

ISC Programme of Inquiry

Adapted from the *Primary Years Programme Science scope and sequence*. Publication. Cardiff: IBO, 2008. Print.

The following document seeks to lay out the minimum requirement to be taught in POI for each grade level in each of the areas of social studies and science. During the construction of this Curriculum Document every effort has been made to ensure the alignment all the elements of the Austrian National Curriculum and the IB PYP Science and Social Studies Scope and Sequences.

The knowledge components of science in the PYP is arranged into four strands as shown below.

Science strands	
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.
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.
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.
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.

All teaching and learning provides the opportunity to utilize and develop the transdisciplinary skills identified in *Making the PYP happen: A curriculum framework for international primary education (2007)*. In addition to these, 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.

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).

The scope and sequence document contains the following.

For each age range:

- overall expectations by age range.

For each unit selected from the PYP sample programme of inquiry:

- transdisciplinary theme
- central idea
- key concepts and related concepts
- lines of inquiry.

Specific reference to subject area knowledge and skills:

- knowledge strands for science
- subject-specific skills for science
- possible learning outcomes for each unit of inquiry
- cross-reference to social studies scope and sequence document (where appropriate).

At the start of each age range, the overall expectations provide broad, summative descriptions of what a PYP student could have achieved in science by the end of each age range. The possible learning outcomes in the tables that follow are an extension of these overall expectations and relate directly to the units of inquiry from the PYP programme of inquiry.

Overall expectations in science PYP 1 (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.

Learning will include the development of the following knowledge, concepts and skills		Possible learning outcomes in science
<p>Transdisciplinary theme Who we are An inquiry into the nature of the self; beliefs and values; personal, physical, mental, social and spiritual health; human relationships including families, friends, communities, and cultures; rights and responsibilities; what it means to be human.</p> <p>Central idea Our senses allow us to better understand ourselves and the world around us.</p> <p>Key concepts</p> <ul style="list-style-type: none"> • Function • Connection • Perspective <p>Related concepts</p> <ul style="list-style-type: none"> • subjectivity • perception <p>Lines of inquiry</p> <ul style="list-style-type: none"> • How senses work • How senses and feelings are connected • How perceptions can differ among people 	<p>Science strand (s) Living things</p> <p>Science skills (The skills that are easier to teach and observe are marked in bold text)</p> <p>a. Observe carefully in order to gather data</p> <p>b. Use a variety of instruments and tools to measure data accurately</p> <p>c. Use scientific vocabulary to explain their observations and experiences</p> <p>d. Identify or generate a question or problem to be explored</p> <p>e. Plan and carry out systematic investigations, manipulating variables as necessary</p> <p>f. Make and test predictions</p> <p>g. Interpret and evaluate data gathered in order to draw conclusions</p> <p>h. Consider scientific models and applications of these models</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> • name the five senses • name a body part used for each sense • describe how each sense works • use one of the five senses, at a time, to discover the properties of objects in the environment • compare and contrast the different senses and its functions • understand and explain how the five senses are connected • demonstrate awareness of how to show responsibility in taking care of his/her sensory organs • understand that the senses help us to perceive the environment around us and that the perceptions can differ among people.

Learning will include the development of the following knowledge, concepts and skills		Possible learning outcomes in science
<p>Transdisciplinary theme How the world works An inquiry into the natural world and its laws; the interaction between the natural world (physical and biological) and human societies; how humans use their understanding of scientific principles; the impact of scientific and technological advances on society and on the environment.</p> <p>Central idea All living things go through a process of change</p> <p>Key concepts</p> <ul style="list-style-type: none"> ● Causation ● Change ● Connection <p>Related concepts</p> <ul style="list-style-type: none"> ● Cycles ● Transformations ● Similarities and differences <p>Lines of inquiry</p> <ul style="list-style-type: none"> ■ Patterns of growth ■ How living things change over their lifetime ■ Factors that can influence life cycles 	<p>Science strand (s) Living things</p> <p>Science skills (The skills that are easier to teach and observe are marked in bold text)</p> <p>a. Observe carefully in order to gather data</p> <p>b. Use a variety of instruments and tools to measure data accurately</p> <p>c. Use scientific vocabulary to explain their observations and experiences</p> <p>d. Identify or generate a question or problem to be explored</p> <p>e. Plan and carry out systematic investigations, manipulating variables as necessary</p> <p>f. Make and test predictions</p> <p>g. Interpret and evaluate data gathered in order to draw conclusions</p> <p>g. Interpret and evaluate data gathered in order to draw conclusions</p> <p>h. Consider scientific models and applications of these models</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> ● observe the life cycle of a plant and/or animal ● identify the common components of life cycles (birth, growth, maturity, death, reproduction) ● gather data based on the development of the living being observed to make and test predictions ● describe the life cycles of a variety of living beings (animals and plants) ● compare and contrast the life cycles of different living beings using appropriate scientific vocabulary ● understand and list factors that can influence life cycles.

