Sciences MYP Subject Group Overview

Year 6 MYP1							
Unit Title, Duration and Hours	Skills and Content	Key and Related Concepts	Global Context	Statement of Inquiry	Science Objectives	Approaches to Learning Skills	Assessment Task
Semester 1: Change 3 x 50min lessons per week 16 weeks.	Scientific thinking skills identity as a scientist Relationships between variables, ideas, cause and effect Reversible and irreversible change	Key: **Change** **Related:** Evidence and conditions	**Identities and Relationships**	SOI: **Change is constant, observable and recordable through evidence but impacted by variable conditions.** **Area of exploration**: Identify formation as scientists and scientific thinkers. Relationships between variables, ideas, cause and effect	**Criterion A: Knowing and understanding** i. describe scientific knowledge ii. apply scientific knowledge and understanding to solve problems set in familiar and unfamiliar situations iii. analyse information to make scientifically supported judgments. **Criterion B: Inquiring and designing** i. describe a problem or question to be tested by a scientific investigation ii. outline a testable hypothesis and explain it using scientific reasoning iii. describe how to manipulate the variables, and describe how data will be collected iv. design scientific investigations. **Criterion C: Processing and evaluating** i. present collected and transformed data ii. interpret data and describe results using scientific reasoning iii. discuss the validity of a hypothesis based on the outcome of the scientific investigation iv. discuss the validity of the method v. describe improvements or extensions to the method. **Criterion D: Reflecting on the impacts of science** i. describe the ways in which science is applied and used to address a specific problem or issue ii. discuss and analyse the various implications of using science and its application in solving a specific problem or issue iii. apply scientific language effectively iv. document the work of others and sources of information used.	**Organisation** SEARCH pathway: Habits & Goals **Skill needed:** Understanding and maintaining physical organisation and readiness to learn will support student preparedness and increase student achievement. (e.g. charged device, stationary, books etc) **Approach:** Explicit teaching of routines needed for both physical organisation and presentation (uniform inc jewellery), access to communication (daily notices), classroom entry and exit, cleanliness, behaviour expectations. Strong accountability measures maintained in a consistent manner. Random equipment checks across each term based on a given checklist. **Research** When students collect, record and process data using observations or measurements (Ci) **Skill needed**: Students need to be able to represent their results using a table and graph on paper. Students need to be able to make observations. **Approach**: Teachers can provide table template showing the independent variable in the first column and the dependent variable in the second column. Students use a given template and then asked to make their own table using the template as a guide. The same format is used consistently for each practical. Modelling how to draw a graph by hand to understand how data is represented visually with a focus on bar graph using discrete data. Skills transferred from Maths. Observations are practiced using all senses. Activity: Look out the window for 1minute, write observations for one minute. Compare lists. What do most people see? What do only some people see? What do people see but not record? Close eyes and listen for 1minute. Write observations for one minute. Compare lists. How specific are people about what they list? Are inferences made? How reliable are their inferences? Students use a thermometer to learn to read a scale. Students use stop watches to time observations. **Thinking** Interpret information (Aiii) **Skill needed:** Students must be able to read information as a	Students will learn about physical and chemical change (reversible/irreversible) as well as the structure and features of a scientific report. Criteria B/C: Constructing a scientific report by conducting elephant toothpaste experiment and investigating how changing materials or procedures affects results. Criteria A Knowledge and Understanding task : Characteristics of physical/chemical changes Solving problems in familiar situations by developing aim, hypothesis, materials and method for proposed experiment. Criteria D Reflecting on the impacts of science by completing reflection task on how plastic pollution is changing the world's oceans and scientific strategies to combat these changes.

						paragraph of words, as a picture, as a simple graph, in a simple table. **Approach:** Teachers can expose students with a range of different types of information and model interpreting the information. Students can list key features of the information	
Semester 2: Building for a strong future 3 x 50min lessons per week 16 weeks.	Renewable and non renewable energy Consequences of non-renewable energy. Sustainable alternatives. Impact of technology on the earth Impact of innovation good and bad.	Key: **Global Interactions** **Related:** Relationships, innovation	**Globalisation and Sustainability**	SOI: **Sustainable solutions to resource use requires innovation, positive relationships and ongoing global interactions.** **Area of exploration:** Global responsibility, sustainability of Earth's resources, collaboration, responsibility, innovation.	**Criterion A: Knowing and understanding** i. describe scientific knowledge ii. apply scientific knowledge and understanding to solve problems set in familiar and unfamiliar situations iii. analyse information to make scientifically supported judgments. **Criterion B: Inquiring and designing** i. describe a problem or question to be tested by a scientific investigation ii. outline a testable hypothesis and explain it using scientific reasoning iii. describe how to manipulate the variables, and describe how data will be collected iv. design scientific investigations. **Criterion C: Processing and evaluating** i. present collected and transformed data ii. interpret data and describe results using scientific reasoning iii. discuss the validity of a hypothesis based on the outcome of the scientific investigation iv. discuss the validity of the method v. describe improvements or extensions to the method. **Criterion D: Reflecting on the impacts of science** i. describe the ways in which science is applied and used to address a specific problem or issue ii. discuss and analyse the various implications of using science and its application in solving a specific problem or issue iii. apply scientific language effectively iv. document the work of others and sources of information used.	**Research skills** - finding, interpreting, judging and creating. When students document sources correctly (Div). **Skill needed:** Students should know how to write a bibliography for information they have researched. They must acknowledge that they have used a source. **Approach**: Teachers can use power points to explicitly teach what the parts of a bibliography reference mean and why we reference. They can model referencing class used sources for all to use. Students should practice writing references for sources they use in class by following the modelled format. When students describe and summarise the implications of using science and its application to solve a specific problem or issue, interacting with a factor. (D.ii) **Skill needed:** Students must read scientific information and choose relevant information which highlights how science is being used and what impact it has on people. **Approach:** Students do this by being given age/topic appropriate scientific information to highlight how science is being used in one colour and how it impacts people in another colour. Then they will summarise this information in their own words. **Social – collaboration skills** **SEARCH pathway: Relationships** **Skills needed:** Students need to be able to listen to each others ideas and share resources. **Approach:** Students choose groups to undertake directed practical activities with allocated resources. Teachers choose groups for students to undertake directed practical activities with specified jobs different people need to undertake.	Criteria B&C Renewable energy experiments - students select an energy alternative to non-renewables and explore efficiency Criteria A: Test Knowledge and Understanding of renewable energy Criteria D- Report on benefits, limitations and impacts of renewable energy.

Unit Title, Duration and Hours	Skills and Content	Key and Related Concepts	Global Context	Statement of Inquiry	Science Objectives	Approaches to Learning Skills	Assessment Task
PHYSICS: **Ancient relationships** 9 weeks. 3 x 50min lessons.	Change to an object's motion is caused by unbalanced forces, acting on the object (ACSSU117 - Scootle) Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge (ACSIS124 - Scootle) Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed (ACSIS125 - Scootle) Measure and control variables, select equipment appropriate to the task and collect data with accuracy (ACSIS126 - Scootle) Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships in data using digital technologies as appropriate (ACSIS129 - Scootle Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions based on evidence (ACSIS130 - Scootle) Reflect on scientific investigations including evaluating the quality of the data collected, and identifying improvements (ACSIS131 - Scootle) Use scientific knowledge and findings from investigations to evaluate claims based on evidence (ACSIS132 - Scootle) Communicate ideas, findings and evidence based solutions to problems using scientific language, and representations, using digital technologies as appropriate (ACSIS133 - Scootle)	Key: **Relationships** **Related:** Development, innovation	**Scientific and technical innovation**	SOI: **Innovation and development are influenced by relationships.** **Area of exploration:** How do scientific and technical innovations come about through relationships within communities.	**Criterion B: Inquiring and designing** i. describe a problem or question to be tested by a scientific investigation ii. outline a testable hypothesis and explain it using scientific reasoning iii. describe how to manipulate the variables, and describe how data will be collected iv. design scientific investigations. **Criterion C: Processing and evaluating** i. present collected and transformed data ii. interpret data and describe results using scientific reasoning iii. discuss the validity of a hypothesis based on the outcome of the scientific investigation iv. discuss the validity of the method v. describe improvements or extensions to the method.	**Critical-Thinking Skills:** Interpret data, draw reasonable conclusions and generalisations. When students are able to read tables of values and graphs to determine the highest and lowest values and what those points mean in relation to the data collected and the hypothesis given. They begin to establish if there is any trend (linear). (Cii, Ciii) **Skill needed**: In tables of values students need to be able to read titles and units to establish the independent and dependent variables. In graphs students need to be able to read axes titles to determine the independent and dependent variables and identify the highest and lowest points on a graph to identify how the IV is connected to the DV and if there is a regular trend in the data (linear). **Approach:** Students undertake formative practicals to practice collecting data in a table to read and understand in relation to a given hypothesis. Teachers provide students with graphs and discuss the axes labels and identify the highest and lowest points, discussing what those points mean using the language from the axes and relate it to the hypothesis given. Students look at linear graphs both positive and negative to identify that a straight line has a linear relationship between the IV and DV. **Self Management** - Organisation: managing class time to complete the different sections of the practical report. Organising time and resources to ensure practical data is collected in a timely manner with respect to sharing resources. **SEARCH pathway: Habits & Goals** **Skill needed:** Keeping valuable information you research / learn organised **Approach**: Explicitly taught keyboard shortcuts to help manage tabs in a web browser, list and discuss ways of taking notes while researching, maintaining a bibliography of sources. Explicit instruction on sketchnoting to encourage visual thinking (https://www.verbaltovisual.com/sketchnoting-in-the-classroom/)	Design and carry out a practical which shows a relationship between 2 variables showing how a force can be increased or reduced allowing a decision to be made which developed an ancient civilisation. **Investigating: Deconstruction and Introduction** 1. You have undertaken research for your I&S assessment task to explore an aspect of Ancient Egypt regarding relationships, innovation and development. Use this information to determine what practical activity could be undertaken to highlight a relationship between forces in your chosen area. Deconstruct the possible options you could explore. 2. Select one option for practical investigation. **Planning:** 1. Design an experiment that investigates how Ancient Egyptians used innovation to aid their development. 2. Plan, conduct and collect data from your experiment. **Processing and Analysing:** 3. Analyse your results to explain how scientific and technical innovation was utilised in developing your chosen problem in ancient Egypt and the relationship between your independent and dependent variable. 4. With guidance from your Practical Report Guide, reflect on your results and evaluate your practical plan.
Biology: **Know your place** 8 weeks. 3 x 50min lessons.	Classification helps organise the diverse group of organisms (ACSSU111 - Scootle) Interactions between organisms, including the effects of human activities can be represented by food chains and food webs (ACSSU112 - Scootle) People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human	Key: **Identity** Related: Environment, balance	**Identities and Relationships** AOE: Relationships between organisms and their environment can be identified to understand balance. Their adaptations connect them with their place.	SOI: **Identity is created through our connection with place.**	**Criterion A: Knowing and understanding** i. describe scientific knowledge ii. apply scientific knowledge and understanding to solve problems set in familiar and unfamiliar situations iii. analyse information to make scientifically supported judgments. **Criterion D: Reflecting on the impacts of science** i. describe the ways in which science is applied and used to address a specific problem or issue	**Research:** When students discuss and summarise the implications of using science and its application to solve a specific problem or issue, interacting with a factor. (D.ii) **Skill needed:** Students must start to choose appropriate scientific information to read and select relevant information which highlights how science is being used and what impact it has on people. **Approach:** Students do this by being given stimulus questions to research, with some guidance on appropriate information to choose. Students highlight scientific information in one colour and how it impacts people in another colour. They summarise this	*Criteria A and D:* Show how the identity of an organism is created through their connection with their environment. Identifying a Species: Identifying the features of an organism is to understand its needs. Identify an endangered species and explain its needs in relation to its environment and survival.

