts of potential and kinetic energy forms • Explain that energy is the capacity to cause change, and that change is measured as work in various situations • Solve problems involving work done by machines that transform energy • Solve problems involving work done by gravitational fields • Explain that in each transformation of energy some energy is wasted as heat • Outline the principle heat transfer processes: conduction, convection, radiation • Describe the states of matter in terms of particle motion • Explain state changes in terms of energetics • Solve problems involving specific heat capacities • State the definition of efficiency • Solve problems about the efficiency of machines and energy transformation processes	Summative: Essay Criteria D: Reflecting on the impacts of science Criteria A: Knowing and understanding

						<ul style="list-style-type: none"> • Present energy transformations in the form of Sankey diagrams • Suggest some different ways of minimizing energy loss • Describe systems for dissipating energy usefully, e.g. heat-sinks, crumple zones <p>Service learning</p> <p>During the Summative, students share how bikes make life easier in the developing world.</p>	

MYP Biology

Grade 10

Unit title	Key Concept	Related concept(s)	Global context	Statement of Inquiry	ATL Skills and Learner Profile	Content and Service Learning	Summative Assessment & MYP Objectives
Unit 1 - How have different forms of life arisen?	Change	Interaction, Environment	Globalization and sustainability Exploration – Conservation	Species change over time through interactions with their environment: the evolution of humans has impacted global biodiversity in ways that may not be sustainable.	<p>Learner Profile</p> <p>Reflective</p> <p>Communication skills</p> <ul style="list-style-type: none"> • Organize and depict information logically <p>Thinking: Transfer Skills</p> <ul style="list-style-type: none"> • Apply skills and knowledge in unfamiliar situations <p>Thinking: Critical Thinking Skills</p> <ul style="list-style-type: none"> • Draw reasonable conclusions and generalizations <p>Research: Information Literacy Skills</p> <ul style="list-style-type: none"> • Access information to be informed and inform others • Create references and citations, use footnotes/endnotes and construct a bibliography according to recognized conventions <p>Social: Collaboration Skills</p> <ul style="list-style-type: none"> • Considering the global impacts of sciences on others <p>Communication skills Use appropriate forms of writing for different purposes and audiences</p>	<p>State the evidence for the evolution of species</p> <p>Describe how fossils are formed</p> <p>Describe and explain how species evolve by natural selection</p> <p>Outline evidence for natural selection Interpret data that shows evidence for natural selection</p> <p>Outline the role of isolation in speciation</p> <p>Outline the stages of meiosis and describe how they lead to variation and the production of gametes</p> <p>Describe what is meant by the term 'superbug'</p> <p>Describe how superbugs have evolved</p> <p>Explain how meiosis leads to variation</p> <p>Explain how DNA provides evidence for the tree of life</p> <p>Explain how homologous structures could provide evidence for evolution.</p> <p>Explain how fossil records could provide evidence for evolution.</p> <p>Explain the evolution of antibiotic resistance in bacteria</p> <p>Service learning</p> <p>As part of the Summative Assessment: Students present their findings to raise awareness of the suggestions, and alternatives. Consider the difference if more people bought and used products that are less disruptive to the balance of ecosystems.</p>	<p>Summative:</p> <p>Unit Test (Criterion A) Essay - Taking Action against Extinction (Criterion D)</p> <p>Criteria A: Knowing and understanding</p> <p>Criteria D: Reflecting on the impacts of Science ii</p>

