Course Overviews MYP Science, UWC Thailand 2026-2027

All units taught in grades 6 to 10 are continuously being developed and improved to best meet the needs of the students at UWCT. Therefore, the following overview is only a reflection of current plans for the course. Some changes to these course overviews may occur as a result of planning done throughout the academic year.

Grade	Unit Number and Title	Key and Related Concepts	Global Context	Statement of Inquiry	Inquiry Questions	Approaches To learning skills taught / learnt / developed in this unit	Content (topics / knowledge/ subject specific skills)	Summative Assessment and MYP Criteria Assessed
6	Unit 1: Becoming Scientists - Exploring the world through a scientific lens (7 weeks)	Relationships Evidence Patterns	Identities and relationships Identity formation	Scientists use evidence to identify patterns and relationships in the natural world, forming their identity as investigators who contribute to our understanding of how the world works.	**Factual: What is evidence? What key ideas do scientists use to investigate relationships (variables)?** **Conceptual: How do scientists use evidence? What kinds of relationships can be investigated? How does following the scientific method help us understand patterns in nature?** **Debatable: What are the implications of the work of various scientists throughout history?**	Research (information literacy) - Use online information effectively to research the work and impact of a specific scientist	- identify similarities and differences between a science laboratory and other MYP classrooms - suggest and follow laboratory safety rules - suggest the features of becoming a scientist - define and use the key concepts needed to investigate relationships in science: evidence, variables, hypothesis, research questions etc - outline the scientific method (MYP experimental cycle) - outline what data is and how it can be used to support our ideas - safely operate a bunsen burner - Identify and draw standard lab equipment and outline its use - make correct measurements using standard lab equipment - identify famous scientists and outline the impact of their work on society	D - Famous Scientists presentation - How did the work of one person impact our scientific understanding? A- Scientific method, lab safety and the tools of science
6	Unit 2: Matter in Motion - Exploring particles and properties of matter (7 weeks)	Change Form, Energy	Scientific and Technological Innovation: Systems, models, methods; products, processes and solutions	Understanding how particles interact and change allows scientists to develop methods for separating and identifying substances, leading to innovations that impact daily life.	**Factual: What are the three states (forms) of matter? What is the difference between melting and dissolving? What are some different techniques used to separate mixtures?** **Conceptual: How do particle arrangement and motion change as matter transforms between states or dissolves? How do the properties of substances determine which separation method is most effective?** **Debatable: Did my experiment give me a valid answer about the relationship between my variables**	Critical Thinking - Using the scientific method to design, carry out and analyse the data from an investigation.	• Identify and outline the three states of matter—solids, liquids, and gases—including particle arrangement, motion, and inter-particle forces. • Describe how the properties of solids, liquids, and gases relate to particle behavior. • Explain changes of state in terms of particle arrangement, motion, and forces. • Apply understanding of energy transfer and particle behavior to explain why substances change state at different temperatures. • Design an experiment testing how Bunsen burner settings affect the melting time of an ice cube (Criterion B formative). • Distinguish between pure substances and mixtures. • Define and use key solution terms: solvent, solute, dissolve, soluble, insoluble, saturated. • Differentiate between melting and dissolving at the particle level. • Describe and perform methods for separating mixtures, including filtration, evaporation, and chromatography. • Design an investigation on how water temperature affects the dissolving time of a fizzy tablet (Criterion B summative). • Analyse and evaluate data from the dissolving investigation, identifying patterns, errors, and improvements (Criterion C formative). • Conduct a chromatography experiment to separate inks from different pen types. • Record and present data to describe how solubility and solvent attraction influence separation.	B: Design an experiment to test how the settings on a bunsen burner impact time taken for an ice cube to melt B (summative): Design an investigation into how water temperature impacts dissolving time of a fizzy tablet. C (formative): Analyse and evaluate the results of an investigation into how water temperature impacts dissolving time of a fizzy tablet. C: Analyse and evaluate the results of an investigation into impacts of ink type on chromatography.