	activity (ACSHE121 - Scootle) Science knowledge can develop through collaboration across the disciplines of science and the contributions of people from a range of cultures (ACSHE223 - Scootle)				ii. discuss and analyse the various implications of using science and its application in solving a specific problem or issue iii. apply scientific language effectively iv. document the work of others and sources of information used.	information in their own words and infer further impacts on people in light of their research. Critical thinking: Information Literacy skills: Reading, writing, and using language to gather and communicate information. Identify the elements of information and make connections (Aiii) **Skill needed:** Students must be able to read information from provided sources, and from sources they find themselves. Students must be able to interpret simple tables and graphs, and summarise the key information from read sources in their own words. **Approach:** Teachers provide students with a variety of types of information, and explicitly teach how to interpret the information, and how to identify the key points in a source, to be able to summarise the information.	
Chemistry: **Be water wise** 7 weeks. 3 x 50min lessons.	Some of Earth's resources are renewable, including water that cycles through the environment, but others are non-renewable (ACSSU116 - Scootle) Science knowledge can develop through collaboration across the disciplines of science and the contributions of people from a range of cultures (ACSHE223 - Scootle)	Key: **Perspective** Related: Conditions, Consequences	**Orientation in space and time** AOE: Changing conditions has consequences which can be measured to determine the degree of improvement being made.	SOI: **Understanding perspectives helps us to recognise how different conditions can have consequences**	**Criterion B: Inquiring and designing** i. describe a problem or question to be tested by a scientific investigation ii. outline a testable hypothesis and explain it using scientific reasoning iii. describe how to manipulate the variables, and describe how data will be collected iv. design scientific investigations. **Criterion C: Processing and evaluating** i. present collected and transformed data ii. interpret data and describe results using scientific reasoning iii. discuss the validity of a hypothesis based on the outcome of the scientific investigation iv. discuss the validity of the method v. describe improvements or extensions to the method.	**Critical-Thinking Skills: Interpret data, draw reasonable conclusions and generalisations**. When students are able to read tables of values and graphs to determine the highest and lowest values and what those points mean in relation to the data collected and the hypothesis given. They begin to establish if there is any trend (linear). (Cii, Ciii) **Skill needed**: In tables of values students need to be able to read titles and units to establish the independent and dependent variables. In graphs students need to be able to read axes titles to determine the independent and dependent variables and identify the highest and lowest points on a graph to identify how the IV is connected to the DV and if there is a regular trend in the data (linear). **Approach:** Students undertake formative practicals to practice collecting data in a table to read and understand in relation to a given hypothesis. Teachers provide students with graphs and discuss the axes labels and identify the highest and lowest points, discussing what those points mean using the language from the axes and relate it to the hypothesis given. Students look at linear graphs both positive and negative to identify that a straight line has a linear relationship between the IV and DV.	Criteria B and C: Design an experiment to determine how water could be more sustainable.
Our place in space 7 weeks. 3 x 50min lessons.	Implications of the position of earth in space in relation to the sun and moon. Day and night Seasons (indigenous, western, NT) Tides	Key: **Time place and space** Related: Conditions, consequence	**Identities and Relationships** Area of exploration: Solar system	SOI: **Our understanding of causality is dependent upon our perspective of different time, place and space.**	**Criterion A: Knowing and understanding** i. describe scientific knowledge ii. apply scientific knowledge and understanding to solve problems set in familiar and unfamiliar situations iii. analyse information to make scientifically supported judgments. **Criterion D: Reflecting on the impacts of science** i. describe the ways in which science is applied and used to address a specific problem or issue ii. discuss and analyse the various implications of using science and its application in solving a specific problem or issue iii. apply scientific language effectively iv. document the work of others and sources of information used.	**Information literacy skills: *finding, interpreting, judging and creating information*** When students document sources completely (Div) **Skill needed:** Students should be able to create their own full Harvard reference in their bibliography using a reference generator (SLASA or Word Reference). They should attempt to provide in text citations. **Approach**: Teachers can invite the teacher librarian in to explicitly teach creating a reference using SLASA. Students should practice by undertaking weekly referencing homework which provides a model to follow. Students research the answer to a question, write their answer in their own words, provide an in text reference to their answer, and provide a full Harvard Reference. When students discuss and summarise the implications of using science and its application to solve a specific problem or issue, interacting with a factor. (D.ii) **Skill needed:** Students must start to choose appropriate scientific information to read and	*A: Test* *D: Article analysis*

						select relevant information which highlights how science is being used and what impact it has on people. **Approach:** Students do this by being given stimulus questions to research, with some guidance on appropriate information to choose. Students highlight scientific information in one colour and how it impacts people in another colour. They summarise this information in their own words and infer further impacts on people in light of their research.	

Year 8 MYP3							
Unit Title, Duration and Hours	Content	Key and Related Concepts	Global Context	Statement of Inquiry	Science Objectives	Approaches to Learning Skills	Assessment Task
10 weeks (4 x 50 minutes per week) How we function	Cells are the basic units of living things; they have specialised structures and functions (ACSSU149 - Scootle) Multi-cellular organisms contain systems of organs carrying out specialised functions that enable them to survive and reproduce	Key: **Systems** Related: Balance, function, models	**Personal and cultural expression** **Area of exploration**: By understanding the needs of the cell students can make informed decisions on how to maintain healthy bodies.	SOI: **Our personal decisions influence whether systems are in balance, which determine how effectively they function.** Factual inquiry question(s): What are the structures and functions of different body systems? How do our body systems work together? What are our systems made up of and what do they need to function? Conceptual inquiry question(s): How can understanding cell needs help us to make decisions for balanced and healthy lives? Debatable inquiry question(s): To what extent should people follow traditions, culture, science or personal preferences when making lifestyle choices?	A: Knowing and Understanding Students should be able to: i. explain scientific knowledge ii. apply scientific knowledge and understanding to solve problems set in familiar and unfamiliar situations iii. analyse and evaluate information to make scientifically supported judgments. D: Reflecting on the impacts of Science Students should be able to: i. explain the ways in which science is applied and used to address a specific problem or issue ii. discuss and evaluate the various implications of the use of science and its application in solving a specific problem or issue iii. apply scientific language effectively iv. document the work of others and sources of information used.	**Organising information & writing for a purpose and audience:** In order for students to be able to communicate their knowledge and justifications to others, students must be able to organise information in appropriate ways. **Self-management: Organisation** **SEARCH pathway:** Habits & Goals **Skill needed:** Keeping valuable information you research / learn organised **Approach:** Explicitly taught keyboard shortcuts to help manage tabs in a web browser, list and discuss ways of taking notes while researching, maintaining a bibliography of sources. Explicit instruction on sketchnoting to encourage visual thinking (**https://www.verbaltovisual.com/sketchnoting-in-the-classroom/**) **Communication: Reading, writing and using language to gather and communicate information.** When students describe subject-specific knowledge. (A.i) **Skill needed:** Students must be able to show a detailed account using scientific terminology with careful attention to the specifics. **Approach:** Students can do this by extracting the specific major and minor details of their reading or viewing. They can bring together the directly stated information into a paraphrased coherent paragraph using the PLAN strategy. When students apply a wide range of subject-specific terminology to communicate understanding. (D.iii) **Skill needed:** Students are able to incorporate scientific language they hear or read to their own writing, indicating an understanding of the connections in the topic. **Approach:** Students can use definitions in context to describe situations. Teachers can provide a paragraph of information which lacks scientific terminology which students then rewrite using scientific terms to describe the situation more clearly. When students document sources completely (Div) **Skill needed**: Students need to use in-text referencing regularly, provide full Harvard Referenced bibliography, have chosen relevant sources. **Approach**: Students can write about a given topic and use at least 3 sources. They could use at least 2 of those sources multiple times. Students show in text referencing to highlight their multiple use and changing use of each source. This should be used in conjunction with criteria A when students are learning to extract information from a source. Students should be directed to reputable websites.	**Part A: Cell model.** Choose a type of cell to create a labelled model. Identify which system it is connected to and what it needs to be kept functional. • **Criteria Ai** Create a scale model of a human cell. The model should include: the name of the cell, the organ it is found in and the system of which it is a part. Label each of the organelles within your cell. Provide the function of each organelle you labelled. • **Criteria Aii** Show the following relationships: the size of the cell, the shape of the cell, and the number of the organelles within the cell. • **Criteria Aiii** Explain how the mitochondria and one other cell part assists the organism with its function to maintain a healthy organism. Criteria D: Making healthy choices. Take action! • Create a communication platform to help teens understand the anatomy and physiology of their bodies and then use this understanding to make decisions for more balanced and healthy lifestyles. • Choose a body system you feel is important for people to keep healthy. • Identify a group of people who could benefit from your information (age, gender, culture, community, location…) • Choose a mode of communication to share your information (oral presentation, web page, infographics, video, social media, blog, brochure, poster...) • How will people access your information? (presentation at assembly, social media, internet availability, poster in a prominent position, brochures available in a prominent position…)
10 weeks (4 x 50min lessons per week) Chemistry at home	**Chemical Science** ***ACSSU151*** The properties of the different states of matter can be explained in terms of the motion and arrangement of particles	Key: **Change** **Related:** Interaction, Conditions Consequences	**Identities and Relationships**	SOI: **How do materials interact with solutions to create change?**	**Criterion B: Inquiring and Designing** Students should be able to: • explain a problem or question to be tested by a scientific investigation	**Communication** When students write a logical and complete procedural text (Biv), the method is in numbered chronological order, all materials are mentioned in	**Design Practical:** How are materials affected by their environment? Design an experiment to determine how a solution affects a material.

