

Science Scope and Sequence

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In addition to the IB Approaches to Learning, the science component of the curriculum also provides opportunities for students to develop a range of science-specific skills and processes. In the list that follows, each of the science-specific skills (taken from the subject annex in Making the PYP happen: A curriculum framework for international primary education, 2007) is accompanied by examples of how these skills might manifest themselves in the classroom. These examples vary in their degree of complexity and are intended to show progression in the development of each skill.

Primary Years Programme Science Scope and Sequence; 2008

Science Skills

- a. **Observe carefully in order to gather data** (for example, students will examine objects and living things to find out more about them; observe and manipulate objects by using all their senses as appropriate; observe changes in living things, objects and events over a period of time; distinguish between significant and less significant observations; record observations in a systematic way).
- b. **Use a variety of instruments and tools to measure data accurately** (for example, students will use a range of tools and techniques with increasing competency; use standard and non-standard units for measurement; measure, compare and record data including mass, weight, time and temperature; select appropriate tools and measurement units).
- c. **Use scientific vocabulary to explain their observations and experiences** (for example, students will talk about what is observed; describe simple features of objects and events; describe what is happening using an increasing scientific vocabulary; record and present findings and conclusions using a variety of strategies and appropriate scientific vocabulary).
- d. **Identify or generate a question or problem to be explored** (for example, students will ask questions or show curiosity about the natural and physical environment; ask questions or identify problems that may lead to investigations; pose questions and define problems that will facilitate effective investigations or inquiries).
- e. **Plan and carry out systematic investigations, manipulating variables as necessary** (for example, students will identify variables; collect information and data from a range of sources; suggest approaches and methods for solving problems; identify one or two variables relevant to an



investigation; recognize the way in which an experiment is unfair if the relevant variables are not controlled; reflect on methods used in investigations and their effectiveness).

f. **Make and test predictions** (for example, students will observe similarities and differences; guess and suggest what will happen next in structured situations; based on prior learning and/or observations, suggest outcomes of an investigation; make justified predictions; propose ideas or simple theories that may be explored or tested).

g. **Interpret and evaluate data gathered in order to draw conclusions** (for example, students will sort and classify according to observable features or selected criteria; look for and recognize patterns in observations; compare results of different investigations; interpret information and offer explanations).

h. **Consider scientific models and applications of these models** (including their limitations) (for example, students will share findings with peers informally; represent findings using pictures and models; reflect on and build upon their own current scientific theories and applications; apply scientific knowledge to reconstruct or refine their understandings of the physical, chemical and biological worlds; assess their understanding in light of new data or reconsideration of existing data).

Overall expectations in Science 3-5 years

Students will develop their observational skills by using their senses to gather and record information, and they will use their observations to identify simple patterns, make predictions and discuss their ideas. They will explore the way objects and phenomena function, and will recognize basic cause and effect relationships. Students will examine change over varying time periods and know that different variables and conditions may affect change. They will be aware of different perspectives, and they will show care and respect for themselves, other living things and the environment. Students will communicate their ideas or provide explanations using their own scientific experience and vocabulary.



Overall expectations in Science 5-7 years

Students will develop their observational skills by using their senses to gather and record information, and they will use their observations to identify patterns, make predictions and refine their ideas. They will explore the way objects and phenomena function, identify parts of a system, and gain an understanding of cause and effect relationships. Students will examine change over varying time periods, and will recognize that more than one variable may affect change. They will be aware of different perspectives and ways of organizing the world, and they will show care and respect for themselves, other living things and the environment. Students will communicate their ideas or provide explanations using their own scientific experience.

Overall expectations in Science 7-9 years

Students will develop their observational skills by using their senses and selected observational tools. They will gather and record observed information in a number of ways, and they will reflect on these findings to identify patterns or connections, make predictions, and test and refine their ideas with increasing accuracy. Students will explore the way objects and phenomena function, identify parts of a system, and gain an understanding of increasingly complex cause and effect relationships. They will examine change over time, and will recognize that change may be affected by one or more variables. They will examine how products and tools have been developed through the application of science concepts. They will be aware of different perspectives and ways of organizing the world, and they will be able to consider how these views and customs may have been formulated. Students will consider ethical issues in science-related contexts and use their learning in science to plan thoughtful and realistic action in order to improve their welfare and that of other living things and the environment. Students will communicate their ideas or provide explanations using their own scientific experience and that of others.