							• Analyse and evaluate chromatography results to describe relationships between variables and draw valid conclusions (Criterion C summative). Terminology: Solids, liquids, gases, particle arrangement, particle motion, inter-particle forces, energy transfer, change of state, pure substance, mixture, solvent, solute, dissolve, chromatography, variable, investigation, data analysis, evaluation	
6	Unit 3: The Living World - From cell structure to life processes (4 weeks)	Relationships Form Function	Scientific and technical innovation	Scientific and technical innovations allow us to explore the relationship between the form and function of cells, revealing how life processes work at the microscopic level.	**Factual: What are the characteristics of living things? What are living things made of? What are the specialised forms and functions of cells?** **Conceptual: How do we use microscopes? How do we calculate magnification? How do we categorise forms as living?** **Debatable: Is MRS GREN the most suitable way to categorise living and nonliving things?**	Self management - Organising class notes and preparing a study plan to prepare for the test.	Students will: - outline the structure of a cell, including the function of key organelles (mitochondria, chloroplast, nucleus, membrane, cell wall, vacuole, cytoplasm) - outline how to prepare a slide to be viewed under a microscope - outline how to view cells under a microscope - compare plant cells and animal cells - outline the characteristics of living things (MRS GREN) - outline how the form of specialised cells is adapted to their function. - state the relationship between cells, tissues, organs and systems - apply their knowledge of the seven life processes to determine if an object is alive or not - set-up and use a microscope to view plant and animal cells - prepare microscope slides to view plant and animal cells using appropriate chemical stains for the specimen	A: Knowledge test focusing on cells, microscope use and 7 life processes.
6	Unit 4: Energy Transformations - Powering a sustainable future (9 weeks)	Change Energy	Globalisation and Sustainability urban planning, strategy and infrastructure	Energy transfers and transformations can be optimized to create sustainable infrastructure that meets global development needs while protecting our planet's future.	**Factual: What types of energy are there? How can energy be transformed?** **Conceptual: What does sustainability mean? How can you make a house more sustainable through controlling energy transfer?** **Debatable: Is it more important to focus on energy efficiency or switching to renewable sources?**	Critical Thinking - Using the scientific method to design, carry out and analyse the data from an investigation	Students will: Identify the different types of energy and give examples. Outline simple energy transfers and transformations and give examples. Investigate simple energy changes. Outline conduction, convection, radiation and insulation State how insulation is used to make sustainable homes Investigating how controlling the heat energy transfer through insulation can impact the sustainability of our buildings. Define fuels Define the terms renewable and nonrenewable Outline how energy is transferred from the sun to different renewable and nonrenewable energy sources (fossil fuels, wind, water, geothermal and biomass) Outline the energy transfers that occur when when we use the different energy sources ((fossil fuels, wind, water, geothermal, biomass and nuclear) Analyse efficiency using Sankey diagrams Outline advantages and disadvantages of different energy sources, include suitability for different areas Consider the meaning of the term ‘sustainability’ in relation to different UN sustainability goals (not just the context of environmentalism) Analyse and evaluate the best future energy source for Phuket	B: Design a lab to investigate the conductivity of various metals C: Build a model house, carry out and analyse an investigation into how controlling the heat energy transfer through insulation can impact the sustainability of our buildings.
6	Unit 5: Biodiversity in Balance - Investigating ecological	Systems Balance Interaction	Scientific and Technical Innovation	Scientists use innovative technologies and models to understand the complex interactions that maintain balance in ecosystems,	**Factual: What are ecosystems and how can they be studied?** **Conceptual: What do scientists do to understand ecosystems and what makes**	Communication (organise and depict information logically).	Students will: - Define: ecosystem, habitat, population, biodiversity, innovation, quadrat, transect, ecologist, mesocosm, species -outline different types of habitats/biomes and some adaptations of the plants and animals that live there	D: Students will research an ecosystem that has become unbalanced and reflect on the impact of science on their chosen

	connections			guiding our decisions about protecting biodiversity.	**them healthy? How do scientific innovations and daily decisions help keep ecosystems healthy?** **Debatable: Can we find a sustainable balance between human progress and protection of biodiversity?**		- Recall what plants and animals need to survive and different ways in which they compete for these resources - describe interactions between organisms in an ecosystem using food chains and food webs to model this - describe the interdependence of organisms in an ecosystem (and how changing number of predators or prey affects this balance), including use of an online modelling tool - interpret and use the scientific model of graphing to show interdependence in an ecosystem - describe factors that make an ecosystem balanced - identify factors making an ecosystem unbalanced. Example: invasive species, eutrophication, acid rain, overfishing/hunting, flooding, presence of different pollutants - Research and evaluate an innovation aimed at managing balance in an ecosystem	ecosystem and potential ethical considerations. Write a persuasive letter asking the government to provide funding toward conservation for an important ecosystem.
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7	Unit 1: Energizing Our World -The Science of Electricity Generation	Development Energy	*scientific and technical innovation*	Scientific and technical innovations in electricity generation transform energy sources to meet development needs, but these advances require careful evaluation of their environmental and social impacts.	**Factual: What is electricity?** **What is a magnetic field?** **Conceptual: What is the relationship between electricity and magnetism?** **How does energy move through a circuit?** **Debatable: To what extent are hydroelectric dams a good solution to the problem of energy generation without impacting the environment?**	Critical Thinking - Using the scientific method to design, carry out and analyse the data from an investigation	- Students will describe the effects of a magnet and define a magnetic field - Students will recall the difference between insulating and conducting materials with examples. - Students will state that electrical current is a flow of charged particles, measured in amperes - Students will state that electrical voltage is the difference in the potential energy of electrons between 2 points in a circuit, measured in volts. - Students will describe how static electricity forms from the transfer of electrons - Students will state that “electrical energy” may mean energy stored in a battery or energy transmitted by electric currents. -Students will recall that electric, and magnetic forces between a pair of objects do not require that the objects be in contact. - Students will describe electromagnetism and design an investigation into the factors which affect it (criterion B) - Students will describe how energy is generated by a turbine and dynamo - Students will distinguish between renewable and non-renewable energy sources used to drive a turbine - Students will evaluate the use of hydroelectric dams (criterion D)	B/C: Various investigations are run throughout the unit and lab work is kept in a workbook. Workbooks graded for Criterion B and C at the end of the Unit Criterion A: Test on Static electricity, electromagnets, turbines and generators, renewable and non renewable energy types.
7	Unit 2: Beyond Earth - human expansion and extraterrestrial futures	Time, place and space Consequences	*Scientific and technical innovation*	Humans should plan for eventual migration away from Earth.	**Factual: What are the challenges presented by our growth as a species on a finite planet? What are some of the difficulties associated with space travel?** **Conceptual: How can science solve new and complex problems associated with space travel and living on another planet?** **Debatable: Is it worth investing time and money in space research when we have problems to solve on our own planet?**	Communication (organise and depict information logically).	- students will consider human population growth and effects of a 9 billion population on the environment - Students will evaluate some potential risks to life on Earth - students will be able to recall some of the technical challenges associated with space travel - Students will be able to state some challenges associated with living on Mars - students will be able to describe some technological solutions to the challenges of living on Mars - students will evaluate some of the potential benefits and costs of attempting the colonisation of Mars	Criterion D Students will summarise the challenges and scientific solutions associated with living on Mars in a panel discussion Criterion A Open book test