Learning will include the development of the following knowledge, concepts and skills		Possible learning outcomes in science
<p>Transdisciplinary theme Sharing the planet An inquiry into rights and responsibilities in the struggle to share finite resources with other people and with other living things; communities and the relationships within and between them; access to equal opportunities; peace and conflict resolution.</p> <p>Central idea Water is essential to life, and is a limited resource for many people.</p> <p>Key concepts</p> <ul style="list-style-type: none"> • Function • Causation • Responsibility <p>Related concepts</p> <ul style="list-style-type: none"> • Consumption • Conservation • Distribution <p>Lines of inquiry</p> <ul style="list-style-type: none"> • How water is used in our community • Distribution and availability of usable water • The importance of water and its preservation 	<p>Science strand (s) Living things Earth and space</p> <p>Science skills (The skills that are easier to teach and observe are marked in bold text)</p> <p>a. Observe carefully in order to gather data</p> <p>b. Use a variety of instruments and tools to measure data accurately</p> <p>c. Use scientific vocabulary to explain their observations and experiences</p> <p>d. Identify or generate a question or problem to be explored</p> <p>e. Plan and carry out systematic investigations, manipulating variables as necessary</p> <p>f. Make and test predictions</p> <p>g. Interpret and evaluate data gathered in order to draw conclusions</p> <p>h. Consider scientific models and applications of these models (including their limitations)</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> • understand that water is essential for life but it is a limited resource • recognize that water exists in the air in different forms • explain the water cycle • recognize the impact of the sun on the availability of water • explain why fresh water is a limited resource • investigate how water is used in our community • analyse systems of water storage and usage, both natural and human-made in our community • list ways to conserve water
<p>Please note: this unit is also included in the social studies scope and sequence.</p>		

Overall expectations in science PYP 2 (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.

Learning will include the development of the following knowledge, concepts and skills		Possible learning outcomes in science
<p>Transdisciplinary theme Who we are An inquiry into the nature of the self; beliefs and values; personal, physical, mental, social and spiritual health; human relationships including families, friends, communities, and cultures; rights and responsibilities; what it means to be human.</p> <p>Central idea Systems in our bodies work together to keep us alive</p> <p>Key concepts</p> <ul style="list-style-type: none"> ● Form ● Function ● Connection ● Responsibility <p>Related concepts</p> <ul style="list-style-type: none"> ● Properties ● Systems ● Interdependence <p>Lines of inquiry</p> <ul style="list-style-type: none"> ● Organs in human body ● Body systems ● Ways to keep our bodies healthy and working together 	<p>Science strand (s) Living things</p> <p>Science skills (The skills that are easier to teach and observe are marked in bold text)</p> <p>a. Observe carefully in order to gather data</p> <p>b. Use a variety of instruments and tools to measure data accurately</p> <p>c. Use scientific vocabulary to explain their observations and experiences</p> <p>d. Identify or generate a question or problem to be explored</p> <p>e. Plan and carry out systematic investigations, manipulating variables as necessary</p> <p>f. Make and test predictions</p> <p>g. Interpret and evaluate data gathered in order to draw conclusions</p> <p>h. Consider scientific models and applications of these models</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> ● name all organs in the digestive, respiratory, and circulatory systems (mouth, nose, lungs, heart, veins, arteries, esophagus, stomach, liver, small intestine, large intestine, gall bladder, pancreas) ● describe and identify the function of all the organs listed above ● explain ways they can keep their bodies healthy with a special focus on foods and food groups, basic first aid, and making safe choices.