Unit 2 - How are organisms adapted to survive?	Change	Environment, Interaction	Orientation in space and time Exploration – Evolution	Organisms are more likely to survive when they are adapted to interact with their surroundings and respond to changes in their environment.	<p>Learner Profile</p> <p>Balanced</p> <p>Thinking: Creative Thinking Skills</p> <ul style="list-style-type: none"> Use brainstorming and visual diagrams to generate new ideas and inquiries Make guesses, ask “what if” questions and generate testable hypotheses <p>Thinking: Critical Thinking Skills</p> <ul style="list-style-type: none"> Plan a logical procedure to investigate a research question <ul style="list-style-type: none"> Interpret data <p>Research: Information Literacy Skills</p> <ul style="list-style-type: none"> Process data and report results⁴ Revise understanding based on new information and evidence <p>Self- Management Skills: Reflection skills</p> <ul style="list-style-type: none"> Reflect upon a scientific investigation to determine sources of error and evaluate their impact. 	<p>Define the terms ‘nucleus’, ‘chromosome’, ‘DNA’, ‘gene’, ‘allele’</p> <p>Describe the structure of DNA and outline how its structure relates to its function</p> <p>Describe the cause and effect of gene mutations</p> <p>Analyse genetic diagrams to calculate the ratio of expected genotypic and phenotypic outcomes</p> <p>Explain how outcomes of genetic crosses can be used to define parental genotypes</p> <p>Describe the difference between asexual and sexual reproduction</p> <p>Describe the process of mitosis</p> <p>Outline different life cycles for both vertebrates and invertebrates</p> <p>Explain the differences between asexual and sexual reproduction</p> <p>Outline how genes code for proteins Explain how mutations lead to a change in phenotype</p> <p>Explain how different life cycles adapt organisms to different environments</p>	<p>Summative:</p> <p>Design Lab & Lab Report: Investigating the effect of animal coverings</p> <p>Criteria B: Planning and designing.</p> <p>Criteria C: Processing and evaluating</p>
Unit 3 - How do species interact?	Systems	Balance Function	Globalization and sustainability Exploration – Diversity and interconnection	Ecosystems can be in balance when the species sharing their habitat have interconnected and sustainable functions and roles.	<p>Learner Profile</p> <p>Caring</p> <p>Communication skills</p> <ul style="list-style-type: none"> Organize and depict information logically <p>Thinking: Transfer Skills</p> <ul style="list-style-type: none"> Apply skills and knowledge in unfamiliar situations <p>Thinking: Critical Thinking Skills</p> <ul style="list-style-type: none"> Draw reasonable conclusions and generalizations 	<ul style="list-style-type: none"> Discuss the impact of removing the top predator from an ecosystem e.g. Pisaster ochraceus (starfish) Define producer, trophic level, niche, consumer, omnivore, decomposer, saprotroph, detritivore Distinguish between photosynthesis and chemosynthesis Construct a food chains/webs Describe energy flow through a food chain Outline Robert Paine’s experiment Discuss the impact of removing the top predator from an ecosystem e.g. Pisaster ochraceus (starfish) Define producer, trophic level, niche, consumer, omnivore, decomposer, saprotroph, detritivore Distinguish between photosynthesis and chemosynthesis Construct a food chains/webs Describe energy flow through a food chain Define: commensalism, parasitism, competition, mutualism, symbiosis Outline examples of herbivory and predation Describe examples/impacts of commensalism, parasitism and mutualism Distinguish between interspecific and intraspecific competition Define: keystone species State a few examples of keystone species Suggest the impact of removing keystone species from human population 	<p>Summative:</p> <p>Unit Test</p> <p>Criteria A: Knowing and understanding</p>