7	Unit 3: Body Systems, Exercise, and Health IDU: PE/MATH	Systems Related concepts: Form Function	*identities and relationships - Health and wellbeing*	Body systems work together as interconnected networks where form determines function, and understanding these relationships helps us make informed decisions about our health and wellbeing.	**Factual: What are the structures and functions of our digestive, circulatory and respiratory systems?** **Conceptual: How does the form of our small intestine, heart and alveoli help to make their functions more efficient? What is the relationship between different body systems?** **Debatable: Is it more important to focus on cardiovascular fitness or overall body system health? Should doctors use exercise as the primary treatment for lifestyle diseases before prescribing medication?**	Communication - Students develop communication skills by translating complex body system concepts into accessible language for their doctor's office brochure. They learn to organize and present fitness data through tables and graphs, communicate scientific findings across PE and science contexts, and effectively combine evidence from multiple sources to create persuasive health messages for general audiences.	SCIENCE: - Students will describe the structure and function of the digestive system - Students will describe the role of enzymes in aiding the function of the digestive system, including the importance of the specific form of enzymes. - Students will outline the role and structure of carbohydrates, fat and protein - Students will describe how the form of the small intestine is adapted to its function. - Students will describe the structure and function of the respiratory system, including gas exchange and breathing - Students will describe the structure and function of the circulatory system, including the heart, double loop, vessels and red blood cells - Students will outline how the form of the heart is adapted to its function. - Students will explain how the major body systems and their functions interact to support respiration (digestive, respiratory, circulatory) - Students will investigate and describe the impact of exercise on heart rate - Students will create results tables and graphs communicating the changes in their fitness over the period of the IDU -Students will analyse and interpret results tables and graphs PHE: -Students will learn through practical application how the circulatory and respiratory systems in their body are connected and how the energy systems function: -Students will describe the impact of exercise on the circulatory and respiratory systems, with reference to form and function. -Students will develop an understanding of the two forms of exercise (aerobic/anaerobic) -Students are able to measure their heart rate Students will describe the function of the heart rate in relation to the type of exercise -Students will be able to justify any changes in heart rate over time as a result of exercise.	A Test (body systems) C Heart rate lab IDU 2. Doctors office brochure on the importance of including evidence from the classes fitness testing data 3. Panel Discussion Presenting and reflecting on interdisciplinary knowledge
7	Unit 4: Atoms at Work - How Atomic and Molecular Changes Release Energy Transformations	Change Consequences Form	Globalisation and sustainability	The structure and behavior of atoms and molecules determines both the energy released when matter changes form and the consequences of these changes on the environment.	**Factual: What is the structure of the atom? What are compounds?** **Conceptual: How do we release energy by changing the form of atoms? How does changing the form of atoms create new products?** **Debatable: Should we continue to rely on fossil fuel combustion for energy despite its environmental consequences?**	Critical Thinking - Using the scientific method to design, carry out and analyse the data from an investigation	- Students will state what atoms are - Students will outline the history of the atom - Students will describe the structure (form) of the atom - Students will outline what elements are - Students will recall the names and symbols of key elements - Students will describe the parts of an atom using Bohr's model In the context of the combustion of hydrocarbon fuels: - Students will describe ‘combustion’, ‘fuel’ -Students will recall major types and uses of hydrocarbon fuels - Students will outline what fossil fuels are mostly made of (their form) and what a hydrocarbon is - Students will define ‘molecule’ and interpret molecular formula - Students will define the terms ‘reactants’ and ‘products’ and outline the relationship between them	C Clean burning Lab Analysis - does changing the size of the bunsen burner hole affect the energy it gives out? Explain with reference to how the fuel changes form during combustion.

							- Students will recall the molecular formula of water, carbon dioxide, carbon monoxide, oxygen and methane - Students will write word equations for the complete and incomplete combustion of alkanes and consider how their form is changed in this process - Students will write (unbalanced) symbol equations for the combustion of alkanes to demonstrate how their form changes in this process - Students will be able to explain why combustion of hydrocarbons causes their form to be changed to carbon dioxide or monoxide - Students will investigate how the oxygen supply given to a flame affects the energy given out via combustion and consider the impacts of clean burning for the environment (Criterion C) - Students will describe scientific phenomenon and process (the form of an atom or compound and how this form is changed during nuclear fission or combustion) -Students will evaluate the use of nuclear power stations. -Students will draw results tables and graphs pertaining to how the form of compounds is changed during combustion. They will use scientific conventions for this. -Students will analyse and interpret results tables and graphs pertaining to how the form of compounds is changed during combustion -Students will evaluate the validity of the method used to obtain the combustion data. -Students will use scientific equipment safely and appropriately.	
7	Unit 5: Adaptation and Ancestry: From Plant Function to Human Origins	Change Interaction	*Orientation in time and space*	The interactions between organisms and their environments drive changes in form and function over time, creating the diverse web of life we observe today through common ancestry and continuous adaptation.	**Factual: What are the processes of photosynthesis and respiration, and how do they interact in plants? What key traits distinguish human ancestors in the fossil record?** **Conceptual: How do interactions between plants and other organisms ensure successful reproduction and survival? How do phylogenetic trees represent evolutionary relationships across time and space?** **Debatable: How does understanding human evolution in Africa challenge or support different cultural perspectives on human origins?**	Self management - Organising class notes and preparing a study plan to prepare for the test.	- Students will be able to outline the process of photosynthesis. - Students will be able to outline the process of respiration - Students will be able to outline how respiration and photosynthesis interact to enable plant growth - Students will be able to outline how the leaf is adapted for photosynthesis - Students will design an investigation into a factor affecting the growth of a plant - Students will identify the different stages of the plant life cycle (including pollination, fertilisation, seed dispersal, germination, and photosynthesis) - Students will give examples of interactions between organisms that are essential for each stage of a plants life cycle - students will relate adaptations to natural selection & thus Darwinian evolution - students will describe how Darwin's finches demonstrate evolution and speciation - Students will understand the common genetic ancestry of all life on earth - Students will be able to visualise and draw phylogenetic tree showing different connections and relationships between forms of organisms over time - Students will understand that humans evolved in Africa over several millions of years from ancestors which are common to us and other current primates - students will be able to identify some of the main phylogenetic traits of human ancestors	B: Students will Design/evaluate an investigation into a factor affecting either the growth of a plant A: Students will answer questions based on plant life processes and biological interactions and human evolution.