Learning will include the development of the following knowledge, concepts and skills		Possible learning outcomes in science
<p>Transdisciplinary theme How the world works An inquiry into the natural world and its laws; the interaction between the natural world (physical and biological) and human societies; how humans use their understanding of scientific principles; the impact of scientific and technological advances on society and on the environment.</p> <p>Central idea Materials and simple machines are selected based on their properties and functions</p> <p>Key concepts</p> <ul style="list-style-type: none"> ● form ● function ● causation ● connection <p>Related concepts</p> <ul style="list-style-type: none"> ● properties ● structure ● behaviour ● consequences ● cause and effect <p>Lines of inquiry</p> <ul style="list-style-type: none"> ● Forces ● Simple Machines ● Materials and their properties 	<p>Science strand (s) Materials and matter Forces and energy</p> <p>Science skills (The skills that are easier to teach and observe are marked in bold text)</p> <p>a. Observe carefully in order to gather data</p> <p>b. Use a variety of instruments and tools to measure data accurately</p> <p>c. Use scientific vocabulary to explain their observations and experiences</p> <p>d. Identify or generate a question or problem to be explored</p> <p>e. Plan and carry out systematic investigations, manipulating variables as necessary</p> <p>f. Make and test predictions</p> <p>g. Interpret and evaluate data gathered in order to draw conclusions</p> <p>h. Consider scientific models and applications of these models</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> ● apply the scientific method ● create and test a hypothesis using a “lab write-up” format ● use standard units of measure while conducting experiments ● interpret and evaluate the results of experiments ● use vocabulary related to forces, simple machines and materials (push, pull, gravity, friction, magnetism, sink and float, lever, pulley, screw, wedge, wheel and axle, inclined plane, wood, metal, plastic etc) ● describe materials using their properties (waterproof, absorbent, flexible, etc) ● apply their knowledge gained in class to solve real-life problems.

Learning will include the development of the following knowledge, concepts and skills		Possible learning outcomes in science
<p>Transdisciplinary theme Sharing the planet</p> <p>An inquiry into rights and responsibilities in the struggle to share finite resources with other people and with other living things; communities and the relationships within and between them; access to equal opportunities; peace and conflict resolution.</p> <p>Central idea Animals rely on their habitats and adaptations to survive</p> <p>Key concepts</p> <ul style="list-style-type: none"> ● Form ● Responsibility ● Reflection <p>Related concepts</p> <ul style="list-style-type: none"> ● Properties ● Similarities ● Differences ● Adaptations <p>Lines of inquiry</p> <ul style="list-style-type: none"> ● Animal adaptations ● Habitats ● Human activity and its effect on the environment 	<p>Science strand (s) Living things</p> <p>Science skills (The skills that are easier to teach and observe are marked in bold text)</p> <p>a. Observe carefully in order to gather data</p> <p>b. Use a variety of instruments and tools to measure data accurately</p> <p>c. Use scientific vocabulary to explain their observations and experiences</p> <p>d. Identify or generate a question or problem to be explored</p> <p>e. Plan and carry out systematic investigations, manipulating variables as necessary</p> <p>f. Interpret and evaluate data gathered in order to draw conclusions</p> <p>g. Interpret and evaluate data gathered in order to draw conclusions</p> <p>h. Consider scientific models and applications of these models</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> ● identify adaptations animals, and some plants, use to survive in their habitats ● identify and describe habitats in their own surroundings and in the world ● reflect on how an adaptation could be suitable in one habitat and not another ● examine the relationships between predators and their prey; and the consequences of a disrupted food web ● research and present their findings to a large audience with the intent to inspire others to take action.

Overall expectations in science PYP 3 (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.