	• explaining why a model for the structure of matter is needed • modelling the arrangement of particles in solids, liquids and gases • using the particle model to explain observed phenomena linking the energy of particles to temperature changes ***ACSSU152*** Differences between elements, compounds and mixtures can be described at a particle level • modelling the arrangement of particles in elements and compounds • recognising that elements and simple compounds can be represented by symbols and formulas • locating elements on the periodic table **ACSSU225** Chemical change involves substances reacting to form new substances identifying the differences between chemical and physical changes • identifying evidence that a chemical change has taken place • investigating simple reactions such as combining elements to make a compound • recognising that the chemical properties of a substance, for example its flammability and ability to corrode, will affect its use			**Area of exploration:** Products, processes and solutions	• formulate a testable hypothesis and explain it using scientific reasoning • explain how to manipulate the variables, and explain how data will be collected • design scientific investigations. **Criterion C: Processing and Evaluating** Students should be able to: • present collected and transformed data • interpret data and explain results using scientific reasoning • evaluate the validity of a hypothesis based on the outcome of the scientific investigation • evaluate the validity of the method • explain improvements or extensions to the method	the method, the IV has been changed, the DV has been measured and recorded and it appears controlled. **Skill needed:** Students must be able to number different steps, name items in the materials list in the method, describe how the independent variable is changed, describe how the dependent variable is measured, describe how to keep other variables the same. Use "repeat" steps making sure they are the appropriate steps. When students collect reliable data in an organised table and correctly transform into graphical representation (Ci) **Skill needed:** Students in MYP3 should be able to formulate their own results using a tables in word and graph via excel. They will be able to explain the reason for using various types of graphs. They will be able to reliably collect data by reading scales on various equipment. **Critical Thinking** Bii When students are given a topic, students are able to deconstruct, outline and explain a testable hypothesis using correct scientific reasoning that is linked to the key scientific concepts that were raised in the introduction. This must be referenced using the Harvard referencing System. (Bii) **Skill needed:** Students need to be able to form a hypothesis which clearly expresses what will happen to the dependent variable when the independent variable is changed and justify with scientific reasoning linked to the content of the unit. Biii Describe how to collect sufficient and relevant data (Biii) **Skill needed**: This would include describing how to manipulate the variables and describe how data will be collected.	
10 weeks (4 x 50min lessons per week)) Physics	**Physical Science** ***ACSSU155*** Energy appears in different forms including movement (kinetic energy), heat and potential energy, and causes change within systems • recognising that kinetic energy is the energy possessed by moving bodies • recognising that potential energy is stored energy, such as gravitational, chemical and elastic energy • investigating different forms of energy in terms of the effects they cause, such as gravitational potential causing objects to fall and heat energy transferred between materials that have a different temperature • recognising that heat energy is often produced as a by-product of energy transfer, such as brakes on a car and light globes • using flow diagrams to illustrate changes between different forms of energy **Use and Influence of Science** ***ACSHE135*** Science and technology contribute to finding solutions to a range of contemporary issues; these solutions	Key: **Change** Related: Energy, transformation	**Scientific and Technical innovation**	**SOI**: Energy can neither be created or destroyed. **Area of exploration:** Energy	**Criterion B: Inquiring and Designing** Students should be able to: • explain a problem or question to be tested by a scientific investigation • formulate a testable hypothesis and explain it using scientific reasoning • explain how to manipulate the variables, and explain how data will be collected • design scientific investigations. **Criterion C: Processing and Evaluating** Students should be able to: • present collected and transformed data • interpret data and explain results using scientific reasoning • evaluate the validity of a hypothesis based on the outcome of the scientific investigation • evaluate the validity of the method • explain improvements or extensions to the	**Thinking: Critical Thinking –** revise understanding based on new information and evidence (Solar Oven Investigation) **Research: Information literacy Skills –** process data and collect results; make connections between various sources of information (Solar Oven Investigation) **Thinking: Creative Thinking Skills –** use brainstorming and visual diagrams to generate new ideas and inquires (Concept mapping beginning and end of unit) **Thinking: Transfer skills –** transfer current knowledge to learning of new technologies (Solar Oven investigation); combine knowledge, understanding and skills to create products or solutions (Solar Oven Investigation and Renewable energy Activity in Reflection/Taking further of Inquiry Cycle)	Investigation: The Law of conservation of energy states that energy can never be created or destroyed. It can only be converted from one form to another. For us, this means that the food we consume contains energy that our bodies convert into different forms as required. The term energy refers to an ability to do work and is measured in Joules (J). A Joule "is defined as the amount of energy required to raise the temperature of one kilogram of water by one degree Celsius." (Business Directory, 2018). With this in mind, it should be possible to transfer the energy from a food source to water and then calculate the energy content of that particular food. **Note: It takes 42 joules of energy to raise the temperature of 10 mL of water by 1°C.** **Task**

	may impact on other areas of society and involve ethical considerations • investigating how energy efficiency can reduce energy consumption ***ACSHE227*** People use understanding and skills from across the disciplines of science in their occupations • considering how engineers improve energy efficiency of a range of processes **Scientific Inquiry Skills** **Questioning and Predicting** ***ACSIS124*** Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge • working collaboratively to identify a problem to investigate • recognising that the solution of some questions and problems requires consideration of social, cultural, economic or moral aspects rather than or as well as scientific investigation • using information and knowledge from previous investigations to predict the expected results from an investigation **Planning and Conducting** ***ACSIS125*** Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed • working collaboratively to decide how to approach an investigation • learning and applying specific skills and rules relating to the safe use of scientific equipment • identifying whether the use of their own observations and experiments or the use of other research materials is appropriate for their investigation • developing strategies and techniques for effective research using secondary sources, including use of the internet ***ACSIS126*** In fair tests, measure and control variables, and select equipment to collect data with accuracy appropriate to the task • recognising the differences between controlled, dependent and independent variables • using a digital camera to record observations and compare images using information technologies • using specialised equipment to increase the accuracy of measurement within an investigation **Processing and analysing data and information** ***ACSIS129*** Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships, including using digital technologies as appropriate				method		**This task is divided into two parts!** In the first part, you are measuring the energy contained in marshmallows. For the second part, you are ***refining*** your investigation and conducting an experiment based on what you have discovered before. Design an experiment that investigates how much heat energy you can obtain from the chemical potential energy stored in a food source. Once you have completed your calculations, compare your results with the dietary information on the packet and account for any differences. You will work in groups but submit individual practical reports. You may use the following the Year 8 Prac Template attached if you like, or other science report templates.