Overall expectations in Science 9-12 years

Students will develop their observational skills by using their senses and selected observational tools. They will gather and record observed information in a number of ways, and they will reflect on these findings to identify patterns or connections, make predictions, and test and refine their ideas with increasing accuracy. Students will explore the way objects and phenomena function, identify parts of a system, and gain an understanding of increasingly complex cause and effect relationships. They will examine change over time, and they will recognize that change may be affected by one or more variables. Students will reflect on the impact that the application of science, including advances in technology, has had on themselves, society and the environment. They will be aware of different perspectives and ways of organizing the world, and they will be able to consider how these views and customs may have been formulated. Students will examine ethical and social issues in science-related contexts and express their responses appropriately. They will use their learning in science to plan thoughtful and realistic action in order to improve their welfare and that of other living things and the environment. Students will communicate their ideas or provide explanations using their own scientific experience and that of others.

Phase 1	Students will develop their observational skills by using their senses to gather and record information, and they will use their observations to identify simple patterns, make predictions and discuss their ideas. They will explore the way objects and phenomena function, and will recognize basic cause and effect relationships. Students will examine change over varying time periods and know that different variables and conditions may affect change. They will be aware of different perspectives, and they will show care and respect for themselves, other living things and the environment. Students will communicate their ideas or provide explanations using their own scientific experience and vocabulary.
Phase 2	Students will develop their observational skills by using their senses to gather and record information, and they will use their observations to identify patterns, make predictions and refine their ideas. They will explore the way objects and phenomena function, identify parts of a system, and gain an understanding of cause and effect relationships. Students will examine change over varying time periods, and will recognize that more than one variable may affect change. They will be aware of different perspectives and ways of organizing the world, and they will show care and respect for themselves, other living things and the environment. Students will communicate their ideas or provide explanations using their own scientific experience.
Phase 3	Students will develop their observational skills by using their senses and selected observational tools. They will gather and record observed information in a number of ways, and they will reflect on these findings to identify patterns or connections, make predictions, and test and refine their ideas with increasing accuracy. Students will explore the way objects and phenomena function, identify parts of a system, and gain

	<p>an understanding of increasingly complex cause and effect relationships. They will examine change over time, and will recognize that change may be affected by one or more variables. They will examine how products and tools have been developed through the application of science concepts. They will be aware of different perspectives and ways of organizing the world, and they will be able to consider how these views and customs may have been formulated. Students will consider ethical issues in science-related contexts and use their learning in science to plan thoughtful and realistic action in order to improve their welfare and that of other living things and the environment. Students will communicate their ideas or provide explanations using their own scientific experience and that of others.</p>
Phase 4	<p>Students will develop their observational skills by using their senses and selected observational tools. They will gather and record observed information in a number of ways, and they will reflect on these findings to identify patterns or connections, make predictions, and test and refine their ideas with increasing accuracy. Students will explore the way objects and phenomena function, identify parts of a system, and gain an understanding of increasingly complex cause and effect relationships. They will examine change over time, and they will recognize that change may be affected by one or more variables. Students will reflect on the impact that the application of science, including advances in technology, has had on themselves, society and the environment. They will be aware of different perspectives and ways of organizing the world, and they will be able to consider how these views and customs may have been formulated. Students will examine ethical and social issues in science-related contexts and express their responses appropriately. They will use their learning in science to plan thoughtful and realistic action in order to improve their welfare and that of other living things and the environment. Students will communicate their ideas or provide explanations using their own scientific experience and that of others.</p>

IICS aims to make learning personalized for students while maintaining a rich and challenging scientific curriculum. Therefore, it is useful to incorporate aspects of the differentiated instruction framework of learning objectives to indicate a range of possible outcomes to meet the diverse needs of students.

The following table offers a possible grouping of learning indicators to represent a progressive depth of study from grade level to grade level. The terms are the MYP command terms to help foster a smooth transition from the PYP to the MYP (see Appendix 1). For example, “recall” is indicative of less depth of study and is classified as “know” and “analyse” is classified as understand as it indicates a deeper level of study. Furthermore, some command terms are repeated, e.g. “present” may indicate a deeper level of study in Phases 1 or 2 but less so in Phases 3 or 4.

Know	Understand
<i>Examples:</i> definitions, facts, classifications, similarities, differences, equations and formulae	<i>Examples:</i> concepts, patterns, changes, cause and effect, influences, perspectives, and relationships
<p><i>Command terms:</i></p> <ul style="list-style-type: none"> Recall State Document Define Identify Select Interpret Outline Compare Contrast Present Summarize 	<p><i>Command terms:</i></p> <ul style="list-style-type: none"> Compare Contrast Present Design Analyse Apply Discuss Formulate Interpret Explain Solve Suggest Summarize

Strand: Living Things

The study of the characteristics, systems and behaviours of humans and other animals, and of plants; the interactions and relationships between and among them, and with their environment.