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8	Unit 1. Disease and Epidemics	Change Patterns Interaction	Orientation in Space and Time	Interactions between different epidemiological factors change patterns in the frequency and distribution of diseases in space and time.	**Factual: What ways can diseases spread? What factors can change (reduce, increase) the spread of disease?** **Conceptual: How do epidemiological factors (both at the microbial and environmental level, such as medicines, vaccines, living conditions) work to change (increase or reduce) the spread of disease? How do you look for patterns in the spread of disease?** **Debatable: To what extent has a treatment for a disease been successful in controlling its spread?**	**Communication Skills (Structure information in summaries, essays, and reports)**	-Students will understand what epidemiology is and how it is used to identify, contain, & treat diseases -Students will understand how the spread of disease is affected by many factors (environmental, cultural, etc..) - Students will identify and outline the features of the main types of pathogen (bacteria, viruses, protists, fungi, & animals (worms)) -Students will give examples of diseases caused by each pathogen - Students will outline how prions, bacteria, viruses, Protista, fungi, & animals can cause infectious disease. - Students will outline how infectious diseases are spread at the micro-level (direct contact, waterborne, foodborne, bodily fluids, animal-borne etc) - Students will suggest ways to prevent the spread of diseases at the micro-level - Students will describe the role of the immune system in the human body in defence against disease (to include the 1st, 2nd, and 3rd lines of defence) - Students will outline the use of vaccines - Students will outline the use of antibiotics, antifungal, antiseptics, anti-malarial and antiviral drugs in the prevention and treatment of disease - Students will analyse and interpret maps and data of infectious diseases, using scientific knowledge - students will describe the ways in which science is applied and used to address a specific problem or issue (a disease of choice) - Students will use scientific language to describe the immune system, ways in which diseases spread, and epidemiological factors (such as medicines, vaccines, living conditions) can change the spread of disease.	Criteria A end of unit test on Epidemiology (all strands) D Describe, analyse and discuss how a scientific innovation of your choosing has been successful in controlling the spread of a particular disease. (presentation) (all strands)
8	Unit 2a. Human impact on the atmosphere and water.	Relationships Related concepts: Consequences and Environment	Globalization and sustainability	The relationship between globalization and its consequences on water and the atmosphere in our local and global environments	**Factual: What are the consequences of global human action on water and the environment (state them)?** **Conceptual: How and why does global human action affect atmospheric and water quality? How the activities relate to the consequences they bring?** **Debatable: Could an innovation of your choosing be successful in reducing the consequences of globalisation on our oceans (e.g. overfishing, plastic pollution, ocean acidification) ?**	Self-management	Water - Students will describe various indicators of water quality (nitrate, phosphate, pH, dissolved oxygen, biochemical oxygen demand, temperature, turbidity) and how these can be used to assess human impact on the environment - Students deduce the relationship between human activities and their consequences by interpreting data about water quality indicators and maps -Students will describe the relationship between global warming on process of ocean acidification and its effect on the coral environment -Students will describe the impact of rising sea water temperatures due to global warming and their impact on coral (coral bleaching) -Students will describe the environmental consequences of overuse of fertilisers developed to meet increasing global food demand on lakes and streams (eutrophication) -pH: students will be understand the basics of the pH scale including what it means in terms of H+ and OH-; students will understand it is a 10 fold increase/decrease as you move up/down	Criteria A test on our impact on water (all strands) Criteria B & C Planning an investigation and analysis of data (all strands for a full lab report) **IDU needs to be done in the rainy season in order to collect good data