Unit 4 - How do the choices people make affect the environment?	Change	Environment, Balance	Globalization and sustainability Exploration – Natural resources and public goods	As a result of the choices that humans make, the environment has undergone and will continue to undergo change. Humans have the ability to understand the consequences of their actions and to act to restore balance in ecosystems and work towards a sustainable future.	Learner Profile Balanced Research: Information Literacy Skills <ul style="list-style-type: none"> • Access information to be informed and inform others • Create references and citations, use footnotes/endnotes and construct a bibliography according to recognized conventions Social: Collaboration Skills <ul style="list-style-type: none"> • Considering the global impacts of sciences on others Communication skills <ul style="list-style-type: none"> • Use appropriate forms of writing for different purposes and audiences 	<ul style="list-style-type: none"> • Identify how the Neolithic period marked the start of population growth • Outline what is meant by exponential growth • Sketch a graph displaying population data and analyse any trends • Identify the periods in the last 12,000 years where the human population reached 1-2 billion, 2-3 billion etc. • Outline what the letters of the mnemonic 'AHIPPO' refer to • Describe examples for each letter of AHIPPO to highlight human impact • Discuss how human threats are harming biodiversity and leading to endangered species • State how much of the Earth's surface is utilised for agriculture • List different types of pollution as well as the sources of them • Suggest some of the effects of pollution on human health • Determine the link between fossil fuels and acid rain affecting trees • Explain the process of eutrophication • Solve the issues of pollution by suggesting realistic strategies • Explain how pollutants can lead to biomagnification • List the greenhouse gases 	Summative: Essay - Consequences of our actions Criteria D: Reflecting on the impacts of science
Unit 5 – How does biotechnology create new options in industry and health?	Change	Development; Transformation	Fairness and development Exploration – Power and privilege	The development and use of biotechnology to change and transform genes helps create new options, choices and opportunities in industry and health: whether these developments are fair for all remains to be seen.	Learner profile Communicator Thinking: Creative Thinking Skills <ul style="list-style-type: none"> • Use brainstorming and visual diagrams to generate new ideas and inquiries • Make guesses, ask "what if" questions and generate testable hypotheses Thinking: Critical Thinking Skills <ul style="list-style-type: none"> • Plan a logical procedure to investigate a research question • Interpret data Research: Information Literacy Skills <ul style="list-style-type: none"> • Process data and report results • Revise understanding based on new information and evidence Self- Management Skills: Reflection skills <ul style="list-style-type: none"> • Reflect upon a scientific investigation to determine sources of error and evaluate their impact. 	Define the term clone Describe selective breeding Explain the techniques used to modify genes Analyse how humans can manipulate genes to create new cells, tissues and organs Consider the use of cloning to benefit agriculture Analyse how people's beliefs and values influence the development of biotechnological techniques What are the possible consequences of developing and applying more biotechnology Discuss the extent to which people should be allowed to clone organisms.	Summative: Design and carry out a practical to investigate the use of and grow tissue cuttings Criteria B: Planning and designing. Criteria C: Processing and evaluating