Related concepts: adaptation, animals, biodiversity, biology, classification, conservation, ecosystems, evolution, genetics, growth, habitat, homeostasis, organism, plants, systems (digestive, nervous, reproductive, respiratory).

Related Concept	Phase 1 (EY 3 to EY 5)	Phase 2 (G1 to G2)	Phase 3 (G3 to G4)	Phase (G5 to G6)
Plants and Animals	<p>The students will know: Living things and nonliving things can be categorized.</p> <p>Nonliving things do not live and thrive.</p> <p>Nonliving things can be human-created or naturally occurring.</p> <p>Living things grow and change.</p> <p>The students will understand that: Organisms have needs in order to grow and change (air, water, light, food).</p> <p>Plants have different structures (roots, leaves, stems, seeds).</p>	<p>The students will know: We can observe, describe and compare a variety of common animals that are carnivores, herbivores, and omnivores.</p> <p>Identify some factors in the local environment that are needed by plants and animals for survival.</p> <p>The students will understand that: Living things play a role in a habitat, e.g. plants as producers and micro-organisms as decomposers.</p> <p>There is an interdependency between plants and animals, i.e. food webs, food chain.</p> <p>There are various relationships between living things, eg predator-prey, competitors and mutually beneficial relationships.</p>	<p>The students will know: The structures and functions of different parts of plants (roots, leaves, flowers).</p> <p>Animals need the right nutrition to survive.</p> <p>The traits of living things are both inherited (color of flowers, eye color) and learned or acquired (riding a bicycle, having scars).</p> <p>The students will understand that: Plants convert the sun's energy through photosynthesis turning it into a different form of energy (chemical) that is useful to plants humans and animals.</p> <p>There are many processes that allow plants to live and grow (the life cycle of plants, how they take in nutrients, photosynthesis, breathe, reproduce, and eliminate waste).</p>	<p>The students will know: Obtaining nutrients is a life process that varies from organism to organism (e.g. some animals, like humans, have digestive systems; others, such as coral, absorb food directly from water).</p> <p>Organisms are made of cells and this forms the basis of all living things</p> <p>Some cells need to be replaced (e.g. blood cells, skin cells).</p> <p>The students will understand that: Some cells perform specific functions (e.g. red blood cells carry oxygen around the body; chloroplasts in leaves in plants carry out photosynthesis).</p> <p>Organisms have adaptations that enable them to survive in changing environments (e.g. marine fish have special cells that detect salt levels and actively pump excess salt out of their bodies and trees have leaves for making food and roots for absorbing nutrients).</p> <p>Scientific classification of organisms can be based on their features (e.g. the difference between</p>

				flowering plants and trees in terms of root systems, stems and leaves) and they allow us to compare the similarities and differences within a group (e.g. mammals are comprised of three groups: placental, marsupial and monotremes; all are warm blooded but each has a different way of producing offspring).
Adaptation	<p>The students will know: Animals have different features: wings, le.g.s, ears, nose, tongue, skin.</p> <p>Living things have offspring and the offspring closely resembles its parents: e.g. Dogs /puppies.</p> <p>The students will understand that: Animal behaviors are influenced by environmental conditions (nest building, hibernation, migration).</p>	<p>The students will know: There are different specific structures play a role in enabling plants to live and thrive (e.g. roots, leaves, stems, flowers, seeds).</p> <p>There are different features play a role in enabling animals to live and thrive: wings, le.g.s, fins, eyes, nose, ears, tongue, skin, claws, etc.</p> <p>There are animals, not living now, that used to live in the past.</p> <p>Fossils provide us with evidence of extinct life that existed on Earth.</p> <p>Plants and animals have life cycles with different stages (e.g. the life cycle of a butterfly, frog or flower).</p> <p>The students will understand that: It is possible to predict the effect of natural changes in the environment on some relationships between plants and animals, e.g. drought and fire.</p> <p>Living things display behaviours that enable them to live (e.g. reptiles bask in the sun, nocturnal animals avoid predators in the heat of the day).</p> <p>Variations within a species cause certain individuals to have an advantage in surviving and reproducing.</p>	<p>The students will know: The traits of living things are both inherited (color of flowers, eye color) and learned or acquired (riding a bicycle, having scars). *This is repeated from above.</p> <p>The students will understand that: Plants adapt to survive (changes in size, shape, thickness, colour, smell, and texture).</p> <p>Animals adapt to environmental changes (e.g. heart rate, eye blinking, shivering) and season changes (e.g. hibernation and migration).</p>	<p>The students will know: There are effects of diseases, poisons, climate change and environmental conditions on organisms.</p> <p>Characteristics of offspring can come from one or both parents (e.g. eye or hair colour).</p> <p>The students will understand that: Organisms respond to changes in the external environment (e.g. changes in temperature, algal blooms caused by nutrient run-off into wetlands) and the application of science to rectify some of these resulting problems.</p> <p>The body defends itself against diseases and there are various ways how vaccines can provide protection.</p>
Ecosystems	<p>The students will know: Living things live in different</p>	<p>The students will know: There are scientific terms to describe one's</p>	<p>The students will know: Ecosystems can consist of many habitats of living</p>	<p>The students will know: Survival of organisms in an environment is</p>