Learning will include the development of the following knowledge, concepts and skills		Possible learning outcomes in science
<p>Transdisciplinary theme Who we are An inquiry into the nature of the self; beliefs and values; personal, physical, mental, social and spiritual health; human relationships including families, friends, communities, and cultures; rights and responsibilities; what it means to be human.</p> <p>Central idea The choices people make affect their health and well being.</p> <p>Key concepts</p> <ul style="list-style-type: none"> • Causation • Responsibility • Reflection <p>Related concepts</p> <ul style="list-style-type: none"> • Consequences • Initiative • Review <p>Lines of inquiry</p> <ul style="list-style-type: none"> • What it means to have a balanced lifestyle. • How the choices we make affect our health. • Different sources of information that help us make choices. 	<p>Science strand (s) Living things</p> <p>Science skills (The skills that are easier to teach and observe are marked in bold text)</p> <p>a. Observe carefully in order to gather data</p> <p>b. Use a variety of instruments and tools to measure data accurately</p> <p>c. Use scientific vocabulary to explain their observations and experiences</p> <p>d. Identify or generate a question or problem to be explored</p> <p>e. Plan and carry out systematic investigations, manipulating variables as necessary</p> <p>f. Make and test predictions</p> <p>g. Interpret and evaluate data gathered in order to draw conclusions</p> <p>h. Consider scientific models and applications of these models</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> • observe changes in living things. (ourselves) • use standard units of measurement (metres, centimetres, hours) • record data (food groups present in snacks, time slept,...) • ask questions or identify problems that may lead to investigations • collect information and data from a range of sources (books, web pages, videos) • suggest approaches and methods for solving problems (how can we improve in an area/element of health) • make justified predictions, for example: if we make a change in our lifestyle what do we think will happen? • interpret information and offer explanations. (Looking at snack and sleep data.)

Learning will include the development of the following knowledge, concepts and skills		Possible learning outcomes in science
<p>Transdisciplinary theme How the world works An inquiry into the natural world and its laws; the interaction between the natural world (physical and biological) and human societies; how humans use their understanding of scientific principles; the impact of scientific and technological advances on society and on the environment.</p> <p>Central idea Natural materials can undergo changes that may provide challenges and benefits for society and the environment</p> <p>Key concepts</p> <ul style="list-style-type: none"> • Form • Change • Connection <p>Related concepts</p> <ul style="list-style-type: none"> • Properties • Transformation • Independence <p>Lines of inquiry</p> <ul style="list-style-type: none"> • Materials can exist in different states • Conditions that cause reversible and irreversible changes in materials • How societies take advantage of the properties of materials 	<p>Science strand (s) Materials and matter</p> <p>Science skills (The skills that are easier to teach and observe are marked in bold text)</p> <p>a. Observe carefully in order to gather data</p> <p>b. Use a variety of instruments and tools to measure data accurately</p> <p>c. Use scientific vocabulary to explain their observations and experiences</p> <p>d. Identify or generate a question or problem to be explored</p> <p>e. Plan and carry out systematic investigations, manipulating variables as necessary</p> <p>f. Make and test predictions</p> <p>g. Interpret and evaluate data gathered in order to draw conclusions</p> <p>h. Consider scientific models and applications of these models</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> • students will examine objects to find out more about them (Solid, liquid, or gas) • observe that temperature affects states of matter • describe what is happening using an increasing scientific vocabulary (solid, liquid, gas, melt, evaporate, boil, condensation, freezing, sublimation, deposition) • students will ask questions or show curiosity about the natural and physical environment • collect information and data from a range of sources (Books, videos, web pages) • observe similarities and differences (categorise materials into their 3 states - solid, liquid, gas) • make predictions in structured situations (Carry out experiments) • sort and classify according to observable features or selected criteria • represent findings using pictures and models • explain the difference between reversible and irreversible changes • list examples of how society takes advantages of the properties of materials.