Grade 10

Unit title	Key Concept	Related concept(s)	Global context	Statement of Inquiry	ATL Skills and Learner Profile	Content and Service Learning	Summative Assessment & MYP Objectives
Unit 1 - What's inside the nucleus? (4 weeks)	Systems	Evidence	Orientation in space and time Exploration – Exchange and interaction	Evidence from physical properties such as masses of nuclei has helped to elaborate our systems for classifying matter and explained the distribution of elements on Earth and elsewhere in the universe.	Learner Profile Risk taker Research: Information Literacy Skills <ul style="list-style-type: none"> Access information to be informed and inform others Create references and citations, use footnotes/endnotes and construct a bibliography according to recognized conventions Social: Collaboration Skills <ul style="list-style-type: none"> Considering the global impacts of sciences on others Communication skills <ul style="list-style-type: none"> Use appropriate forms of writing for different purposes and audiences 	Suggest how isotope ratios inform understanding about a person's movements Calculate the numbers of neutrons and protons to describe atomic structure (including isotopes) Outline examples and uses of stable isotopes Outline types of isotope radioactivity and decay and examples of uses of unstable isotopes. Analyse nuclear decay in a range of ionic compounds which naturally contain potassium-40 Present a case study in which a stable or unstable isotope is an example for reflecting on the impacts of science Analyse data from (a) radioactive decay models and (b) radiation intensity models Suggest how components of smoke alarms, which contain the α -emitter americium-241, may be recycled Calculate the density of mass in atoms and nuclides Interpret complex texts about the origin of different elements, using a three-level guide	Summative: Individually, students use the medium of science journalism to narrate a case study featuring the application of a stable or unstable isotope to resolve a problem. The opening story is cited as a model. Criteria D: Reflecting on the impacts of science
Unit 2 - Why do electron's matter? (4 weeks)	Relationships	Interaction, function	Identities and relationships Exploration – Consciousness and mind	Protons define the identity of an element, but its relationship and interaction with other elements is a function of its outer electrons.	Learner Profile Thinker Communication skills <ul style="list-style-type: none"> Organize and depict information logically Thinking: Transfer Skills <ul style="list-style-type: none"> Apply skills and knowledge in unfamiliar situations Thinking: Critical Thinking Skills <ul style="list-style-type: none"> Draw reasonable conclusions and generalizations 	Suggest how the properties of fireworks come from their chemistry Select the colour (visible radiation) emitted from heated atoms in flame tests Calculate the energy carried by photons (light waves) from the compounds in the flame tests, based on the flame colour of the cation Outline links between chemistry and physics Select columns in data sheets (spreadsheets) to investigate periodic trends, including valency patterns Present electron configurations of atoms using electron shell notation, dot and cross diagrams and Lewis shell diagrams Summarize the results of single displacement reactions Analyse electrochemicals in the voltaic cell and in redox reactions Determine the reactivity series of metals experimentally Describe corrosion protection as a redox reaction Outline conditions in which corrosion of metal objects in the environment is minimized Present a formal essay reflecting on the impacts of redox chemistry in a case study involving metal oxidation or reduction Demonstrate the extraction of copper metal from copper(II) oxide Outline processes used for the extraction of metals	Summative: Various problems allow for application of understanding of the octet rule, valence electrons and redox chemistry. Criteria A: Knowing and understanding
Unit 3 - How are environmental systems sustained by their chemistry? (3 weeks)	Systems	Balance	Globalization and sustainability Exploration – Population and demography	Balancing the chemical inputs and the outputs of Earth's systems is a prerequisite to sustain an	Learner Profile Caring Research: Information Literacy Skills <ul style="list-style-type: none"> Access information to be informed and inform others 	Identify causes of Earth's changing atmosphere Outline how processes carried out by living organisms (photosynthesis and denitrification) have changed the composition of Earth's atmosphere Evaluate information about Earth's systems, including the atmosphere (characteristics of gases, atmospheric composition)	Summative: Individually, students reflect on the impacts of science by researching and reporting on the feasibility of populating another planet, either by providing

				environment that is hospitable to human life.	<ul style="list-style-type: none"> Create references and citations, use footnotes/endnotes and construct a bibliography according to recognized conventions Social: Collaboration Skills <ul style="list-style-type: none"> Considering the global impacts of sciences on others Communication skills <ul style="list-style-type: none"> Use appropriate forms of writing for different purposes and audiences 	Interpret the carbon cycle, emissions and environmental implications Interpret the nitrogen cycle, and nutrient (phosphate) cycles Evaluate the feasibility of populating another planet, either by providing technical solutions or terraforming its systems Compare the emissions caused by the combustion of different solid fuels Design an experimental inquiry into the impacts, on an organism or mineral, of dissolved pollutants in water Compare environmental footprints of brands of bottled drinking water and suggest alternatives Suggest how different cycles of the Earth are linked Describe and explain the catalytic cycle of ozone depletion using a performance art (dance or mime) Identify features of the Montreal protocol that contributed to its success Service learning Students devise a mime, short play, performance poem or other performance to dramatize the importance of the Montreal and Kyoto protocols. They should perform the pieces to another class, or in a school assembly. Video record them and post them online.	technical solutions or by terraforming its systems. Criteria D: Reflecting on the impacts of Science
Unit 4 - How can energy resources be assessed fairly? (5 weeks)	Change	Energy	Fairness and development Exploration – Human capability and development	Global exploitation of energy resources relies on energy changes in chemical reactions; global development depends on the fair and equitable exchange of those resources.	Learner Profile Reflective Thinking: Creative Thinking Skills <ul style="list-style-type: none"> Use brainstorming and visual diagrams to generate new ideas and inquiries Make guesses, ask “what if” questions and generate testable hypotheses Thinking: Critical Thinking Skills <ul style="list-style-type: none"> Plan a logical procedure to investigate a research question <ul style="list-style-type: none"> Interpret data Research: Information Literacy Skills <ul style="list-style-type: none"> Process data and report results⁴ Revise understanding based on new information and evidence Self- Management Skills: Reflection skills <ul style="list-style-type: none"> Reflect upon a scientific investigation to determine sources of error and evaluate their impact. 	Evaluate a factor that affects the length of time for which a candle burns in a closed environment Describe patterns found in the flashpoints in the combustion of fuels Outline the energy changes during combustion reactions Present strategies that promote safety from building fires Identify fuels fit for different purposes Demonstrate a simple fuel cell experimentally Describe changes during endothermic and exothermic reactions using energy level diagrams, using calculations to quantify thermal energy produced or absorbed, or as thermochemical equations. Investigate the relationship between the identity of a metal ion and the current generated in a Daniell cell experimentally Investigate a variable that controls energy production in a circuit including a ‘fruit battery’ Calculate enthalpy changes (ΔH) using bond energy tables and experimental measurements Compare exothermic reactions with explosive exothermic reactions Investigate factors that affect how hand-warmers work by independently developing a hypothesis and testing it experimentally	Summative: Independently, students investigate and report on a variable that affects the energy produced in a circuit which includes a ‘fruit battery’. Criteria B: Planning and designing Criteria C: Processing and evaluating
Unit 5 - How can we shift the balance of a reaction? (6 weeks)	Change	Balance Function	Orientation in space and time	Change in the balance called chemical equilibrium is affected by the	Learner Profile Balanced Thinking: Creative Thinking Skills	State the role of enzymes as catalysts in biological contexts Investigate the role of a catalyst (manganese(IV) oxide) experimentally Investigate independently a factor that affects the efficiency of a catalyst chosen by the student	Summative: Independently, students develop a hypothesis and conduct and report on an investigation into a factor that affects