	• understanding different types of graphical and physical representation and considering their advantages and disadvantages • using spreadsheets to aid the presentation and simple analysis of data • describing the trends shown in collected data ***ACSIS130*** Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions • using diagrammatic representations to convey abstract ideas and to simplify complex situations • comparing and contrasting data from a number of sources in order to create a summary of collected data • identifying data which provides evidence to support or negate the hypothesis under investigation • referring to relevant evidence when presenting conclusions drawn from an investigation ***ACSIS131*** Reflect on the method used to investigate a question or solve a problem, including evaluating the quality of the data collected, and identify improvements to the method • discussing investigation methods with others to share ideas about the quality of the inquiry process • identifying and considering indicators of the quality of the data when analysing results • suggesting improvements to inquiry methods based on experience ***ACSIS132*** Use scientific knowledge and findings from investigations to evaluate claims • using the evidence provided by scientific investigations to evaluate the claims or conclusions **Communicating** ***ACSIS133*** Communicate ideas, findings and solutions to problems using scientific language and representations using digital technologies as appropriate • presenting the outcomes of research using effective forms of representation of data or ideas and scientific language that is appropriate for the target audience • using digital technologies to access information and to communicate and collaborate with others on and off site						
8 weeks (4 x 50min lessons per week) What the rock?	*Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales (ACSSU153)*	Key: **Systems** **Related:** Transformation	**Globalisation and sustainability**	**SOI:** Systems transform resources. **Area of exploration:**	**A: Knowing and Understanding** Students should be able to:	**Communication** Communication skills: use and interpret a range of discipline-specific terms and symbols.	Students design a piece of jewellery that incorporates at least 3 different gemstones/metals and then produce a powerpoint/poster/word document that

	- recognising that rocks are a collection of different minerals - considering the role of forces and energy in the formation of different types of rocks and minerals - recognising that some rocks and minerals, such as ores, provide valuable resources Focused outcomes: ● Explain how the different types of rocks (igneous, sedimentary or metamorphic rocks) are formed. ● Describe and explain how the rock cycle occurs as a result of different forces and energy changes (label diagram of the rock cycle). ● Describe the uses of the different types of rocks (including minerals). ● Describe the methods used to explore for minerals, and explain how the exploratory methods rely on collaborative work of people from various fields of science. ● Analyse and explain data related to the environmental effects of mining.			The impact of human consumption plays an important role in understanding the sustainability and importance of rocks and minerals in the world.	i. explain scientific knowledge ii. apply scientific knowledge and understanding to solve problems set in familiar and unfamiliar situations iii. analyse and evaluate information to make scientifically supported judgments. **D: Reflecting on the impacts of Science** Students should be able to: i. explain the ways in which science is applied and used to address a specific problem or issue ii. discuss and evaluate the various implications of the use of science and its application in solving a specific problem or issue iii. apply scientific language effectively iv. document the work of others and sources of information used.	**Self-Management** Organisation Skills: select and use technology effectively and productively **Research** Information Literacy Skills: create references and citations, use footnotes/endnotes and construct a bibliography according to recognised conventions	details physical and chemical information on their design materials

Year 9 MYP5							
Unit Title, Duration and Hours	Content	Key and Related Concepts	Global Context	Statement of Inquiry	Sciences Objectives	Approaches to Learning Skills	Assessment Task
Term 1: 9 weeks (4 x 50min lessons per week) Chemistry: Chemical reactions	-All matter is made of atoms that are composed of protons, neutrons and electrons; natural radioactivity arises from the decay of nuclei in atoms (ACSSU177) ● describing and modelling the structure of atoms in terms of the nucleus, protons, neutrons and electrons ● comparing the mass and charge of protons, neutrons and electrons ● describing in simple terms how alpha and beta particles and gamma radiation are released from unstable atoms -Chemical reactions involve rearranging atoms to form new substances; during a chemical reaction mass is not created or destroyed (ACSSU178) ● identifying reactants and products in chemical reactions ● modelling chemical reactions in terms of rearrangement of atoms ● describing observed reactions using word equations ● considering the role of energy in chemical reactions ● recognising that the conservation of mass in a chemical reaction can be demonstrated by simple chemical equations -Chemical reactions, including combustion and the reactions of acids, are important in both non-living and living systems and involve energy transfer (ACSSU179) ● investigating reactions of acids with metals, bases, and carbonates ● investigating a range of different reactions to classify them as exothermic or endothermic ● recognising the role of oxygen in combustion reactions and comparing combustion with other oxidation reactions	Key: **Change** **Related:** Balance and interaction	**Scientific and Technical Innovation** Area of exploration: A conceptual understanding of the link between observable change, balanced reactions, and real life interactions and applications.	**SOI: When matter changes we observe similarities and differences that helps us to build models to explain interactions and understand connections.** **Factual inquiry question(s):** ● What is atomic structure? ● How is the periodic table structured? ● How does atomic structure relate to groupings in the periodic table? (why is it structured this way?) ● What is the law of conservation of matter? ● Can the properties of elements be predicted using the periodic table? ● How and why do elements bond together? ● How are chemical reactions represented? ● How does atomic bonding influence a compound's chemical and physical properties? **Conceptual inquiry question(s):** ● How are models and theories connected? (atomic structure, periodic table, bonding etc) ● How do observations indicate change? ● Why will chemical reactions always balance? **Debatable inquiry question(s):** To what extent is all matter the same?	**Criterion B: Inquiring and Designing** Students should be able to: ● explain a problem or question to be tested by a scientific investigation ● formulate a testable hypothesis and explain it using scientific reasoning ● explain how to manipulate the variables, and explain how data will be collected ● design scientific investigations. **Criterion C: Processing and Evaluating** Students should be able to: ● present collected and transformed data ● interpret data and explain results using scientific reasoning ● evaluate the validity of a hypothesis based on the outcome of the scientific investigation ● evaluate the validity of the method ● explain improvements or extensions to the method	**Affective Skills: Resilience:** Practice failing well, dealing with change SEARCH pathway: Emotional Management Skill needed: Understanding the need for replication, trial and error and using as an opportunity to produce an improved or more valid investigation Approach: Constructive and peer feeedback strategies and explicitly stating that the easiest way to eliminate error is through trial. **Communication:** Negotiating ideas and knowledge with peers and teachers When students are given a scientific topic, they are able to deconstruct an investigation to formulate and explain a testable hypothesis using correct scientific reasoning. (Bii) Skill needed: Students need to be able to form a hypothesis which indicates what will happen to the dependent variable when the independent variable will be changed and justify with scientific reasoning.This must be referenced using the Harvard Referencing System. Approach: Scaffolding of a hypothesis in terms of "If (independent variable) is changed from .... to .... then (dependent variable) will.....because....". Explicit teaching of variables and how the dependent variable is being measured. Clear links made between the practical and the theory being explored to justify the observations made and further online research expected to support the hypothesis correctly connected to the science being explored. **Thinking: Critical thinking:** Practice observing carefully to recognise problems Explain beneficial improvements or extensions to the method. (Cv) Skill needed: Articulate specific changes to be made to the method giving reasons as to the impact this would have on the data collected in order to increase reliability and	**Design Practical:Practical design experiment**

	• comparing respiration and photosynthesis and their role in biological processes • describing how the products of combustion reactions affect the environment					validity as they connect to precision and accuracy. Approach 1: Extending the scaffolded sentence structure. Approach 2: Mind Mapping multiple ways to solve an identified flaw and then diamond ranking to prioritise the most effective being able to justify.	The duties of a process chemist include being a trouble-shooter, able to identify what is going wrong in a chemical reaction and to determine how the issue can be fixed. A process chemist must have theoretical knowledge about how the reaction takes place and some practical experience to enable a solution to be found. Students are to work in groups of 3 or 4 to design a logical investigation to demonstrate how **one factor** affects **reaction time**. Students are to undertake the following and submit their design <u>prior</u> to running the experiment: 1. Using the internet and other sources, research factors affecting chemical reaction rates 2. Design an experiment which tests this factor 3. Complete a Practical report design (you may follow the Year 9 Practical Template to up to a blank results table) **Students will be provided with the following lessons of in-class time:** · 2-3 lessons – research/planning/ determining a testable hypothesis/ variables/method. · 3-4 lessons – to complete write up. During this time your teacher will provide guidance on expectations for each part of the report. Care should be taken to: 1. Present data accurately using graphs, tables, or the like. 2. Interpret and explain what the data means. 3. Evaluate errors and **their effect on the data,** and how they can be controlled. 4. Describe in detail how improvements could be made to this investigation **in the future**. <u>The practical report should be a minimum of 700 words with maximum of 1500 words</u>

							The duties of a process chemist include being a trouble-shooter, able to identify what is going wrong in a chemical reaction and to determine how the issue can be fixed. A process chemist must have theoretical knowledge about how the reaction takes place and some practical experience to enable a solution to be found. Students are to work in groups of 3 or 4 to design a logical investigation to demonstrate how **one factor** affects **reaction time**. Students are to undertake the following and submit their design prior to running the experiment: 1. Using the internet and other sources, research factors affecting chemical reaction rates 2. Design an experiment which tests this factor 3. Complete a Practical report design (you may follow the Year 9 Practical Template to up to a blank results table) **Students will be provided with the following lessons of in-class time:** · 2-3 lessons – research/planning/ determining a testable hypothesis/ variables/method. · 3-4 lessons – to complete write up. During this time your teacher will provide guidance on expectations for each part of the report. Care should be taken to: 1. Present data accurately using graphs, tables, or the like. 2. Interpret and explain what the data means. 3. Evaluate errors and **their effect on the data,** and how they can be controlled. 4. Describe in detail how improvements could be made to this investigation **in the future**. The practical report should be a minimum of 700 words with maximum of 1500 words
Term 2: 10 weeks (4 x 50min lessons per week)	**Biological Science**	Key: **Systems** **Related:**	**Identities and Relationships** .	**SOI:** The nervous and endocrine systems keep you safe and in control. The nervous	**Criterion A: Knowing and understanding** i. explain scientific knowledge	**Research** **Information Literacy** When students document relevant sources completely,	**Goal:** To research one medical condition that harms the body and prepare a