							the pH scale; they will understand why it is important to living things and how human impact is affecting the acidity of the oceans & acid rain -Students will understand the impact of ocean acidification on ocean & particularly coral health	
8	Unit 2b: Human Impact on the Environment - IDU with I&S and Design	Relationships Representation and environment	Globalisation and sustainability	Statistics allows us to represent the relationships which impact on sustaining our environment	**Factual: What are the specific issues caused by human impact of freshwater systems?** **How has our role changed over time?** **Conceptual: What is our role as humans (Homo sapiens) in aquatic ecosystems?** **Debatable: Can 1 individual make a difference in the health of an aquatic system?**	Selfmangement	- Students will collect and analyse data on how the water quality of a local stream changes as it moves through a more populated area and deduce the relationship between human activities and their consequences by looking at levels of dissolved oxygen, turbidity, nitrates, heavy metals, pH, conductivity, & other contaminants - Data collection, constructing and interpreting graphs, calculating mean, median and mode, calculating the interquartile range	IDU assessment is an infographic combining Science, I&S, 7 Design concepts
8	Unit 3. Chemical Change	Change Interaction Form	Scientific and Technical Innovations (Exploration: Products)	In a (chemical) change, substances interact to form new products.	**Factual: What are signs of a chemical change? What factors affect the rate of reaction (the rate at which substances change form)?** **Conceptual:How do new products form in a chemical change via the interaction of reactants? How do we represent this change through word and symbol equations? How do different factors affect the interaction between particles so the rate of reaction changes?** **Debatable: Is the method you used to investigate changing the rate of chemical change valid? Is creating products via chemical change a good thing (case study: a chemical reaction that changed the wolrd)?**	**Subject specific skills, knowledge, and understanding** **Learning Experiences:** In this section of the unit plan, each skill strategy is explicitly taught through a combination of direct instruction and guided practice. Initially, the teacher introduces the skill strategy, explaining its purpose and importance in the context of the subject matter. This introduction is followed by a demonstration, where the teacher models the skill through practical examples, ensuring students can observe the strategy in action	- Students will state what atoms, elements, and compounds are - Students will describe what happens in a chemical change in terms of how particles interact and rearrange to form new products. - Students will define the terms ‘reactants’ and ‘products’ and outline the relationship between them - Students will interpret chemical formula (how many atoms of each element are present) - Students will summarise what happens in a chemical change through word and symbol equations (chemical names and formula given) - Students will define the rate of chemical change as the amount of new product formed over time - Students will calculate rate of product formation in chemical changes - Students will identify and describe how different factors can affect the rate of chemical change, with reference particle interactions - Students will plan, carry out, analyse and evaluate an investigation into a factor affecting the rate of chemical change (criterion B and C). - Students will consider how the creation of new products for industry via manipulating the particle interactions in chemical change has impacted the world through a case study of a chemical reaction of their choice e.g. polymerisation of plastics, the Haber process....	Criteria BC lab report on factors affecting the rate of chemical change. (all strands) Criteria A (strand i)
8	Unit 4: Waves	Systems Movement and Energy	Scientific and Technical Innovation	Innovative systems harness wave energy and movement to create sounds and communication.	**Factual: What models help to understand energy transfer through waves?** **Conceptual: How can the properties of sound waves help to understand pitch, loudness, and speed of the waves?** **Debatable: From a mindful perspective, are smartphones harmful?**	Research	General wave properties - Students will use a describe a simple model to represent energy transfer through waves (transverse and longitudinal) - Students will describe a wave using wavelength, frequency, amplitude, period, and speed - Students will calculate wave speed, frequency, and wavelength using $v = f \times \lambda$, including interpreting graphs. Sound - Students will describe how sound transfers energy as a wave of compressions created by objects vibrating -Students will describe how sound intensity in dB relates to energy transfer -Students will describe how pitch relates to the frequency of sound	Criteria D: understanding how science has been used to solve a problem in the context of waves in podcast form (all strands)

							waves -Students will describe how loudness relates to the amplitude of sound waves - Student will interpret representations of sound waves on an oscilloscope to explain and quantify loudness and pitch -Students will explain how sound waves from musical instruments are caused by vibration and standing waves - Students will explain how to adjust the pitch of a string instrument with reference to string density, wavelength, and tension -Students will explain using ideas about sound waves, why different musical instruments sound different even when playing the same notes - Students will build a musical instrument and describe how it functions. EM waves -Students will describe the electromagnetic spectrum - Students will investigate and describe the concepts of reflection, refraction and diffraction (including ray diagrams)	
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9	Unit 1: Population Dynamics	System Pattern Evidence	orientation in space and time - Frequency and variability	Evidence shows patterns in the frequency or variability of a system over time.	**Factual: What is a system?** **Factual: With the evidence collected, which statistical test should be used?** **Conceptual: How can the understanding of patterns (frequency and variability) in populations, help conservationists to protect species?** **Debatable: Can results be effectively analyzed without statistical analysis to show variability or patterns?**	**Social:** Students will learn how to work together and conduct field investigations in a group. Through their design on a population study and then manipulating and analyzing the data they will understand how human error can affect results and will compare their data to other groups to be able to use the statistical analysis tools of ANOVA and t-tests. Forest, Field, & Plantation Field study/lab; In order for a student to design and investigation (B) & C (i) present collected and transformed data and C (ii) interpret data and explain results using scientific reasoning, students will **collect, record and verify data** and **collect and analyse data to identify solutions and make informed decisions** and **Process data and report results.**	-Students will be define key terms related to population dynamics (predation, birth rate, death rate, disease, competition, symbiosis, coevolution, community dynamics, herbivory, succession) - Students will describe factors that affect population size (predation, birth rate, death rate, disease, competition) - Students will explain how sample size impacts the sampling techniques - Students will apply various sampling techniques to collect data on population size (transects, quadrats) -students will apply these sampling techniques to a field study about the diversity of herbaceous plants across 3 environments; boarding house field, rubber plantation, & jungle) - Descriptive statics: Students will interpret data using measures of central tendency (mean, median, mode) and spread (range and standard deviation) - Inferential statistics: Students will apply various statistical tests to interpret data and support their conclusions (t-test, and ANOVA & Simpson's diversity index)	Criteria A - end of unit population dynamics test (strand Ai & Aii) Criteria B, C - Field study of plant species richness across 3 different environments at different levels of disturbance/succession (all strands, full lab report)
9	2. Bonding and balancing equations	Relationships Balance Models	Globalization and Sustainability	**Relationships are shown through modelling changes by balancing connections.**	**Factual: How do chemical elements/compounds form and interact?** **Conceptual:How does the law of conservation of matter help us understand**	**Communication** **I. Communication skills** **Reading, writing and using language to gather and communicate**	Atomic structure (Review from G7) –Students will describe the structure (form) of the atom –Students will use the periodic table to deduce the number of protons neutrons and electrons in an atom –Students will use the bohr model to describe the electron	Criteria A: Test on knowledge and understanding of chemical bonding and how it governs chemical