Learning will include the development of the following knowledge,	Possible learning outcomes in
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concepts and skills		science
<p>Transdisciplinary theme Sharing the planet</p> <p>An inquiry into rights and responsibilities in the struggle to share finite resources with other people and with other living things; communities and the relationships within and between them; access to equal opportunities; peace and conflict resolution.</p> <p>Central idea When interacting with natural habitats, humans make choice that have an impact on other living things</p> <p>Key concepts</p> <ul style="list-style-type: none"> • Causation • Change • Responsibility <p>Related concepts</p> <ul style="list-style-type: none"> • Impact • Adaptation • Conservation <p>Lines of inquiry</p> <ul style="list-style-type: none"> • Humans impact on natural habitats • Living things respond to changing environmental conditions • Rights and responsibilities when interacting with natural habitats. 	<p>Science strand (s) Living things</p> <p>Science skills (The skills that are easier to teach and observe are marked in bold text)</p> <p>a. Observe carefully in order to gather data</p> <p>b. Use a variety of instruments and tools to measure data accurately</p> <p>c. Use scientific vocabulary to explain their observations and experiences</p> <p>d. Identify or generate a question or problem to be explored</p> <p>e. Plan and carry out systematic investigations, manipulating variables as necessary</p> <p>f. Make and test predictions</p> <p>g. Interpret and evaluate data gathered in order to draw conclusions</p> <p>h. Consider scientific models and applications of these models</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> • record and present findings and conclusions using a variety of strategies and appropriate scientific vocabulary (Habitats, classification of animals, food chain/web, biodiversity) • pose questions and define problems that will facilitate effective investigations or inquiries • collect information and data from a range of sources (Books, web pages, videos, field trip) • interpret information and offer explanations. (Man’s impact on natural environments) • investigate positive and negative examples of human interaction on other living things (local and global)
<p>Please note: this unit is also included in the social studies scope and sequence.</p>		

Overall expectations in science PYP 4 (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.

Learning will include the development of the following knowledge, concepts and skills		Possible learning outcomes in science
<p>Transdisciplinary theme Who we are An inquiry into the nature of the self; beliefs and values; personal, physical, mental, social and spiritual health; human relationships including families, friends, communities, and cultures; rights and responsibilities; what it means to be human.</p> <p>Central idea The effective interactions between human body systems contribute to health and survival.</p> <p>Key concepts</p> <ul style="list-style-type: none"> • Causation • Connection • Responsibility <p>Related concepts</p> <ul style="list-style-type: none"> • Consequences • Impact • Systems • Interdependence <p>Lines of inquiry</p> <ul style="list-style-type: none"> • Body systems and how they work • How body systems are interdependent • Impact of lifestyle choices on the body 	<p>Science strand (s) Living things</p> <p>Science skills (The skills that are easier to teach and observe are marked in bold text)</p> <p>a. Observe carefully in order to gather data</p> <p>b. Use a variety of instruments and tools to measure data accurately</p> <p>c. Use scientific vocabulary to explain their observations and experiences</p> <p>d. Identify or generate a question or problem to be explored</p> <p>e. Plan and carry out systematic investigations, manipulating variables as necessary</p> <p>f. Make and test predictions</p> <p>g. Interpret and evaluate data gathered in order to draw conclusions</p> <p>h. Consider scientific models and applications of these models</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> • identify the main organs of the body systems (circulatory, respiratory, digestive, urinary, nervous and reproductive) • explain the function of the main organs of the systems mentioned above • explain how systems are interdependent and connected • recognize that food provide nutrients to the body • identify different nutrients, its importance and function (proteins, carbohydrates, fat, vitamins, minerals and water) • reflect on the importance of healthy lifestyles (sport, diet, sleep...)