Biology: Are you in control (infectious diseases)	***ACSSU175*** Multi-cellular organisms rely on coordinated and interdependent internal systems to respond to changes to their environment. Describing how the requirements for life (for example oxygen, nutrients, water and removal of waste) are provided through the coordinated function of body systems such as the respiratory, circulatory, digestive, nervous and excretory systems Explaining how body systems work together to maintain a functioning body using models, flow diagrams or simulations Identifying responses using nervous and endocrine systems Investigating the response of the body to changes as a result of the presence of micro-organisms Investigating the effects on humans of exposure to electromagnetic radiations such as X-rays and microwaves **Nature and Development of Science** ***ACSHE158*** Advances in scientific understanding often rely on developments in technology and technological advances are often linked to scientific discoveries. Considering how the development of imaging technologies have improved our understanding of the functions and interactions of body systems **Use and Influence of Science** ***ACSHE228*** The values and needs of contemporary society can influence the focus of scientific research investigating the work of Australian scientists such as Fiona Wood and Marie Stoner on artificial skin	Balance, **Function Interaction**		system works in conjunction with the endocrine system to keep our bodies in control. Disease has a way of disrupting this system to reduce control. **Area of Exploration:** Physical, psychological and social development; transitions; health and well-being; lifestyle choices	ii. apply scientific knowledge and understanding to solve problems set in familiar and unfamiliar situations iii. analyse and evaluate information to make scientifically supported judgments. **Criterion D: Reflecting on the impacts of science** i. explain the ways in which science is applied and used to address a specific problem or issue ii. discuss and evaluate the various implications of using science and its application to solve a specific problem or issue iii. apply scientific language effectively iv. document the work of others and sources of information used.	using the Harvard referencing system (Div) **Skill needed:** Students need to use in text referencing, provide full Harvard Referenced bibliography, and have chosen recent relevant sources. **Approach**: Students can analyse different sources to identify which source is better and give reasoning why. Teachers can give students a paragraph and students should identify every place that requires a reference to be given. Students can undertake a source analysis to show that the source they have chosen is appropriate and used for a specific reason. Students should use SLASA or Word to provide regular Harvard Referencing generation for consistency. In order for students to use theories and evidence students will need to consider ideas from more than one perspective and evaluate the information for credibility. **(Thinking: Critical)** In order for students to communicate information in a report format students will need to apply scientific terminology to make meaning clear to an audience of their peers, be able to synthesize information into a paraphrased paragraph and understand the coherence and flow of a report format. **(Communication skills: Communication through various formats)**	written document detailing your research for each of the headings defined in Part A then use that information to prepare a brochure on your disease or ailment (Part B). **Role & Audience:** The audience for Part A is your Teacher/Parents, this document must be well written with complete sentences and a reference section that follows the Harvard Style of Referencing. The audience for Part B is your classmates, the brochure must be attractive, informative and easy to understand. **Assessment standards for success:** Your report needs to meet the requirements of Criteria A – Knowing and Understanding and Criteria D – Reflecting on the impacts of science. **Situation:** You will be given 4 lessons of class time only and then the task must be completed in your own time. **Product**: A communication of your detailed research to others, such as an article, video, brochure, website, etc.
TERM 3: 10 weeks (4 x 50min lessons per week) Physics: Motion	The motion of objects can be described and predicted using the laws of physics (ACSSU229) **Elaborations** • gathering data to analyse everyday motions produced by forces, such as measurements of distance and time, speed, force, mass and acceleration • recognising that a stationary object, or a moving object with constant motion, has balanced forces acting on it • using Newton's Second Law to predict how a force affects the movement of an object • recognising and applying Newton's Third Law to describe the effect of interactions between two objects The motion of objects can be described and predicted using the laws of physics Energy conservation in a system can be explained by describing energy transfers and transformations (ACSSU190) **Elaborations** • recognising that the Law of Conservation of Energy explains that total energy is maintained in energy transfer and transformation	Key: **Relationships** **Related:** Force Movement Consequence	**Scientific and Technical Innovation**	**SOI:**Understanding relationships in movement can help us to predict consequences. **Area of Exploration:**We can use force to create movement, and can use the knowledge of this relationship to predict consequences, suggest possible solutions to problems and generate new ideas.	**Criterion B: Inquiring and Designing** Students should be able to: • explain a problem or question to be tested by a scientific investigation • formulate a testable hypothesis and explain it using scientific reasoning • explain how to manipulate the variables, and explain how data will be collected • design scientific investigations. **Criterion C: Processing and Evaluating** Students should be able to: • present collected and transformed data • interpret data and explain results using scientific reasoning • evaluate the validity of a hypothesis based	In order for students to collaborate to develop their own inquiry into the laws of motion, students must learn to: • Delegate and share responsibility for decision-making • Taking responsibility for one's own actions • Manage and resolve conflict, and work collaboratively in teams • Listen actively to other perspectives and ideas • Encourage others to contribute • Exercise leadership and take on a variety of roles within groups • Give and receive meaningful feedback [Social: II. Collaboration skills]	**Design Practical:** The design investigation encourages students to predict the outcome from changing a relationship from the scientific principles involved.

	• recognising that in energy transfer and transformation, a variety of processes can occur, so that the usable energy is reduced and the system is not 100% efficient • comparing energy changes in interactions such as car crashes, pendulums, lifting and dropping • using models to describe how energy is transferred and transformed within systems				on the outcome of the scientific investigation • evaluate the validity of the method • explain improvements or extensions to the method		
TERM 4: 8 weeks (4 x 50min lessons per week) **Perception is in the eye of the beholder**	**Year 10 Achievement Standard:** Students develop questions and hypotheses. Students evaluate the validity and reliability of claims made in secondary sources with reference to currently held scientific views, the quality of the methodology and the evidence cited. They construct evidence-based arguments and select appropriate representations and text types to communicate science ideas for specific purposes. **Science as a Human Endeavour**: Scientific understanding, including models and theories, is contestable and is refined over time through a process of review by the scientific community.	Key: **Perspective** Related: **Evidence Patterns**	**Identities and Relationships**	**SOI:** Our identity is forged from our perspective which is the combined result of our observation and interpretation of data from our environment. **Area of Exploration:** What it means to be human. Human nature and human dignity; moral reasoning and ethical judgment; consciousness and mind.	**Criterion A: Knowing and understanding** i. explain scientific knowledge ii. apply scientific knowledge and understanding to solve problems set in familiar and unfamiliar situations iii. analyse and evaluate information to make scientifically supported judgments. **Criterion D: Reflecting on the impacts of science** i. explain the ways in which science is applied and used to address a specific problem or issue ii. discuss and evaluate the various implications of using science and its application to solve a specific problem or issue iii. apply scientific language effectively iv. document the work of others and sources of information used.	In order for students to understand presented evidence from a range of theories students will need to be able to extract and interpret information, and then organise that information into a concise set of notes. **(Self-management: Organisation)** In order for students to use theories and evidence students will need to consider ideas from more than one perspective and evaluate the information for credibility. **(Thinking: Critical)** In order for students to communicate information in a report format students will need to apply scientific terminology to make meaning clear to an audience of their peers, be able to synthesize information into a paraphrased paragraph and understand the coherence and flow of a report format. **(Communication skills: Communication through various formats)**	Conduct a research investigation connected to the possible questions: • To what extent is our perceived reality accurate? • To what extent can we change the perspective of others? • How has psychological science impacted real-world applications? **Modified version of this assessment:** As a modified version of this assessment for those Learning Support students who need it, the research question will be provided for them (formative aspect) along with help to identify the sources they should use to address each criterion. A scaffold of questions will also be provided to guide their exploration. For those students who need further modifications, to reduce their cognitive load these students will only be required to use the below sources of background information (which are easier 'reads') to refer to:

Year 10 MYP5							
Unit Title, Duration and Hours	Content	Key and Related Concepts	Global Context	Statement of Inquiry	Sciences Objectives	Approaches to Learning Skills	Assessment Task
Term 1: 8 weeks (4 x 50min lessons per week) Adaptations	**Scientific Inquiry skills:** Formulate questions or hypotheses that can be investigated scientifically (ACSIS198 - Scootle) Plan, select and use appropriate investigation types, including field work and laboratory experimentation, to collect reliable data; assess risk and address ethical issues associated with these methods (ACSIS199 - Scootle) Select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately (ACSIS200 - Scootle) Analyse patterns and trends in data, including describing relationships between variables and identifying inconsistencies (ACSIS203 - Scootle) Use knowledge of scientific concepts to draw conclusions that are consistent with evidence (ACSIS204 - Scootle) Evaluate conclusions, including identifying sources of uncertainty and possible alternative explanations, and describe specific ways to improve the quality of the data (ACSIS205 - Scootle) Critically analyse the validity of information in primary and secondary sources and evaluate the approaches used to solve problems (ACSIS206 - Scootle) Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations (ACSIS208 - Scootle) **Scientific understanding:** The theory of evolution by natural selection explains	**Key: Change** is a conversion, transformation or movement from one form, state or value to another. Inquiry into the concept of change involves understanding and evaluating causes, processes and consequences **Related:** **Evidence** Support for a proposition derived from observation and interpretation of data. **Patterns** The distribution of variables in time or space; sequences of events or features. **Consequences** The observable or quantifiable effects, results, or outcomes correlated with an earlier event or events.	**Orientation in time and space**	**SOI: Change, influenced by both internal and external factors, can be recorded through evidence that collected over time can determine predictable patterns of change.** **Area of Exploration:** Evolution, constraints and adaptation	**Criterion B: Inquiring and Designing** Students should be able to: • explain a problem or question to be tested by a scientific investigation • formulate a testable hypothesis and explain it using scientific reasoning • explain how to manipulate the variables, and explain how data will be collected • design scientific investigations. **Criterion C: Processing and Evaluating** Students should be able to: • present collected and transformed data • interpret data and explain results using scientific reasoning • evaluate the validity of a hypothesis based on the outcome of the scientific investigation • evaluate the validity	**Thinking: Creative thinking** In order to successfully design an investigation students must be able: **Skill needed:** To think broadly to generate new ideas from knowledge already known. **Thinking: creative thinking** In order for students to connect the variables to formulate a relevant scientific investigation with reasoning. (Bi) students will need to be able to write question to be tested that includes the independent and dependent variable and provide a detailed account with reasons as to why this should be tested scientifically. Deconstruct the problem to explore a variety of methods and measurement options that could be used to answer the question to be tested. **Thinking: creative thinking** Explain how to collect sufficient and relevant data (Biii). Skill needed: This would include explaining how to manipulate the variables, and explain how data will be collected. (by the end of MYP, students will be able to list the variables, state their units and explain and give justification for how they plan to manipulate the variables.) Approach: Students expected to enter information under scaffolded headings. Focus on naming the variable and identifying the units, where applicable and describing how their variable is manipulated. To do this, students are able to justify the type and gradations of the variables they are using, and explain how these are likely to affect their future results. Emphasis is given on providing reasoning during deconstruction tasks. **Self-management: organisation - VWB SEARCH pathway:**	**Practical Design Experiment:** To design and conduct an investigation to answer the question '**To what extent do adaptations influence fitness or survival in response to environmental change?**' through exploring factors that affect germination, root growth, shoot length e.g. growth hormones, growth promotion, concentration of salt, alternative plants grown in close proximity. Example ideas for potential research questions can be found at: https://www.thoughtco.com/plant-project-ideas-373334 And at: https://www.sciencemadesimple.com/botany_plant_projects.html