	<p>places where their needs are met.</p> <p>The students will understand that: Plants respond to changes in the environment including seasonal changes (e.g. flowers forming, leaves falling).</p>	<p>role in food chains: producers, consumers, predators, and decomposers.</p> <p>The students will understand that: Different organisms have different roles in food chains (producers, consumers, predators, or decomposers) based upon the role they serve in the ecosystem (food chains, food web, and competition for resources).</p>	<p>things that can be very different.</p> <p>An ecosystem is a community of organisms and non-living environment. Biodiversity relies on a sustainable ecosystem.</p> <p>The students will understand that: Humans cause a variety of impacts on natural systems both positive and negative, which may affect the quality of life (e.g. over-fertilising gardens can run off into waterways and cause algal bloom in rivers, which affects aquatic life; land clearing removes habitat; Indigenous land care practices).</p> <p>When elements of an ecosystem disappear, or new elements are introduced, the whole ecosystem can be affected (e.g. a river drying up or the introduction of feral predators like foxes).</p>	<p>dependent on how well they are adapted to their environment (e.g. insects with better camouflage are less likely to be seen and eaten).</p> <p>The students will understand that: Organisms may adopt different strategies and lifestyles to survive, and there may be advantages and disadvantages of these (e.g. solitary).</p> <p>There are local and global strategies for conservation (e.g. planting native plants to attract bird life; removal of weeds from wetlands).</p> <p>There are strategies for conservation and regeneration of disturbed natural environments (e.g. tree planting may reduce salinity and stop soil erosion on farms).</p>
Human Body and Reproduction	<p>The students will know: Our senses help us understand the world around us.</p> <p>The students will understand that: Humans systems in our body have different functions (the digestive system, the circulatory system, the skeletal system).</p> <p>Healthy balanced choices have a positive effect on our body systems.</p>	<p>The students will know: Making healthy choices contributes to a healthy body.</p> <p>The students will understand that: Leading a healthy lifestyle depends on the action we take.</p> <p>Humans need to take action in a range of fields to achieve a healthy lifestyle.</p>	<p>The students will know: Humans have skeletons to support the body and muscles for the body's movement.</p> <p>Humans have different types of teeth for different functions which are part of the basic human digestive system.</p> <p>The students will understand that: Humans need the right types and amount of nutrition.</p> <p>Humans have skeletons and muscles for support, protection and movement.</p>	<p>The students will know: There are different structures in the reproductive systems of males and females.</p> <p>There are different functions to the structures in the reproductive systems of males and females.</p> <p>Bodies change during puberty in the adolescent years.</p> <p>A body's changes can be seen in many ways during puberty (e.g. menstruation begins, hair under arms, pubic hair seen, voices change, etc.).</p> <p>The students will understand that: Hormones play a role in the body's changes during puberty.</p> <p>Babies are conceived via fertilization of an egg by sperm.</p> <p>It is important to regularly monitor health and enjoy a high quality of life.</p>

Strand: Forces and Energy

The study of energy, its origins, storage and transfer, and the work it can do; the study of forces; the application of scientific understanding through inventions and machines.

Related concepts: conservation of energy, efficiency, equilibrium, forms of energy (electricity, heat, kinetic, light, potential, sound), magnetism, mechanics, physics, pollution, power, technological advances, transformation of energy.