			Exploration – Displacement and change	collisions of particles in space and time.	<ul style="list-style-type: none"> Use brainstorming and visual diagrams to generate new ideas and inquiries Make guesses, ask “what if” questions and generate testable hypotheses Thinking: Critical Thinking Skills <ul style="list-style-type: none"> Plan a logical procedure to investigate a research question <ul style="list-style-type: none"> Interpret data Research: Information Literacy Skills <ul style="list-style-type: none"> Process data and report results⁴ Revise understanding based on new information and evidence Self- Management Skills: Reflection skills <ul style="list-style-type: none"> Reflect upon a scientific investigation to determine sources of error and evaluate their impact. 	<p>Solve problems reflecting on collision theory and factors affecting reaction rates, including graphical representations of reaction kinetics</p> <p>Investigate mathematically the relationship between surface area and the number of divisions in a cube of fixed volume</p> <p>Present quantitative data analysis for observations on the reaction between sodium thiosulfate and hydrochloric acid</p> <p>Describe equilibria and reversible reactions, including the thermal dissociation of hydrated salts, using the correct symbol ()</p> <p>Describe the Haber process</p> <p>Solve problems reflecting on applications of Le Chatelier’s principle</p>	<p>the behaviour of a catalyst, for example a transition metal oxide or an enzyme.</p> <p>Criteria B: Planning and designing</p> <p>Criteria C: Processing and evaluating</p>
Unit 6 - Does organic chemistry mean we can make any substance we want? (6 weeks)	Systems	Form, Function	Scientific and technical innovation Exploration – Processes and solutions	The versatile bonding of carbon atoms has allowed humanity to invent systems of molecules of various forms to fulfil different functions.	<p>Learner Profile</p> <p>Knowledgeable</p> <p>Communication skills</p> <ul style="list-style-type: none"> Organize and depict information logically Thinking: Transfer Skills <ul style="list-style-type: none"> Apply skills and knowledge in unfamiliar situations Thinking: Critical Thinking Skills <ul style="list-style-type: none"> Draw reasonable conclusions and generalizations 	<p>State the meaning of the term ‘organic chemistry’ and list examples</p> <p>Investigate compounds experimentally to determine whether they are hydrocarbons</p> <p>Describe the classification of alkanes and alkenes as homologous series</p> <p>Investigate the solubility of alcohols in water, relating observations to the length of the alkyl chain</p> <p>Demonstrate the flammability of ethanol in a ‘magic trick’</p> <p>Outline industrial uses of alcohol and demonstrate the production of alcohol using fermentation</p> <p>Describe examples of carboxylic acids Apply IUPAC naming to organic compounds, including esters Describe examples of isomers, including by presenting their structural formulas</p> <p>Describe the extraction of different hydrocarbons by the distillation of crude oil, cracking and reforming</p> <p>Demonstrate experimentally the process of saponification</p> <p>Compare condensation and addition polymerization</p>	<p>Summative:</p> <p>Various problems allow for application of understanding of IUPAC nomenclature, discussion of trends of homologous series and the chemistry of functional groups</p> <p>Criteria A: Knowing and understanding</p>