	the diversity of living things and is supported by a range of scientific evidence (ACSSU185 - Scootle) ***Elaborations*** Outlining processes involved in natural selection including variation, isolation and selection describing biodiversity as a function of evolution Investigating changes caused by natural selection in a particular population as a result of a specified selection pressure such as artificial selection in breeding for desired characteristics Relating genetic characteristics to survival and reproductive rates Evaluating and interpreting evidence for evolution, including the fossil record, chemical and anatomical similarities, and geographical distribution of species **Science as a Human Endeavour**: Scientific understanding, including models and theories, is contestable and is refined over time through a process of review by the scientific community.				of the method ● explain improvements or extensions to the method	**Habits & Goals** In order for students to Independently maintaining readiness to learn with the aim of increasing student achievement. students will need to be able to enter skill needed. **Social: Collaboration - VWB SEARCH pathway: Relationships** In order for students to be able to work as a group to effectively design an investigation for their summative task students need to be able to listen to and discuss each other's ideas in order to justify the best approach to the group task and work efficiently to meet the needs of the group and the availability of resources.	
Term 2: 8 weeks (4 x 50min lessons per week) Chemistry - Photosynthesis, reactions for life	**Scientific Understanding**: Chemical reactions involve rearranging atoms to form new substances; during a chemical reaction mass is not created or destroyed Chemical reactions, including combustion and the reactions of acids, are important in both non-living and living systems and involve energy transfer. **Science as a human endeavour** (Year 10): Depending on SHE focus - Values and needs of contemporary society can influence the focus of scientific research Scientific understanding, including models and theories, is contestable and is refined over time through a process of review by the scientific community Advances in scientific understanding often rely on technological advances and are often linked to scientific discoveries	Key: **Systems** **Related**: Balance	**Globalisation and sustainability**	SOI: **Innovation provides opportunities to help balance the chemical inputs and outputs of Earth's environmental systems to sustain a world that is hospitable to human life.** **Area of Exploration:**Opportunity, risk, consequences and responsibility.	**Criterion A: Knowing and understanding** i. explain scientific knowledge ii. apply scientific knowledge and understanding to solve problems set in familiar and unfamiliar situations iii. analyse and evaluate information to make scientifically supported judgments. **Criterion D: Reflecting on the impacts of science** i. explain the ways in which science is applied and used to address a specific problem or issue ii. discuss and evaluate the various implications of using science and its application to solve a specific problem or issue iii. apply scientific language effectively iv. document the work of others and sources of information used.	**<u>Research</u>** **<u>Information Literacy</u>** When students document relevant sources completely, using the Harvard referencing system (Div) **Skill needed:** Students need to use in text referencing, provide full Harvard Referenced bibliography, and have chosen recent relevant sources. **Approach**: Students can analyse different sources to identify which source is better and give reasoning why. Teachers can give students a paragraph and students should identify every place that requires a reference to be given. Students can undertake a source analysis to show that the source they have chosen is appropriate and used for a specific reason. Students should use SLASA or Word to provide regular Harvard Referencing generation for consistency. **<u>Media Literacy</u>** Explain the ways in which science is applied and used to address a specific problem or issue (Di) **Skill needed:** Explain relevant scientific concepts in enough detail to justify their use in addressing a specific problem, including each step in the process. **Approach:** Students are given stimulus articles where they highlight the key scientific concepts and issues involved. Using their scientific understanding of the issue, they explain the connection between scientific concepts and how it is used to address these problems. Questioning and class discussions are used to increase the depth of student's responses. Using targeted articles including the below specific article that will form the basis to the assessment piece to explicitly teach ATL skill - extract directly stated information & paraphrasing. - '**Scientists look to hack photosynthesis for a 'greener' planet**': <u>https://www.sciencenewsforstudents.org/article/scientists-look-hack-photosynthesis-greener-planet</u> For each of the articles students are to use the PLAN strategy to read, view and interpret the information within each article. They will need to follow the below procedure to implement the PLAN strategy: **PREDICT** - ● Preview title, subtitles, boldface or italicised words, graphics and summary. ● Predict the main ideas and text structure. ● Create a brainstorm map to represent these ideas. Using mapping is a very effective way of visually organising key pieces of information. **LOCATE** - ● Using your prior knowledge tick the mapped ideas that	***Research Task:*** *Balancing the inputs and outputs of Earth's chemical systems is needed to sustain a world that is hospitable to human life. All global systems (including all environmental, economic, social, political and legal systems) are reliant on the maintenance of this balance. Small changes in balance can have widespread consequences and affect our sustainability. Human understanding of photosynthesis as one of the most important chemical reactions on Earth, its current and potential use, and its societal impact is a topical and controversial contemporary issue. Scientific and Technical innovation provides both opportunity and risk, with very real consequences. It is our responsibility to understand this potential impact.* In this task **you are required to write a science article for Cosmos magazine** to answer the question: **'To what extent is our society influenced by photosynthesis?'** You article should address: 1. What is photosynthesis? What are the reactants and products and how does it work? How has our knowledge of photosynthesis been used or applied by society? What has it allowed us to do? 2. How do societal systems (social or cultural systems, our economic or political systems, ethical or legal systems) impact our use of photosynthesis in the present and potential research direction in the future? 3. How has our knowledge and understanding of photosynthesis influenced a system in our society? How has it impacted our social or cultural systems, our economic or political systems, ethical or legal systems? You will use and acknowledge a variety of relevant sources to find scientific

						are already known to you and add a question mark beside those that are new. **ADD** - ● Now work in pairs to add further information from your article to your mind map. ● Extract all of the key aspects of the article. As you work through it, don't copy long sentences of information, instead use only the keywords/points you need. ● Use arrows to show connections between key aspects of information. You can add extra words here to explain the connections. ● Highlight the most important information that you identified through your mapping exercise. **NOTE** - ● Do not look back at the article; instead only use your brainstorm mind map. ● Summarise the overall meaning of the article. What information is it trying to convey? You should write a single paragraph or a set of bullet points to do this. **Communication** - *Reading, writing and using language to gather and communicate information.* **Skill needed**: Communication for a particular audience - Communicating accurate scientific information to a non-scientific audience **Approach**: Explicit workshop run by the teacher librarian in analysis of article structure to understand the format requirements of assessment and the language and approach taken to communicate accurate scientific information to a non-scientific audience. When students explain subject-specific knowledge. (A.i) **Skill needed:** Students must be able to provide a detailed account with reasons or causes. They must be able to connect the major and minor details to articulate reason. **Approach**: Explicitly teach the PLAN reading strategy and the cornell method of note-taking. Explicit ATL teaching of note-taking to structure information extracted from the articles provided using the Cornell method of note-taking. A model will be provided and scaffolded. Being explicitly taught the cornell method of note-taking will teach students to: - extract the specific major and minor details - bring together the directly stated information into a paraphrased coherent paragraph using the PLAN strategy - making connections between the details to articulate why **Self management:** Organisation (note-taking) **SEARCH pathway: Habits & Goals** **Skill needed:** Keeping valuable information you research / learn organised **Approach**: As above explicit teaching of the PLAN reading strategy and the cornell method of note-taking. **Communication** When students apply a wide range of subject-specific terminology to effectively communicate understanding. (D.iii) **Skill needed:** Students are able to incorporate appropriate scientific terminology that is beyond what is specifically taught within the classroom. They show the ability to learn the context of new words they find in readings or viewings and use them appropriately. **Approach:** With the teacher, then through peer to peer collaboration then independently, students are to read a range of scientific journal articles with teh specific intention of identifying new words or words which are not easy to understand in the context they are used. Students should have discussions regarding these words, use dictionaries to understand them or wider reading to find the terminology in other contexts. Students will also listen to a podcast of a scientific program so they can hear the words being said by scientists and in a wide variety of cultures (Listen to the BBC Radio 4 podcast on Photosynthesis: https://podtail.com/en/podcast/in-our-time-science/photos	evidence and information to support your findings. You will be challenged to critically analyse your evidence to ensure it is reliable and be required to draw conclusions from it to support your argument. You will present your research findings as an **article for COSMOS magazine**. ***Maximum word count is 1000 words*** ***This includes in-text references but not your bibliography.***