Learning will include the development of the following knowledge, concepts and skills		Possible learning outcomes in science
<p>Transdisciplinary theme How the world works An inquiry into the natural world and its laws; the interaction between the natural world (physical and biological) and human societies; how humans use their understanding of scientific principles; the impact of scientific and technological advances on society and on the environment.</p> <p>Central idea Physical forces can impact upon our environment.</p> <p>Key concepts</p> <ul style="list-style-type: none"> • Causation • Connection • Reflection <p>Related concepts</p> <ul style="list-style-type: none"> • Consequences • Impact • Evidence <p>Lines of inquiry</p> <ul style="list-style-type: none"> • The importance of physical forces • How physical forces can be seen • How scientific knowledge evolved through time 	<p>Science strand (s) Forces and energy</p> <p>Science skills (The skills that are easier to teach and observe are marked in bold text)</p> <p>a. Observe carefully in order to gather data</p> <p>b. Use a variety of instruments and tools to measure data accurately</p> <p>c. Use scientific vocabulary to explain their observations and experiences</p> <p>d. Identify or generate a question or problem to be explored</p> <p>e. Plan and carry out systematic investigations, manipulating variables as necessary</p> <p>f. Make and test predictions</p> <p>g. Interpret and evaluate data gathered in order to draw conclusions</p> <p>h. Consider scientific models and applications of these models</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> • investigate and identify the forces around us (gravity, friction, air resistance, buoyancy) • reflect upon the importance of forces in our world • generate and explain own predictions and hypothesis • plan and carry experiments to test hypothesis • collect and interpret data • write an experiment report • understand that scientific knowledge evolves through time

Learning will include the development of the following knowledge, concepts and skills		Possible learning outcomes in science
<p>Transdisciplinary theme Sharing the planet An inquiry into rights and responsibilities in the struggle to share finite resources with other people and with other living things; communities and the relationships within and between them; access to equal opportunities; peace and conflict resolution.</p> <p>Central idea Earth's resources can lead to conflicts.</p> <p>Key concepts</p> <ul style="list-style-type: none"> • Form • Perspective • Responsibility <p>Related concepts</p> <ul style="list-style-type: none"> • Peace • Reconciliation • Exploitation • Grief <p>Lines of inquiry</p> <ul style="list-style-type: none"> • Finite and Infinite resources • Importance of and access to resources • Our responsibility to share the planet's resources 	<p>Science strand(s) Forces and energy Earth and space</p> <p>Science skills (The skills that are easier to teach and observe are marked in bold text)</p> <p>a. Observe carefully in order to gather data</p> <p>b. Use a variety of instruments and tools to measure data accurately</p> <p>c. Use scientific vocabulary to explain their observations and experiences</p> <p>d. Identify or generate a question or problem to be explored</p> <p>e. Plan and carry out systematic investigations, manipulating variables as necessary</p> <p>f. Make and test predictions</p> <p>g. Interpret and evaluate data gathered in order to draw conclusions</p> <p>h. Consider scientific models and applications of these models</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> • sort and classify Earth's resources • distinguish between finite and infinite resources • explain the importance of these resources • understand and explain the origin of energy, its transfer and storage • research the timeline of earth's major resources • investigate the importance of energy for mankind • recognize that different countries have different access to Earth's resources • debate solutions to support fair access and use of energy sources
<p>Please note: this unit is also included in the social studies scope and sequence.</p>		

Overall expectations in science PYP 5 (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.

Learning will include the development of the following knowledge, concepts and skills		Possible learning outcomes in science
<p>Transdisciplinary theme Where we are in place and time</p> <p>An inquiry into orientation in place and time; personal histories; homes and journeys; the discoveries, explorations and migrations of humankind; the relationships between and the interconnectedness of individuals and civilizations, from local and global perspectives.</p> <p>Central idea Space research continues to enhance our knowledge about the universe and impacts our lives.</p> <p>Key concepts</p> <ul style="list-style-type: none"> • Form • Change • Connection <p>Related concepts</p> <ul style="list-style-type: none"> • Properties • Exploration • Progress <p>Lines of inquiry</p> <ul style="list-style-type: none"> • Composition of the Solar System • Space technology and exploration • Impact of space research in daily life 	<p>Science strand (s) Earth and space</p> <p>Science skills (The skills that are easier to teach and observe are marked in bold text)</p> <p>a. Observe carefully in order to gather data</p> <p>b. Use a variety of instruments and tools to measure data accurately</p> <p>c . Use scientific vocabulary to explain their observations and experiences</p> <p>d. Identify or generate a question or problem to be explored</p> <p>e. Plan and carry out systematic investigations, manipulating variables as necessary</p> <p>f. Make and test predictions</p> <p>g. Interpret and evaluate data gathered in order to draw conclusions</p> <p>h. Consider scientific models and applications of these models (including their limitations)</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> • identify the long-term and short-term changes in our universe (for example; planet formation, star life, biological life, movement of bodies in our solar system) • describe how natural phenomena shape our planet, the solar system and our universe • explore scientific and technological developments that help us understand how and why our solar system and universe is as it is • reflect on the explanations from a range of sources as to what our universe is made of • recognize that space research impacts life on Earth.