MYP Physics

Grade 10

Unit title	Key Concept	Related concept(s)	Global context	Statement of Inquiry	ATL Skills and Learner Profile	Content and Service Learning	Summative Assessment & MYP Objectives
Unit 1 – How can we communicate? (5 weeks)	Relationships	Movement, Energy	Personal and cultural expression Exploration -	New global relationships have become possible as humanity has learned to	<p>Learner Profile</p> <p>Communicate</p> <p>Thinking: Creative Thinking Skills</p>	<ul style="list-style-type: none"> Summarize the properties of oscillatory motion around an equilibrium point Describe longitudinal and transverse wave motion Describe a wave in terms of the key dimensions of wavelength, frequency and amplitude 	<p>Summative:</p> <p>Lab Report</p> <p>Criteria B: Planning and designing</p>

			Metacognition and abstract thinking	communicate through energy transferred as wave motion.	<ul style="list-style-type: none"> Use brainstorming and visual diagrams to generate new ideas and inquiries Make guesses, ask “what if” questions and generate testable hypotheses Thinking: Critical Thinking Skills <ul style="list-style-type: none"> Plan a logical procedure to investigate a research question <ul style="list-style-type: none"> Interpret data Research: Information Literacy Skills <ul style="list-style-type: none"> Process data and report results⁴ Revise understanding based on new information and evidence Self- Management Skills: Reflection skills <ul style="list-style-type: none"> Reflect upon a scientific investigation to determine sources of error and evaluate their impact. 	<ul style="list-style-type: none"> Explain the speed of waves in terms of the properties of media Explain the subjective experience of loudness and of pitch in terms of the dimensions of a sound wave Outline the phenomena of interference and resonance in terms of wave superpositioning Outline the principal regions of the electromagnetic spectrum Describe the communication of information through modulation of wave amplitude and frequency Explain the subjective experience of brightness and of colour in terms of the dimensions of a light wave Describe the phenomenon of reflection in terms of wavefronts and a ray model Describe the phenomenon of refraction in terms of wavefronts and a ray model Solve problems involving Snell’s law relating refraction to wave speed Describe the phenomenon of diffraction in terms of wavefronts and a ray model 	
Unit 2 - How is our climate changing? (5 weeks)	change	Environmental, evidence, models	Globalization and sustainability Exploration - Human impact on the environment	Scientific evidence shows that human activity is leading to major changes in global environments.	Learner Profile Balanced Research: Information Literacy Skills <ul style="list-style-type: none"> Access information to be informed and inform others Create references and citations, use footnotes/endnotes and construct a bibliography according to recognized conventions Social: Collaboration Skills <ul style="list-style-type: none"> Considering the global impacts of sciences on others Communication skills <ul style="list-style-type: none"> Use appropriate forms of writing for different purposes and audiences 	<ul style="list-style-type: none"> Describe surfaces in terms of their black-body emissivity and reflectivity Identify the chief greenhouse gases Summarize the greenhouse effect in terms of absorption and re-emission of radiation Outline the effects of the greenhouse effect on the earth–atmosphere system Identify the chief sectors of human activity that contribute to greenhouse gas emissions Classify energy sources as primary or secondary Evaluate energy density of different fuel sources Identify renewable and non-renewable energy sources Evaluate renewable and non-renewable energy sources Outline the key features of a non-renewable fuel source power station Outline the key features of renewable energy sources: wind generators, hydroelectric, tidal, and solar systems Classify climate phenomena in terms of positive and negative feedback Outline the effects of changing albedo on climate Describe the effects of changing solar irradiation on climate Evaluate the evidence that short-term global warming is a consequence of human activity Service learning Students start a club or campaign in the school to reduce the school’s carbon footprint.	Summative: Presentation on Harnessing Renewable Energy Criteria C: Processing and evaluating
Unit 3 - Are all our futures electric? (5 weeks)	Systems	Development	Scientific and technical innovation	The development of electrical systems has defined the	Learner Profile Caring	<ul style="list-style-type: none"> Recall that negative electric charge is carried by electrons, positive electric charge is carried by protons Explain that a surplus or deficit of electrons leads to a static electric charge 	Summative: Lab Report Realising Potential