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Term 3: 8 weeks (4 x 50min lessons per week) OPTION 1: Scientific Studies	Scientific understanding, including models and theories, is contestable and is refined over time through a process of review by the scientific community (ACSHE 191) People use scientific knowledge to evaluate whether they accept claims, explanations or predictions, and advances in science can affect people's lives, including generating new career opportunities (ACSHE194) Formulate questions or hypotheses that can be investigated scientifically (ACSIS198) Select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately (ACSIS200) Analyse patterns and trends in data, including describing relationships between variables and identifying inconsistencies (ACSIS203) Use knowledge of scientific concepts to draw conclusions that are consistent with evidence (ACSIS204) Evaluate conclusions, including identifying sources of uncertainty and possible alternative explanations, and describe specific ways to improve the quality of the data (ACSIS205) Critically analyse the validity of information in primary and secondary sources and evaluate the approaches used to solve problems (ACSIS206) Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations (ACSIS208)	Key: **Relationships** **Related:** movement, development	**Scientific and Technical Innovation**	**SOI:**How does our knowledge of outer space and the relationships involved impact our thought processes on scientific and technical innovation? **Area of exploration**:We can use force to create movement, and can use the knowledge of this relationship to predict consequences, suggest possible solutions to problems and generate new ideas.	**Criterion B: Inquiring and Designing** Students should be able to: • explain a problem or question to be tested by a scientific investigation • formulate a testable hypothesis and explain it using scientific reasoning • explain how to manipulate the variables, and explain how data will be collected • design scientific investigations. **Criterion C: Processing and Evaluating** Students should be able to: • present collected and transformed data • interpret data and explain results using scientific reasoning • evaluate the validity of a hypothesis based on the outcome of the scientific investigation • evaluate the validity of the method • explain improvements or extensions to the method	In order for students to collaborate to develop their own inquiry into the laws of motion, students must learn to: • Delegate and share responsibility for decision-making • Taking responsibility for one's own actions • Manage and resolve conflict, and work collaboratively in teams • Listen actively to other perspectives and ideas • Encourage others to contribute • Exercise leadership and take on a variety of roles within groups • Give and receive meaningful feedback [Social: II. Collaboration skills]	**Design practical:** Students are to identify a situation involving space and design an experiment which will allow them to explore the relationships and process how these relate to motion. The topic for this unit was outer space. Some ideas students may like to deconstruct, or come up with their own to be checked by the teacher: • How can you launch a rocket the furthest? • How to keep an astronaut's muscles fit in space? • What would be needed to create a permanent habitat in space? • How could a spaceship travel through the solar system with limited fuel? Using your understanding of physics, design and conduct an investigation that tests a particular aspect of motion. Make sure to include and explain your calculations. You will deliver these investigations as a presentation to the class.
Term 3: 8 weeks (4 x 50min lessons per week) OPTION 2: Psychology	Scientific understanding, including models and theories, is contestable and is refined over time through a process of review by the scientific community (ACSHE 191) People use scientific knowledge to evaluate whether they accept claims, explanations or predictions, and advances in science can affect people's lives, including generating new career opportunities (ACSHE194) Formulate questions or hypotheses that can be investigated scientifically (ACSIS198) Select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately (ACSIS200) Analyse patterns and trends in data, including describing relationships between variables and identifying inconsistencies (ACSIS203) Use knowledge of scientific concepts to draw conclusions that are consistent with evidence (ACSIS204) Evaluate conclusions, including identifying sources of uncertainty and possible alternative explanations, and describe specific ways to improve the quality of the data (ACSIS205) Critically analyse the validity of information in primary and secondary sources and evaluate the	**Key: Relationships** **Related:** Evidence, Interaction	**Identities and Relationships** (Who am I? Who are we? Exploring what it means to be human)	**SOI**: Scientifically investigating what it means to be human requires the systematic and ethical collection of evidence that is objectively evaluated and analysed against already established theories, so that the overall result is not simply the sum of separate variables but the determination of a valid relationship. **Area of exploration**: Human nature and human dignity; moral reasoning and ethical judgment; consciousness and mind.	**Criterion B: Inquiring and Designing** Students should be able to: • explain a problem or question to be tested by a scientific investigation • formulate a testable hypothesis and explain it using cientific reasoning • explain how to manipulate the variables, and explain how data will be collected • design scientific investigations. **Criterion C: Processing and Evaluating** Students should be able to: • present collected and transformed data • interpret data and explain results using scientific reasoning • evaluate the validity of a hypothesis based on the outcome of the scientific investigation	In order for students to understand how to systematically and ethically collect evidence on human behaviour, students will need to create novel solutions to authentic problems. **(Thinking: Creative).** In order for students to understand how to evaluate a hypothesis and design (make an appraisal weighing up the strengths and limitations) students will need to interpret data and evaluate evidence. **(Thinking: Critical)** In order for students to understand how to objectively evaluate and analyse their results against already established theories, students will need to make connections between various sources of information. **(Research: Information Literacy)**	**Design practical:** The experimental cycle will be used to explore the interaction between a chosen environmental factor and human behaviour. Students will have to inquire and design their own ethical investigation using one of the three forms of psychological investigation to generate a scientifically based hypothesis. They will then have to gather, analyse and evaluate the evidence for their hypothesis to determine if a valid relationship can be determined based on the available evidence.

	approaches used to solve problems (ACSIS206) Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations (ACSIS208)				• evaluate the validity of the method • explain improvements or extensions to the method		
Term 3: 8 weeks (4 x 50min lessons per week) OPTION 3: Chemistry	Chemical reactions, including combustion and the reactions of acids, are important in both non-living and living systems and involve energy transfer (ACSSU179) Formulate questions or hypotheses that can be investigated scientifically (ACSIS198) Plan, select and use appropriate investigation types, including field work and laboratory experimentation, to collect reliable data; assess risk and address ethical issues associated with these methods (ACSIS19) Select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately (ACSIS200) Analyse patterns and trends in data, including describing relationships between variables and identifying inconsistencies (ACSIS203) Use knowledge of scientific concepts to draw conclusions that are consistent with evidence (ACSIS204) Evaluate conclusions, including identifying sources of uncertainty and possible alternative explanations, and describe specific ways to improve the quality of the data (ACSIS205) Critically analyse the validity of information in primary and secondary sources and evaluate the approaches used to solve problems (ACSIS206) Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations (ACSIS208)	Key: **Change** **Related:** Consequence	**Scientific and technical innovation**	SOI:**Scientific and technical innovations allow us to quantitatively assess the consequence of chemical change.** **Area of exploration:** Combustion and Corrosion	**Criterion B: Inquiring and Designing** Students should be able to: • explain a problem or question to be tested by a scientific investigation • formulate a testable hypothesis and explain it using scientific reasoning • explain how to manipulate the variables, and explain how data will be collected • design scientific investigations. **Criterion C: Processing and Evaluating** Students should be able to: • present collected and transformed data • interpret data and explain results using scientific reasoning • evaluate the validity of a hypothesis based on the outcome of the scientific investigation • evaluate the validity of the method • explain improvements or extensions to the method	**<u>Critical thinking</u>** When students independently deconstruct a problem to identify the variables influencing a decision (Bi, Biii) **Skill needed:** Students use the statement of inquiry to identify problems related to it. Identify the possibilities for a practical which solves a problem related to the area of exploration. When students are given a scientific topic, they are able to deconstruct an investigation to formulate and explain a testable hypothesis using correct scientific reasoning. (Bii) **Skill needed:** Students need to be able to form a hypothesis which indicates what will happen to the dependent variable when the independent variable will be changed and justify with scientific reasoning.This must be referenced using the Harvard Referencing System. When students write a detailed procedural text (Biv) they include numbered steps, every item in the materials list is mentioned in the method, quantities and units given consistently, how the controlled variables are controlled, how the independent variable is changed, how the dependent variable is measured, **Skill needed:** Students must be able to number steps in chronological order, name items in the materials list in the method and describe how to use them, explain how the independent variable is changed, explain how the dependent variable is measured and recorded, describe how to keep other variables the same. Use "repeat" steps making sure they are the appropriate steps. **<u>Communication</u>** When students collect sufficient reliable data in an organised table and correctly transform into graphical representation (Ci) **Skill needed**: Students in MYP5 should be able to formulate their own results using a tables in word and graph via excel. They will be able to explain the reason for using various types of graphs and select appropriate observations that will support their practical findings. When students are able to read tables of values and graphs to determine a relationship between the IV and DV in relation to the data collected and the hypothesis given in relation to correct referenced scientific understanding. (Cii, Ciii) **Skill needed:** In tables of values students need to be able to read titles and units to establish the independent and dependent variables and establish that the mean is the generalised answer for the experimental data. In graphs students need to be able to read axes titles to determine the independent and dependent variables and identify the trend shown by the data to identify how the IV is connected to the DV. The relationship needs to be explained in relation to accurate scientific theory with data points being referred to for justification. Extrapolation and interpolation of data where appropriate. **Civ.** Students are able to evaluate the validity of the method based on the outcome of a scientific investigation **Skill needed:** Students need to identify sources of random and systematic error. They need to be able to calculate the range for all tests and identify the test with the highest range and use that to determine the validity and reliability of their results. They need to identify factors which affected the results with justification of why or how using the data values.	Design practical: Chemical changes, or reactions, occur constantly around us. Chemical change is the process of atoms combining to make products. Reactions such as combustion and corrosion are examples of chemical change. We can measure these changes quantitatively using the scientific method. Choose an experiment from one of the topics: • Combustion • Corrosion Then, deconstruct the question: “How can we assess the consequence of chemical change?” Consider the practical investigations completed previously in class and the types of reactions examined to address this question.