Related Concept	Phase 1 (EY 3 to EY 5)	Phase 2 (G1 to G2)	Phase 3 (G3 to G4)	Phase (G5 to G6)
Energy	<p>The students will know: Light is essential for seeing things; there are many sources of light.</p> <p>Darkness is the absence of light; when it is dark other senses can be used to help us find things and identify things.</p> <p>Light can be blocked by objects to create shadows.</p> <p>The students will understand that: The Sun is the source of light and heat for Earth.</p> <p>Energy is required for different purposes in everyday life (heating, cooling, light).</p>	<p>The students will know: Some forms of energy are evident at home and at school (<i>e.g. light, sound and heat</i>).</p> <p>Energy use changes over the day.</p> <p>The students will understand that: Energy is used in everything that people do (<i>e.g. an oven needs to be hot enough to cook food; a car needs petrol or it will stop</i>).</p> <p>Energy has various effects on the body. (<i>e.g. effects of the Sun, eating food</i>).</p>	<p>The students will know: The Sun is the centre of the solar system and it is the main source of energy for all life on Earth.</p> <p>Shadows and coloured lights can be used to explore reflections.</p> <p>Sound and electricity are forms of energy.</p> <p>Sound is created by vibrations.</p> <p>A change in vibration causes a change in pitch and volume.</p> <p>Common appliances run on electrical energy.</p> <p>Materials can be classified as conductors or insulators.</p> <p>A conductor is a material that transfers heat easily and allows electricity to flow easily.</p> <p>An insulator is a material that does not transfer heat easily and allows electricity to flow easily.</p>	<p>The students will know: Energy sources can be classified as renewable and non-renewable</p> <p>Various renewable and non-renewable energies are used in different situations.</p> <p>Energy types can be classified as potential (stored) or kinetic (moving).</p> <p>Energy can be changed from one form to another (transformed) (<i>e.g. a burning candle produces light, movement and heat</i>).</p> <p>Factors that affect energy transfers (<i>e.g. insulators, friction</i>).</p> <p>Energy transfers can be represented as flow diagrams (<i>e.g. electrical → movement → sound</i>).</p> <p>Energy transfer of heat can take the form of convection, conduction and radiation.</p> <p>Echoes occur when sounds are reflected by hard surfaces (reverberation).</p> <p>The students will understand that: Energy transfers and changes can be affected by a number of factors (<i>e.g. the brightness of globes is</i></p>

			<p>The students will understand that: Energy from the sun can be both helpful and harmful.</p> <p>The medium that sound travels through influences how it reaches the ear.</p> <p>An electrical circuit consists of cells, wires, bulbs, switches (and possibly buzzers and switches) and a complete loop is required to close the circuit to allow electricity to flow.</p>	<p><i>affected by the number of batteries, or type of globes and how they are connected</i></p> <p>It is important to consider societal issues related to renewable and non-renewable energy resources including their short-term and long-term uses and implications.</p> <p>Some materials absorb/reflect sound more readily than others while other materials transmit sound (<i>e.g. curtains and carpets in a movie theatre absorb sound whilst wooden floors reflect sound</i>).</p> <p>Effects of energy used in a simple system (<i>e.g. adding extra light globes in a simple circuit may change the brightness of a globe</i>).</p> <p>Energy can transfer over distances (<i>e.g. waves can carry energy over long distances; strength of magnetic attraction is affected by distance; sunlight and heat travel from the Sun</i>).</p> <p>Movements (vibrations) are associated with the production of sound (<i>e.g. altering the vibration in a musical instrument can alter the pitch or loudness of a sound</i>).</p>
Forces	<p>The students will know: Objects can move in different ways (a ball being pushed, a ball rolling down).</p> <p>People and animals move in different ways (hopping, swimming, flying, climbing).</p> <p>The students will understand that: Energy has an effect on what happens to objects e.g. movement, changes in properties, changes in matter (wind moving a weather vane, magnets moving steel).</p>	<p>The students will know: Types of simple machines (lever, screw, inclined plane, wedge, pulleys, wheels and axles).</p> <p>Gravity is force which affects everything we do.</p> <p>Force can be applied in different ways (push, pull, turn etc).</p> <p>Identify examples of simple machines at work at home and in the community.</p> <p>Simple machines makes tasks easier to do.</p> <p>The students will understand that: Adjusting the position of the fulcrum applied force and load can change how well a machine works.</p>	<p>The students will know: Forces can move in different directions (<i>e.g. boats, gravity pushes down but buoyancy is pushing a boat up</i>).</p> <p>The students will understand that: Effects of forces on an object can be shown by change of movement, changes in shape or direction (<i>e.g. pushing and pulling, twisting and squeezing</i>).</p>	

		Newton's 2nd Law states that the greater the force of an object, the greater the change in motion; a larger force has a greater effect on an object and a smaller force has less effect on the same object.		
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Strand: Materials and Matter

The study of the properties, behaviours and uses of materials, both natural and human-made; the origins of human-made materials and how they are manipulated to suit a purpose.