			Exploration - Principles and discoveries	modern world and made new futures possible.	<p>Thinking: Creative Thinking Skills</p> <ul style="list-style-type: none"> Use brainstorming and visual diagrams to generate new ideas and inquiries Make guesses, ask “what if” questions and generate testable hypotheses <p>Thinking: Critical Thinking Skills</p> <ul style="list-style-type: none"> Plan a logical procedure to investigate a research question <ul style="list-style-type: none"> Interpret data <p>Research: Information Literacy Skills</p> <ul style="list-style-type: none"> Process data and report results⁴ Revise understanding based on new information and evidence <p>Self- Management Skills: Reflection skills</p> <ul style="list-style-type: none"> Reflect upon a scientific investigation to determine sources of error and evaluate their impact. 	<ul style="list-style-type: none"> Describe how moving electric charge produces an electric current Describe how the flow of electrons is used to do work State that electric current is measured in amperes Outline how to use switches in simple series and parallel circuits Describe how current varies in different parts of series and parallel circuits Describe how energy in an electric circuit is measured as potential difference, or voltage, and is measured in volts Classify materials in terms of their conductive properties Identify electrical conductors and insulators Measure the currents and voltages in circuits containing different conductors Measure the V–I characteristics of a range of conductors 	<p>Criteria B: Planning and designing</p> <p>Criteria C: Processing and evaluating</p>
<p>Unit 4 - Power to the people?</p> <p>(5 weeks)</p>	Relationships	Interaction, Energy	<p>Fairness and development</p> <p>Exploration - Civic responsibility and the public sphere</p>	<p>Manipulating the relationship between interacting electric and magnetic forces makes it possible to distribute plentiful energy to everyone.</p>	<p>Learner Profile</p> <p>Caring</p> <p>Communication skills</p> <ul style="list-style-type: none"> Organize and depict information logically <p>Thinking: Transfer Skills</p> <ul style="list-style-type: none"> Apply skills and knowledge in unfamiliar situations <p>Thinking: Critical Thinking Skills</p> <ul style="list-style-type: none"> Draw reasonable conclusions and generalizations 	<ul style="list-style-type: none"> Recall the relationship between electric and magnetic fields. Describe the observation you see when passing electric current through a wire Using your hand, model how magnetic field is generated. Explain how electromagnets can be used in industry Recall the factors that affect an electromagnets Describe how a force is produced using electric and magnetic fields. Explain how it's possible to make a motor using magnetic fields State Flemings LHR, and describe what each finger models Describe how it possible to induce a current with a magnet Explain in terms of magnetic fields and electrons the phenomena of electromagnetic induction Describe the process of how electricity is generated Draw a model of a power station with annotations describing the key processes. Discuss the energy transfers that take place in a power station Apply your knowledge of electromagnetic induction to explain how a transformer works 	<p>Summative:</p> <p>Topic Test</p> <p>Criteria A: Knowing and understanding</p>
<p>Unit 5 - What's in an atom?</p> <p>(5 weeks)</p>	change	Consequences, energy, environment	<p>Scientific and technical innovation</p> <p>Exploration - Industrialization and engineering</p>	<p>Learning to control nuclear changes allows us to use matter in new ways and release huge quantities of energy, with</p>	<p>Learner Profile</p> <p>Open-minded</p> <p>Research: Information Literacy Skills</p> <ul style="list-style-type: none"> Access information to be informed and inform others 	<ul style="list-style-type: none"> Describe the basic properties of protons, electrons and neutrons Model the relative size of the atom Describe what is meant by an isotope Discuss the importance of Rutherford and Thompson in developing an understanding of the atom Draw the basic structure of the atom 	<p>Summative:</p> <p>Useful Radiation Presentation</p> <p>Criteria D: Reflecting on the impacts of Science</p>