					why reactions must be balanced? **Conceptual: After learning about chemical bonds, how can students design and explain a chemical reaction?** **Debatable: Did a chemical reaction of your choice change the world for better or worse, with reference to globalisation or sustainability?**	**information** **Understand and use mathematical notation** **Thinking** **VIII. Critical thinking skills** **Analysing and evaluating issues and ideas** **Recognise unstated assumptions and bias** **Draw reasonable conclusions and generalizations** **IX. Creative thinking skills** **Generating novel ideas and considering new perspectives** **Make guesses, ask "what if" questions and generate testable hypotheses**	structure of the first 20 elements (draw electron dot diagrams) –Students will relate the position of an element on the periodic table to how many electrons it has in its outer shell and what charge each group on the periodic table is. Students will be able to deduce the formula of ions for elements in groups –Ionic bonding Students will explain the difference between an atom and its ion Students will recall the formula of common polyatomic ions (hydroxide, sulphate, nitrate, phosphate, ammonium and carbonate ions) Students will describe what happens in terms of electron transfer when a metal atom reacts with a non-metal atom to form an ionic compound. Students will be able to draw dot and cross diagrams for the formation of ionic compounds (not including those with polyatomic ions). Students will deduce the formula of ionic compounds from the parent atoms Students will deduce the names of ionic compounds from the parent atoms or formula Covalent bonding Students will describe what happens in terms of electron transfer when a non-metal atom reacts with a non-metal atom to form a covalent compound. Students will deduce how to name a covalent compound from its formula Students will deduce how to draw Lewis or dot & cross diagrams of covalent molecules when given the formula. Properties of ionic and covalent compounds Write word and balanced symbol equations for these tests. Balancing equations Students will outline the law of the conservation of mass Students will be able to write and balance equations when given formula of the reactants and products. Students will be able to write and balance equations when given the names of the reactants and products. (Limited to the types of ionic and covalent compounds covered in the earlier sections of the course).	reactions (all strands) Criteria D: An essay evaluating a chemical reaction that changed the world.
9	Unit 3: Endocrine, Reproductive systems and Homeostasis	Change Models Function	Identities and Relationships physical, psychological and social development, transitions	**Models help to identify how various relationships can change functions and result in transitions in the body.**	**Factual: How do the hormones in the human body fluctuate and affect our health?** **Conceptual: How can students make better informed choices from learning about their own biology?** **Debatable:Should research/change focus on the reason or the result?**	Social	Students will understand homeostasis and homeostatic mechanism for controlling body temperature and blood sugar (including hormones) and water balance Students will explain how hormones can intentionally be used to find solutions and evaluate their success. Students will understand & recall the organs of the endocrine system Students will recall the structure and function of the male and female reproductive systems Students will outline the similarities between the male and female reproductive systems Students will outline the meaning of XX, XY and other sex chromosome combinations Students will define intersex and recall some possible structures of	Criteria A - end of unit reproductive, endocrine and homeostasis test Criteria D - Reflective essay about a disorder of the endocrine or reproductive system Criteria C (formative): analysis of feedback loop data

							intersex reproductive systems Students will explain the menstrual cycle including hormones and negative feedback loops Students will explain the role of hormones people with male reproductive systems Students will explain how to become pregnant and some artificial techniques used to help this process	
9	Unit 4 Science Fair	Relationships Evidence	Students will explore how scientific inquiry and innovation help us understand the world and develop solutions to practical problems.	**Scientific investigations use evidence-based research and systematic processes to develop understanding and communicate solutions to real-world problems.**	**Factual: What topic(s)/question(s) interest you? What will you select for your variables?** **Conceptual: How can you make your exhibition engaging and clear? How can you make sure your method is a fair test? How does the evidence you collected support whether there is a relationship between your variables? How could you improve your method?** **Debatable: Was your method valid? Did it give you data you can trust or did it answer your research question?**	**Communication** I. Communication skills Exchanging thoughts, messages and information effectively through interaction Use a variety of speaking techniques to communicate with a variety of audiences Use a variety of media to communicate with a range of audiences Reading, writing and using language to gather and communicate information Make inferences and draw conclusions Paraphrase accurately and concisely	Students will present the evidence into the relationship between the two variables of their choice at a Science Fair Exhibition. They will also present the process they used to instigate their research question. The science fair exhibition which will be attended by their supervisors, parents and other classes. Students can choose a topic of their own choice, they will be guided to refine this into a question that this appropriate for them by their supervisor and class teacher. Different levels of verbal support will be given to students by their supervisor/class teacher. Options for writing frames can be made available to particular students. Assignment of students to supervisors will primarily be done according to area interest and expertise, however, those students who are likely to need more support will be assigned the class teacher as the supervisor. All students must have a table at the exhibition and a poster board displaying information about their results and method. They will also be told what they need to include on their posterboard and in their discussion at the exhibition. But students will be given choice into how they present this (diagrams, photographs, video, text, demonstration).	Criteria B & C (all strands)
9	Unit 4: Circuits	Change Interaction Function	Scientific and Technical Innovation	Innovations in circuit functions have changed our interactions with our surroundings.	**Factual: How do circuits function?** **Conceptual: How do changes in circuits affect measurement?** **Debatable: How will human interaction with circuits change as technology develops?**	Creative thinking skills	Students will explain and algebraically manipulate the equation V=IR to describe electrical circuits - I can describe what the equation R=V/I defines regarding electrical circuits - I know what R stands for when discussing electrical circuits - I can describe what the equation I=V/R defines regarding electrical circuits - I know what I stands for when discussing electrical circuits - I can describe what the equation V=IR defines regarding electrical circuits - I know what V stands for when discussing electrical circuits Students will solve for V, I, and R in a circuit - I can use algebra to solve for a missing part of the equation if I have two of the three parts of the equation Students will explain what electrical current is, and how we measure it (including units)	Criteria A - Final exam B &/or C - circuits or static electricity lab investigation of students' choice Crit D: Building project with representation of a series, parallel, & combination circuit.