Related concepts: changes of state, chemical and physical changes, conduction and convection, density, gases, liquids, properties and uses of materials, solids, structures, sustainability.

Related Concept	Phase 1 (EY 3 to EY 5)	Phase 2 (G1 to G2)	Phase 3 (G3 to G4)	Phase 4(G5 to G6)
Phases of matter (solids, liquids, gases)	<p>The students will know: Our senses help us investigate water e.g. colour – sight, baby bath – smell, hot/cold – touch, bottled water – taste.</p> <p>Evaporation is the process of water becoming a vapor (can be seen by painting with water on warm bricks).</p> <p>Solids have a definite shape and a definite volume.</p> <p>Liquids flow and have therefore can have a different shape, but have a definite volume (can be seen by children building pipe systems and water flow devices).</p> <p>Temperature changes on water can have an effect (freezing and melting).</p> <p>The students will understand that:</p>		<p>The students will know: The states of matter are solids, liquids, and gases (possibly include plasma).</p> <p>Scientists use a range of equipment to accurately observe, measure and describe changes.</p> <p>Matter is something that has mass and volume.</p> <p>Heat can be transferred in three ways: radiation, convection, and conduction</p> <p>The students will understand that: Solids have definite shape and definite volume, liquids have definite volume but varying shapes, and gases have varying shapes and varying volumes.</p> <p>Heat energy is involved in phase changes.</p>	<p>The students will know: There are properties of materials and different ways in which they can be used when constructing real-life objects (<i>e.g. materials that would be strong enough for building bridges</i>).</p> <p>The students will understand that: Reaction rates can be controlled (rate of change) (<i>e.g. heating, cooling</i>).</p> <p>Materials may change at each stage in industrial processes of common materials (<i>e.g. paper from wood; aluminium cans from bauxite</i>).</p>

	<p>Shape and density play a role in floating and sinking (buoyancy).</p> <p>Porous objects can float and sink, be submerged, and hold different amounts of water.</p>			
<p>Properties and uses of material</p> <p>Changes of state, chemical</p> <p>Physical changes</p>	<p>The students will know: Materials have different properties, to be used for different purposes.</p> <p>Recognize the effects of heating and cooling, and identify methods for heating and cooling.</p> <p>Materials and objects can be grouped according to different features (solid, liquid, gas).</p> <p>Everyday materials can change state (e.g. ice cream melting; dissolving sugar in water, cooking).</p> <p>The students will understand that: Materials can be recycled, re-used, reduced in a variety of ways.</p> <p>Different properties of materials make them suitable for certain structures in different types of construction play--natural/man-made/ insulation/ waterproofing.</p> <p>The construction of an object determines the task it can perform e.g make a truck that will carry some animals, a chair for teddy.</p>	<p>The students will know: Water changes when it is exposed to different temperatures.</p> <p>Scientists use tools such as thermometers, hand lenses, measuring containers to observe and measure how water undergoes changes.</p> <p>Changes in materials can be fast or slow (e.g. toasting bread is fast, rust in metals is slow).</p> <p>The students will understand that: Evaporation and condensation play a role in the water cycle.</p> <p>Materials can be changed and this alters their appearance (e.g. leaving chocolate in the sun; heating popcorn changes the shape, size, taste and texture).</p>		<p>The students will know: Physical changes in matter are changes that are reversible (e.g., a melted ice cube can be refrozen; a bottle of frozen water can be thawed to a liquid state again; water vapour that has condensed on a cold window can evaporate into a vaporous state again; water from a puddle that has evaporated will fall to the ground as rain).</p> <p>The students will understand that: Chemical changes result in the formation of new substances and are very difficult to reverse (e.g. rust, burning).</p> <p>Adding materials such as alloys in metals, can result in the new material having different properties (e.g. harder, stronger, more resistant to rust).</p>

Strand: Earth and Space

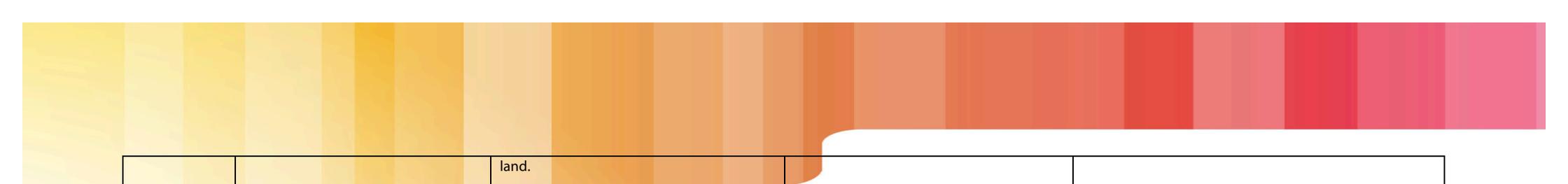
The study of planet Earth and its position in the universe, particularly its relationship with the sun; the natural phenomena and systems that shape the planet and the distinctive features that identify it; the infinite and finite resources of the planet.