				consequences that can be both positive and negative.	<ul style="list-style-type: none"> Create references and citations, use footnotes/endnotes and construct a bibliography according to recognized conventions <p>Social: Collaboration Skills</p> <ul style="list-style-type: none"> Considering the global impacts of sciences on others <p>Communication skills</p> <ul style="list-style-type: none"> Use appropriate forms of writing for different purposes and audiences 	<ul style="list-style-type: none"> Outline the principle of electrons moving between shells Explain the relationship between neutrons and protons in the nucleus Describe what is meant by ionizing radiation Outline the phenomena of ionization Explain the reason for radioactive decay Summarise the properties of alpha, beta and gamma Outline sources of background radiation Explain how a Gieger-Muller tube works Evaluate which form of radiation is the most harmful to humans Calculate half-life of a decay source Outline the practical uses of alpha, beta and gamma Explain how we use carbon dating to find out the age of objects Describe the process of nuclear fission Model a chain reaction Recall what is meant by binding energy Describe how nuclear fission can be controlled 	
Unit 6 - Where are we in the Universe? (5 weeks)	Relationships	Form, Models, Evidence	Orientation in space and time Exploration - Scale	As we extend the reach of our observations, we better understand the relationships that form our models of the Universe, and so our place in the cosmos.	<p>Learner Profile</p> <p>Knowledgeable</p> <p>Communication skills</p> <ul style="list-style-type: none"> Organize and depict information logically <p>Thinking: Transfer Skills</p> <ul style="list-style-type: none"> Apply skills and knowledge in unfamiliar situations <p>Thinking: Critical Thinking Skills</p> <ul style="list-style-type: none"> Draw reasonable conclusions and generalizations <p>Research: Information Literacy Skills</p> <ul style="list-style-type: none"> Access information to be informed and inform others Create references and citations, use footnotes/endnotes and construct a bibliography according to recognized conventions <p>Social: Collaboration Skills</p> <ul style="list-style-type: none"> Considering the global impacts of sciences on others <p>Communication skills</p> <p>Use appropriate forms of writing for different purposes and audiences</p>	<ul style="list-style-type: none"> Compare in terms of relative factors of scale: size of Solar System, size of galaxy, size of known Universe Outline the principal constituents of our Solar System: Sun, rocky planets, gas planets, satellites, asteroids, comets Summarize the astronomical bases for the calendar: the day, the month, the year Describe planetary orbits in terms of centripetal force and gravitational attraction Describe Kepler's laws for planetary motion Outline Newton's law of universal gravitation Apply understanding of lenses to outline the phenomena of magnification and resolution Recall the principle domains of the electromagnetic spectrum and their relative positioning in terms of wavelength and frequency Describe the principal stages in the life of a star, and the magnitude of their duration Outline the properties of: protostars, main-sequence stars, red giants, white dwarves, neutron stars, black holes Outline the properties of some deep space objects: nebulae (both star-forming and supernova remnant), pulsars, other galaxies Calculate time of travel for light over cosmological distances. State the definition of the light year Describe different cosmological models: steady state, 	<p>Summative:</p> <p>Test and essay</p> <p>Criteria A: Knowing and understanding</p> <p>Criteria D: Reflecting on the impacts of Science</p>