						Explain beneficial improvements or extensions to the method. (Cv) **Skill needed:** Articulate specific changes to be made to the method giving reasons as to the impact this would have on the data collected in order to increase reliability and validity as they connect to precision and accuracy.	
Term 4: 8 weeks (4 x 50min lessons per week) OPTION: Physics - Transport safety/efficiency	The motion of objects can be described and predicted using the laws of physics (ACSSU229) **Elaborations** Recognising that a stationary object, or a moving object with constant motion, has balanced forces acting on it Using Newton's Second Law to predict how a force affects the movement of an object Recognising and applying Newton's Third Law to describe the effect of interactions between two objects The motion of objects can be described and predicted using the laws of physics Energy conservation in a system can be explained by describing energy transfers and transformations (ACSSU190) **Elaborations** Recognising that the Law of Conservation of Energy explains that total energy is maintained in energy transfer and transformation Recognising that in energy transfer and transformation, a variety of processes can occur, so that the usable energy is reduced and the system is not 100% efficient Using models to describe how energy is transferred and transformed within systems	**Key:** Systems **Related**: Force Movement Energy	**Scientific and Technical Innovation**	**SOI:**Technological advances are made to improve energy transformation systems **Area of exploration:** Movement in transport can be technologically advanced to improve energy efficiency	**Criterion A: Knowing and understanding** i. explain scientific knowledge ii. apply scientific knowledge and understanding to solve problems set in familiar and unfamiliar situations iii. analyse and evaluate information to make scientifically supported judgments. **Criterion D: Reflecting on the impacts of science** i. explain the ways in which science is applied and used to address a specific problem or issue ii. discuss and evaluate the various implications of using science and its application to solve a specific problem or issue iii. apply scientific language effectively iv. document the work of others and sources of information used.	**Social: II. Collaboration skills** In order for students to be able to discuss and evaluate the implications of using science and its application to solve a specific problem or issue, interacting with a factor (D.ii) students must be able to choose appropriate scientific information to read and select relevant information which highlights how science is being used and to what degree it impacts society. They can then generate new questions for further research to ensure their understanding is balanced from a variety of points of view. **(Research: Media Literacy)** In order for students to be able to make a scientifically supported judgement based on analysis and evaluation of information (Aiii) students must be able to analyse and evaluate information in a source in order to build a scientifically supported judgement. **(Thinking: Critical)** In order for students to be able to apply scientific knowledge and understanding to solve problems set in familiar and unfamiliar situations (Aii) students will be able to use their knowledge in a familiar and new contexts in order to solve problems. This means that the context may be either part of explicit teaching in class or new contexts generated by the teacher or new contexts generated by the student, understanding that it must be related to their current scientific learning. Understanding will be shown through justification statements which involve referenced, collected or researched examples, data or relationships. **(Thinking: Transfer)**	Students are required to individually investigate a contemporary example of how energy transformation systems have helped us to understand the interactions between technology and innovation. The statement of inquiry 'Technological advances are made to improve energy transformation systems' is explored through a chosen contemporary example that has direct relevance to current society. *Through understanding of energy transformation systems, scientists are able to identify connections and build theories that bring new understanding and insights into possible ways to address challenges in our everyday world.* *Ideas, models, and theories are continually reviewed and reassessed as new evidence is obtained, and as emerging technologies enable new avenues of investigation.* *The application of science may provide great benefits to individuals, the community, and the environment, but may also pose risks and have unexpected outcomes. Decision-making about technological issues often involves consideration of multiple lines of evidence and a range of needs and values.* *As critical thinkers, you need to appreciate science as an ever-evolving body of knowledge that frequently informs public debate but is not always able to provide definitive answers.*
Term 4: 8 weeks (4 x 50min lessons per week) OPTIONS: Biology - Genetics	***ACSSU184 The transmission of heritable characteristics from one generation to the next involves DNA and genes*** • describing the role of DNA as the blueprint for controlling the characteristics of organisms • using models and diagrams to represent the relationship between DNA, genes and chromosomes • recognising that genetic information passed on to offspring is from both parents by meiosis and fertilisation • representing patterns of inheritance of a simple dominant/recessive characteristic through generations of a family • predicting simple ratios of offspring genotypes and phenotypes in crosses involving dominant/recessive gene pairs or in genes that are sex-linked • describing mutations as changes in DNA or chromosomes and outlining the factors that contribute to causing mutations ***Nature and Development of Science*** ***ACSHE191 Scientific understanding, including models and theories, are contestable and are refined over time through a process of review by the scientific community*** • investigating the development of the Watson and	Key: **Relationships** Related:**Structure** **Function** **Model**	**Identities and Relationships**	SOI: **Relationships between the model and function of living things has allowed human manipulation.** **Area of exploration**: The structure and function of DNA and inherited characteristics can be modeled to explore human identity.	**Criterion A: Knowing and understanding** i. explain scientific knowledge ii. apply scientific knowledge and understanding to solve problems set in familiar and unfamiliar situations iii. analyse and evaluate information to make scientifically supported judgments. **Criterion D: Reflecting on the impacts of science** i. explain the ways in which science is applied and used to address a specific problem or issue ii. discuss and evaluate the various implications of using science and its application to solve a specific problem or issue iii. apply scientific language effectively iv. document the work of others and sources of information used.	**Communication skills:** Give and receive meaningful feedback. Negotiate ideas and knowledge with peers and teachers **Self-management:** Select and use technology effectively and productively. Consider ethical, cultural and environmental implications **Research:** Present information in a variety of formats and platforms. Formulate factual, topical, conceptual and debatable questions. Consider ideas from multiple perspectives. Use models and simulations to explore complex systems and issues. (Toulmin model)	Develop a research question that investigates an aspect of genetic engineering, the development and use of genetic technologies, or the ethical and social implications of the use of genetic engineering for human benefit and communicate your findings scientifically.

	Crick double helix model for the structure of DNA • investigating the history and impact of developments in genetic ***Use and Influence of Science*** ***ACSHE195 Advances in science and emerging sciences and technologies can significantly affect people's lives, including generating new career opportunities*** • predicting future applications of aspects of nanotechnology on people's lives • investigating the applications of gene technologies such as gene therapy and genetic engineering ***ACSHE230 The values and needs of contemporary society can influence the focus of scientific research*** • considering the use of genetic testing for decisions such as genetic counselling, embryo selection, identification of carriers of genetic mutations and the use of this information for personal use or by organisation such as insurance companies or medical facilities ***ACSSU185*** The theory of evolution by natural selection explains the diversity of living things and is supported by a range of scientific evidence ● outlining processes involved in natural selection including variation, isolation and selection ● describing biodiversity as a function of evolution ● investigating changes caused by natural selection in a particular population as a result of a specified selection pressure such as artificial selection in breeding for desired characteristics ● relating genetic characteristics to survival and reproductive rates ● evaluating and interpreting evidence for evolution, including the fossil record, chemical and anatomical similarities, and geographical distribution of species **Nature and Development of Science** **ACSHE191** Scientific understanding, including models and theories, are contestable and are refined over time through a process of review by the scientific community considering the role of different sources of evidence including biochemical, anatomical and fossil evidence for evolution by natural selection						
Term 4: 8 weeks (4 x 50min lessons per week) OPTIONS: **Psychology** - The Biology of Human Behaviour	Scientific understanding, including models and theories, is contestable and is refined over time through a process of review by the scientific community (ACSHE 191) People use scientific knowledge to evaluate whether they accept claims, explanations or predictions, and advances in science can affect people's lives, including generating new career opportunities (ACSHE194) Analyse patterns and trends in data, including describing relationships between variables and identifying inconsistencies (ACSIS203) Use knowledge of scientific concepts to draw conclusions that are consistent with evidence (ACSIS204) Critically analyse the validity of information in primary and secondary sources and evaluate the approaches used to solve problems (ACSIS206) Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations (ACSIS208)	**Key**: Relationships **Related**: Patterns, Interactions	**Identities and relationships**	**SOI:**Psychologists identify relationships from patterns in human behaviour in order to build psychological theories that explain the interaction between our biology and our behaviour. **Area of exploration**: Consciousness and mind.	**Criterion A: Knowing and understanding** i. explain scientific knowledge ii. apply scientific knowledge and understanding to solve problems set in familiar and unfamiliar situations iii. analyse and evaluate information to make scientifically supported judgments. **Criterion D: Reflecting on the impacts of science** i. explain the ways in which science is applied and used to address a specific problem or issue ii. discuss and evaluate the various implications of using science and its application to solve a specific problem or issue iii. apply scientific language effectively iv. document the work of others and sources of information used.	In order for students to be able to discuss and evaluate the implications of using science and its application to solve a specific problem or issue, interacting with a factor (D.ii) students must be able to choose appropriate scientific information to read and select relevant information which highlights how science is being used and to what degree it impacts society. They can then generate new questions for further research to ensure their understanding is balanced from a variety of points of view. **(Research: Media Literacy)** In order for students to be able to make a scientifically supported judgement based on analysis and evaluation of information (Aiii) students must be able to analyse and evaluate information in a source in order to build a scientifically supported judgement. **(Thinking: Critical)** In order for students to be able to apply scientific knowledge and understanding to solve problems set in familiar and unfamiliar situations (Aii) students will be able to use their knowledge in a familiar and new contexts in order to solve problems. This means that the context may be either part of explicit teaching in class or new contexts generated by the teacher or new contexts generated by the student, understanding that it must be related to their current scientific learning. Understanding will be shown	Through identifying patterns in human behaviour, psychologists are able to identify connections and build theories that bring deeper understanding into understanding human behaviour. Psychological ideas, models, and theories are continually reviewed and reassessed as new evidence is obtained. Society is continually changing, and scientific progress is influenced by a wide range of factors including: ● Cultural factors: patterns of knowledge, behaviour, beliefs, shared attitudes, values, goals and practices that characterize groups of people. ● Economic factors: production, distribution, and use of income, wealth, and commodities. ● Environmental factors: the circumstances or conditions one is surrounded by. ● Ethical factors: decisions on issues as either right or wrong, as applied to the people and their actions. ● Moral factors: principles of right or wrong behaviour as determined by a particular society. ● Political factors: government or public affairs.

						through justification statements which involve referenced, collected or researched examples, data or relationships. **(Thinking: Transfer)**	● Social factors: interactions between groups of people involving issues such as welfare, safety, rights, justice or class. The application of psychological science may provide great benefits to individuals, the community, and the environment, but may also pose risks and have unexpected outcomes. Decision-making about psychological issues often involves consideration of multiple lines of evidence and a range of needs and values. As critical thinkers, you need to appreciate psychological science as an ever-evolving body of knowledge that frequently informs public debate but is not always able to provide definitive answers. In this task you are required to answer the question: 'To what extent is our behaviour influenced by our biology?' You are required to individually investigate an example of how psychological science has helped us to understand the interactions between our biology and our behaviour.