Related concepts: atmosphere, climate, erosion, evidence, geography, geology, gravity, renewable and non-renewable energy sources, resources, seasons, space, sustainability, systems (solar, water cycle, weather), tectonic plate movement, theory of origin.

Related Concept	Phase 1 (EY 3 to EY 5)	Phase 2 (G1 to G2)	Phase 3 (G3 to G4)	Phase (G5 to G6)
Space	<p>The students will know: Observable changes occur in the sky and landscape.</p> <p>how to describe personal observations using vocabulary such as night, day, sun, and moon</p> <p>The sun can be seen only in the daytime, but the moon can be seen sometimes at night and sometimes during the day.</p> <p>The students will understand that: Earth's rotation results in features of day and night.</p>	<p>The students will know: The features of the Sun and planets that make up the Solar System <i>(e.g. numbers of moons some planets have; orbits of planets around the Sun, size and location of the planets)</i></p> <p>The Sun is the centre of the solar system and it is the main source of energy for all life on Earth.</p> <p>The students will understand that: The earth's movement around its axis and around the sun causes changes we can recognise and predict.(e.g. shadows, sunrise/sunset, day/night, the seasons, phases of the moon)</p> <p>The features of the Sun and planets make up the Solar System <i>(e.g. numbers of moons some planets have; orbits of planets around the Sun, size and location of the planets).</i></p> <p>The Sun is the centre of the solar system and it is the main source of energy for all life on Earth.</p>	<p>The students will know: Similarities and differences between Earth, the other planets and the Sun in the Solar System <i>(e.g. Venus and Earth are similar in size but we cannot live on Venus due to poisonous gases)</i></p> <p>The planets' size relative to the Earth and their position relative to the Sun</p> <p>The mass is the amount of matter in an object, that weight is the force of gravity on the mass of an object, and that the force of gravity varies from planet to planet</p> <p>The students will understand that: Technological developments that enable astronauts to meet their basic needs in space; including Examples: dehydrated foods, backpacks with an oxygen supply, hermetically sealed cabins with temperature and air controls.</p> <p>Technological devices placed in space help humans learn more about space exploration and communicate more efficiently; including the collaborative efforts of nations to build, maintain and</p>	<p>The students will know: eclipses, regular patterns of day and night, seasons and the position of the Sun at different times of the year</p> <p>how lunar and solar cycles can affect us <i>(e.g. tides and ultraviolet [UV] index)</i></p> <p>scientists can predict the movements of comets, asteroids <i>(e.g. records of Halley's Comet can precisely predict when it will pass the Earth next)</i></p> <p>The students will understand that: the effects of the tilt of the Earth on its axis <i>(e.g. the tilt of the axis creates the seasons and our proximity to the Sun at different times of the year)</i></p> <p>the gravity of other bodies in the Solar System influences the Sun, the Moon and the Earth</p> <p>it is important to evaluate positive and negative impacts arising from space research programs. Examples: advantages — increased knowledge about space and medicine, the development of technologies such as orange drink crystals and pocket calculators; disadvantages — space pollution and the high cost of research projects..</p>