							- I can describe what electrical current is - I can explain how electrical current works and factors that affect it - I can describe how we measure electrical current, including the proper tools - I can state the unit used to measure electrical current Students will explain what potential difference is, and how we measure it (including units) - I can describe what potential difference is - I can explain how potential difference works and factors that affect it - I can describe how we measure potential difference, including the proper tools - I can state the unit used to measure potential difference Students will explain what electrical resistance is, and how we measure it (including units) - I can describe what electrical resistance is - I can explain how electrical resistance works and factors that affect it - I can describe how we measure electrical resistance, including the proper tools - I can state the unit used to measure electrical resistance Students will present circuit diagrams including switches, power source, and resistors - I can outline the symbols used to represent the parts of a circuit in a circuit diagram (power cell, wire, resistor, switches, lights, etc) - I can outline a circuit by drawing a proper circuit diagram (not a picture) - I can explain a circuit by drawing a proper circuit diagram and labelling the appropriate resistances, currents, and potential differences at each component Students will solve for the amount of power transferred in any circuit device - I can define power/watts - I can solve for the amount of power transferred in circuit device	

Grade	Unit Number and Title	Key and Related Concepts	Global Context	Statement of Inquiry	Inquiry Questions	Approaches To Learning Skills taught / learnt / developed in this unit	Content (topics / knowledge/ subject specific skills)	Summative Assessment and MYP Criteria Assessed
10	1. The Mole Concept	Change Interaction and Transformation	Globalization and Sustainability: Conservation	**Matter and energy are conserved and transformed through chemical reactions, and understanding quantitative relationships allows us to predict and optimize the outcomes of these transformations in real-world contexts.**	**Factual: Why does the color of the solution change during titration when the acid and base interact?** **Conceptual: How can the molar mass of a substance be determined using the Law of Conservation of Matter?** **Conceptual: How is the volume released during titration used to find the strength of an unknown solution when an acid or base is transformed into a neutral**	Critical thinking skills Communication skills Research Skills: Information Literacy	- Students will be able to identify how many atoms of each type of element are present in a molecule. - Students will be able to calculate relative molecular mass - Students will describe the mole concept. -Students will be able to calculate molecular mass -students will be able to calculate the number of moles, grams, particles in solutions - Students will be able to use the equations n=M/m, - Students will apply principles of stoichiometry to calculate reacting masses, concentrations, and volumes. - Students will be able to titrate an unknown solution and estimate its molarity.	Criteria A: Exam on the use of the periodic table and changing rates of reaction (strand Ai) Criteria B: Designing an investigation (all strands) about titrations Criteria C: Analyzing and Evaluating data from an