Learning will include the development of the following knowledge, concepts and skills		Possible learning outcomes in science
<p>Transdisciplinary theme How the world works An inquiry into the natural world and its laws; the interaction between the natural world (physical and biological) and human societies; how humans use their understanding of scientific principles; the impact of scientific and technological advances on society and on the environment.</p> <p>Central idea Photosynthetic organisms sustain life on Earth.</p> <p>Key concepts</p> <ul style="list-style-type: none"> • Function • Causation • Connection <p>Related concepts</p> <ul style="list-style-type: none"> • Biodiversity • Interdependence • Relationships <p>Lines of inquiry</p> <ul style="list-style-type: none"> • Characteristics of photosynthetic organisms • The importance of photosynthetic organisms • Ways in which organisms are interconnected in nature 	<p>Science strand (s)</p> <p>Living things</p> <p>Science skills (The skills that are easier to teach and observe are marked in bold text)</p> <p>a. Observe carefully in order to gather data</p> <p>b. Use a variety of instruments and tools to measure data accurately</p> <p>c. Use scientific vocabulary to explain their observations and experiences</p> <p>d. Identify or generate a question or problem to be explored</p> <p>e. Plan and carry out systematic investigations, manipulating variables as necessary</p> <p>f. Make and test predictions</p> <p>g. Interpret and evaluate data gathered in order to draw conclusions</p> <p>h. Consider scientific models and applications of these models (including their limitations)</p>	<p>The student will be able to:</p> <ul style="list-style-type: none"> • identify different components and members in an ecosystem • explain the function and connection between the different components and members in an ecosystem (food chains, food webs, energy transfer...) • understand that life on Earth depends on the energy and oxygen produced by photosynthetic organisms • name and describe local, regional and/or national biodiversity • give examples of how humans impact the balance of systems.

Learning will include the development of the following knowledge, concepts and skills		Possible learning outcomes in Science
<p>Transdisciplinary theme Sharing the Planet An inquiry into rights and responsibilities in the struggle to share finite resources with other people and with other living things; communities and the relationships within and between them; access to equal opportunities; peace and conflict resolution.</p> <p>Central idea Students will carry out an extended, collaborative inquiry project - the exhibition. Students will identify, investigate and offer solutions to real-life issues. Central ideas and lines of inquiry will be defined by the students to meet the different issues.</p> <p>Key concepts</p> <ul style="list-style-type: none"> Will be developed to meet the research topic <p>Related concepts</p> <ul style="list-style-type: none"> Will be developed to meet the research topic <p>Lines of inquiry</p> <ul style="list-style-type: none"> Will be developed to meet the research topic 	<p>Social Studies Strand(s)</p> <ul style="list-style-type: none"> Human systems and economic activities Social organisation and culture Continuity and change through time Human and natural environments Resources and the environment <p>Social Studies skills</p> <ol style="list-style-type: none"> Formulate and ask questions about the past, the future, places and society Use and analyse evidence from a variety of historical, geographical and societal sources Orientate in relation to place and time Identify roles, rights and responsibilities in societies Assess the accuracy, validity and possible bias of sources 	<p>The student will be able to:</p> <ul style="list-style-type: none"> identify local or global issues of his/her interest that fall under this transdisciplinary theme initiate a research project to find answers and solutions for the chosen issue plan and organize the project make use of the transdisciplinary skills and learner profile to work with a partner in researching, conducting surveys and interviews, collecting, organizing, interpreting and presenting data identify, select and summarize relevant information organize, prepare and present a presentation to the school community.
<p>Please note: this unit is also included in the social studies scope and sequence.</p>		