			use the International Space Station. Examples: communication and remote sensing satellites.	
Weather	<p>The students will know: Compare temperatures at night, during the day, inside, outside and in the sun and shade.</p> <p>The characteristics of the weather (e.g. sunny, rainy, cold, hot, windy).</p> <p>The students will understand that: Daily and seasonal changes in our environment, including the weather, affect everyday life (such as clothing choices).</p>	<p>The students will know: The sun's position, and the moon's appearance is relative to time of day and month</p> <p>Specific weather conditions occur during each season.</p> <p>Warm air rises, cool air sinks, and convection currents are created by this movement of air, which influences weather.</p> <p>The students will understand that: Water, wind and other weather patterns can affect features of the environment and can impact upon people (e.g. rain can flood and cause erosion, sand can be blown or washed away from beaches during storms)</p>	<p>The students will know: Weather can be recorded using scientific equipment data throughout the year (e.g., thermometers, anemometers, wind vanes, and rain gauges.)</p> <p>Cloud types and different weather patterns (e.g. <i>nimbostratus</i> → rain)</p> <p>Severe weather patterns (e.g. <i>storms in summer can be different to winter storms</i>)</p> <p>The students will understand that: Evaporation and condensation play a part in the water cycle and are influenced by temperature</p> <p>Annual rainfall can vary and impacts an environment (e.g. <i>reduced rainfall can result in changes in vegetation, water-table levels, river levels, water usage and drought</i>)</p> <p>There are global implications for climate change (e.g. <i>extended periods of reduced rainfall can result in droughts</i>).</p>	
Water Cycle	<p>The students will know: Evaporation is the process of water becoming a vapor (can be seen by painting with water on warm bricks).</p> <p>The students will understand that: water exists in different forms in different places in the environment and goes through a repeated pattern of changes, i.e. it goes through a cycle.</p>	<p>The students will know: The water cycle and related vocabulary: evaporation, precipitation, condensation.</p> <p>Water is important in everyday life (e.g. water is used for drinking, washing people, watering plants).</p> <p>The natural and man-made environment have different features; some of which are included in the natural or local environment (e.g. a house is built but a tree occurs naturally; rocks can be used in built</p>		

		<p>features and also found in rivers and the natural environment).</p> <p>The students will understand that: Some resources are vital for animals and plants to live (e.g. water, mix paints, water the garden, drinking).</p> <p>Water pollution has an impact on Earth's water resources.</p> <p>There are different ways to care for the environment (e.g. riding bikes on bike tracks and not through bush or garden areas, playgrounds have bins for litter).</p>		
Composting GEOLOGY & TECTONIC PLATE MOVEMENT	<p>The students will know: Organisms break down waste in a natural process called composting.</p> <p>There are wide variety of natural landforms on Earth.</p>	<p>The students will know: There are basic properties and components of soil: living components and nonliving components.</p> <p>Soil can be classified according to: texture, materials, capacity to retain water.</p> <p>The Earth's internal structure consists of the core, mantle and crust.</p> <p>Fossils are formed when things that have lived are trapped within sedimentary rock.</p> <p>Non-living things can be human-created or naturally occurring.</p> <p>The local environment is made up of natural and man-made features (e.g. a house is built but a tree occurs naturally: rocks can be used in built features and also found in rivers and the natural environment)</p> <p>The students will understand that: Erosion and deposition are the result of interactions between air, wind, water, and</p>		<p>The students will know: The earth's crust is made of pieces called tectonic plates that fit together like pieces of a puzzle.</p> <p>The tectonic plates move based upon their composition and because of convection currents creating different landforms (i.e. in subduction zones causing mountains or rifts causing mid-ocean ridges or rift valleys).</p> <p>The supercontinent, Pangea, has changed into our current arrangement of continents).</p> <p>The students will understand that: Evidence of movement of the Earth's crust can be seen in changes in rock strata (e.g. older rocks are on the bottom, younger rocks are on the top).</p> <p>Fossils of the same species on different continents provide evidence of plate tectonics and continental drift.</p>



		<p>land.</p> <p>Different geological processes lead to specific rock types.</p> <p>Rocks have different properties according to how they were formed which can be recognised and compared (e.g. size, shape, color, presence of fossils, luster, texture, patterns, hardness/softness).</p>		
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Appendix 1: MYP Command Terms

Term	Definition
Analyse	Break down in order to bring out the essential elements or structure. To identify parts and relationships, and to interpret information to reach conclusions.
Apply	Use knowledge and understanding in response to a given situation or real circumstances
Describe	Give a detailed account or picture of a situation, event, pattern or process
Design	Produce a plan, simulation or model
Discuss	Offer a considered and balanced review that includes a range of arguments, factors or hypotheses. Opinions or conclusions should be presented clearly and supported by appropriate evidence
Document	Credit sources of information used by referencing (or citing), following one recognized referencing system. References should be included in the text and also at the end of the piece of work in a reference list or bibliography
Evaluate	Make an appraisal by weighing up the strengths and limitations
Explain	Give a clear account, including causes and reasons or mechanisms
Formulate	Express precisely and systematically the relevant concept(s) or argument(s)
Interpret	Use knowledge and understanding to recognize trends and draw conclusions from given information
Outline	Give a brief account
Present	Offer for display, observation, examination or consideration
Recall	Remember or recognize from prior learning experiences
Select	Choose from a list or group
Solve	Obtain the answer(s) using appropriate methods
State	Give a specific name, value or other brief answer without explanation or calculation
Suggest	Propose a solution, hypothesis or other possible answer
Summarize	Abstract a general theme or major point(s)