					solution? **Debatable: Is titration a useful tool in the sustainable creation of products such as preservatives, medicine, and dairy?**		- Students will be able to calculate the molar mass of the reagent. -Students will be able to calculate the limiting reagent in a chemical equation using stoichiometry Before lab: - Students will be able to determine the appropriate number of decimal places to read equipment to. - Students will quantify the uncertainty of particular measurements (absolute and percentage). - Students will be able to draw error bars based on the measurement uncertainty and/or max-min value. - Extension: Students will be able to propagate measurement uncertainties.	investigation (all strands)
10	2: Genetics	Change Form and Function	Identities and Relationships: Ethical Judgement	Changes in DNA may alter the form and function of who we are but these decisions need to be ethically questioned.	**Factual: Who were the scientists that have contributed to the modern understanding of DNA and to the ability to manipulate genes to create a change in phenotype?** **Conceptual: How does the structure and form of DNA allow the DNA to function as a template for replication RNA transcription?** **Conceptual: How can Punnett Squares help us determine the possible offspring genotypes and phenotypes, which will help to determine characteristics and identity?** **Debatable: Is the change of genes via genetic modification beneficial to feed a growing human population or are there ethical issues to consider?**	Communication: Read critically and for comprehension Paraphrase accurately and concisely Preview and skim texts to build understanding Social: Collaboration: Listen actively to other perspectives and ideas Thinking: Critical: Draw reasonable conclusions and generalizations Consider ideas from multiple perspectives	-Students will describe DNA structure & function, including nucleotide structure & types - Students will explain that the genome interacts with the environment to influence the development of the phenotype - Students will explain the following terms: chromosome, gene, variant, dominant, recessive, homozygous, heterozygous, genotype and phenotype, diploid, haploid, homologious pairs of chromosomes - Students will understand transcription and translation - Students will explain monohybrid & dihybrid inheritance Students will be able to do incomplete, codominance, & sex-linked trait crosses - Students will describe the work of Mendel in discovering the basis of genetics and recognise the difficulties of understanding inheritance before the mechanism was discovered. - Students will describe the impact of selective breeding on food plants and domesticated animals - Students will describe the main stages of the process of genetic engineering & recombinant organisms - Students will explain some of the possible benefits of using genetic engineering in modern agriculture and medicine - Students will understand biotechnology; cloning (both genes and organisms), PCR, recombinant organisms, CRISPR/gene therapy, DNA fingerprinting, & gel electrophoresis -Students will discuss some of the practical and ethical issues of using genetic engineering in modern agriculture and medicine. -Students will be able to read a karyotype and identify common disorders such as Down's syndrome, Klinefelter's & Turner's syndrome -Students will know how to read a pedigree and identify genotypes/phenotypes from it. This unit will allow a continuation from Grade 9 with genetics, variation, adaptations, and evolution. This can be linked with the Criteria D essay on genetic modification and understand how the new adaptations make the organism more fit for the environment.	Criteria D reflecting on the impact of science in terms of any type of biotechnology Criteria A genetics vocabulary (strand i & ii)
10	3. Environmental Sustainability	Systems Consequences and	Globalization and Sustainability: Human impact	Interactions with systems can have unexpected consequences if we don't make sustainable	**Factual:What are the Sustainable Development Goals?** **Conceptual: Why do linear models not help**	Critical Thinking Skills Practise observing carefully in order to recognise problems	-Students will understand the earth's systems and nutrient cycles (carbon, nitrogen, water, phosphorus, etc..) -Students will understand how those cycles are related to climate change & how humans are disrupting them	Criteria D: Reflecting on the impacts of science on natural disasters from a systems perspective using

	IDU with INS	Interactions	on the environment	decisions, which can lead to negative impacts on the environment..	**in predicting unexpected consequences?** **Conceptual: How can a model be created with stores, flows, inputs, and outputs to view the interactions between the nodes of the model?** **Conceptual: What are the pros and cons of using models to determine the impacts of sustainability?** **Debatable: Can systemic structures change patterns of behavior?**	Gather and organize relevant information to formulate an argument Evaluate evidence and arguments Students are expected to interview at least one person who had direct experience with the disaster or one person who has primary knowledge on the scientific solution. Most of their research is most likely coming from western sources. The interview will be from someone with a relevant background of the local disaster. Hearing from two sides will lead to better understanding of intercultural awareness. Many times, western science is used to solve solutions without asking the local experts about their values and needs. Transfer Skills Make connections between subject groups and disciplines Combine knowledge, understanding and skills to create products or solutions	-Students will understand how energy and matter move differently through an ecosystem -students will understand how important mangroves are and we will use our mangrove nursery to do some investigations -Students will understand systems thinking and will apply the iceberg model to environmental challenges we face - Students will learn how to use the compass method to analyze results of sustainable models. - Students will explain how more sustainable practices can keep systems away from the Tragedy of the Commons. - Students will determine whether ignorance is a solvable problem. - Students will evaluate whether technology can help to manage sustainable development. - Students will discuss whether the current human culture represents the pinnacle of human achievement.	the iceberg & compass models. (all strands) Criteria B: setting up a lab to measure the amount of soil respiration in different soil types Criteria C: measuring the rate of carbon sequestration in mangroves Criteria A; systems thinking, nutrient cycles, & tragedy of the commons IDU mini documentary about a natural disaster and mitigation strategies and looking at it as a system
10	4. Force & Motion	Systems Balance and Movement	Scientific and Technical Innovation: Ingenuity and Progress	Students will understand that patterns describe changes in motion & unbalanced forces cause changes in motion in a system	**Factual:** How do force, mass, and acceleration relate to one another in determining an object's motion? **Conceptual:** How do interactions between forces and objects determine patterns of motion? **Debatable:** To what extent can the motion of an object be accurately predicted?	Transfer skills Combine knowledge, understanding and skills to create products or solutions Critical Thinking Interpret data Evaluate evidence and arguments	Students will understand the basic content of kinematics including scalar vs. vector quantities; distance vs displacement Students will understand how to manipulate the 5 kinematic equations Students will understand speed, velocity, & acceleration Students will be able to describe and represent velocity by calculating with the equation $v = \Delta d / \Delta t$ Students will be able to describe and represent acceleration using the equation $a = (v_f - v_i)/ \Delta t$ Students will create and read information from a graph of position vs. time. Students will be able to create & read information from a graph of velocity vs. time. Students will understand that the slope of a distance/time graph is the velocity Students will understand that the slope of a velocity/time graph is acceleration Students will understand that the area under the line on a velocity/time graph is the displacement	Criteria A: Exam on mechanics such as motion and force and the understanding of how planes fly. Criteria B: Designing an investigation Criteria C: Analyzing and Evaluating data from an investigation

							Students will understand the categories of forces (contact vs noncontact) Students will understand how to measure force Students will understand Newton's 3 laws of motion and apply them to real life -Students will conduct an investigation of the factors that affect the rate of falling on a rotating helicopter blade.	