



Science Overall Expectations Phase 2 (5-7 years old – grade 1,2)

- Students will develop their observational skills by using their senses to gather and record information
- Students will use their observations to identify patterns, make predictions and refine their ideas
- Students 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
- Students will be aware of different perspectives and ways of organizing the world
- Students 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

(Source: IB Primary Years Programme- Science scope and sequence, 2008)

A student will ...	G1	G2
<b>Strand sub-objectives</b> <b>Related Concepts</b>	<p><b>1. Living Things (human body)-</b> <i>biology, growth, systems (digestive, nervous, reproductive, respiratory)</i></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> identify body parts and their roles</li> <li><input type="checkbox"/> observe and investigate how body parts work together</li> <li><input type="checkbox"/> investigate the function of the five senses</li> <li><input type="checkbox"/> explore ways to keep fit and observe how it affects the body</li> <li><input type="checkbox"/> investigate what makes up a balanced diet and the effect this can have on the body</li> <li><input type="checkbox"/> demonstrate good hygiene practices and describe the consequences if not applied</li> </ul> <p><b>1. Living Things (endangered animals) –</b> <i>adaptation, animals, biodiversity, classification, conservation, ecosystems, habitat</i></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> observe the needs of living things that enable them to stay healthy</li> <li><input type="checkbox"/> identify characteristics of different animals</li> <li><input type="checkbox"/> compare different types of animals</li> <li><input type="checkbox"/> investigate the relationship between people and animals</li> <li><input type="checkbox"/> investigate people’s responsibility to take care of animals</li> <li><input type="checkbox"/> compare and classify animals</li> <li><input type="checkbox"/> investigate why some animals are endangered</li> <li><input type="checkbox"/> observe animals in their habitat and describe their dependence to the environment</li> <li><input type="checkbox"/> identify and consider our role in the conservation of animals</li> </ul>	<p><b>Living Things (water)-</b> <i>animals, habitats, ecosystems, geography</i></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> identify various landforms and bodies of water</li> <li><input type="checkbox"/> name the continents and oceans</li> </ul> <p><b>2. Earth and Space (Earth’s resources) –</b> <i>climate, erosion, geography, geology, renewable and non-renewable energy source, resources, sustainability, systems</i></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> identify different natural resources and describe their uses</li> <li><input type="checkbox"/> examine the causation and consequences of varied global access to natural resources</li> <li><input type="checkbox"/> recall the 5R’s (reduce, re-use, reduce, refuse, repair)</li> <li><input type="checkbox"/> suggest ways that people could have in the conservation of natural resources</li> </ul>



## HKCA PLKS CONTINUUM - SCIENCE

A student will ...	G1	G2
<b>Strand sub-objectives</b> <b>Related Concepts</b>	<p><b>1. Living Things (food)</b> –animals, biodiversity, classification, conservation, ecosystems, growth, habitat, plants</p> <ul style="list-style-type: none"><li><input type="checkbox"/> investigate the origins of food</li><li><input type="checkbox"/> grow a variety of food and observe the growth</li><li><input type="checkbox"/> identify properties of food using the five senses</li><li><input type="checkbox"/> classify food</li><li><input type="checkbox"/> compare and contrast food</li><li><input type="checkbox"/> experiment and observe making various food products</li><li><input type="checkbox"/> describe the process and changes during the process of making food products</li></ul> <p><b>3. Materials and Matter</b>- changes of state, chemical and physical changes, properties and uses of materials, solids, liquids, gases, structures, sustainability</p> <ul style="list-style-type: none"><li><input type="checkbox"/> observe, describe and classify non-living and living things</li><li><input type="checkbox"/> investigate the sources of various materials</li><li><input type="checkbox"/> state the properties of different materials</li><li><input type="checkbox"/> recall and name different states of matter</li><li><input type="checkbox"/> compare and contrast natural and human-made materials and their origins</li><li><input type="checkbox"/> investigate the use of materials in daily life</li><li><input type="checkbox"/> observe and describe the process of changing materials</li><li><input type="checkbox"/> describe reversible and irreversible changes</li><li><input type="checkbox"/> determine the best material for different purposes</li><li><input type="checkbox"/> show awareness of the importance of sustainability of natural sources</li><li><input type="checkbox"/> apply the 5R's (recycle, re-use, reduce, refuse, repair) in daily life</li></ul> <p><b>4. Forces and Energy (food)</b> – pollution, efficiency, technological advances</p> <ul style="list-style-type: none"><li><input type="checkbox"/> show awareness of the inequity of access to food and the consequences of wasting food</li><li><input type="checkbox"/> show awareness of the danger of pollution</li><li><input type="checkbox"/> show responsibility to take care of the environment</li><li><input type="checkbox"/> investigate the role of technology in the process of making food</li></ul>	<p><b>4. Forces and Energy (light and sound)</b>- conservation of energy, efficiency, forms of energy (electricity, light, sound), transformation of energy</p> <ul style="list-style-type: none"><li><input type="checkbox"/> explore the scientific method</li><li><input type="checkbox"/> recall and state the properties of light and sound</li><li><input type="checkbox"/> identify light and sound as forms of energy</li><li><input type="checkbox"/> investigate the everyday uses of light and sound</li><li><input type="checkbox"/> demonstrate how to build an electrical circuit</li><li><input type="checkbox"/> explore alternative ways to make electricity used for light and sound</li><li><input type="checkbox"/> suggest ways to save energy</li></ul>



## HKCA PLKS CONTINUUM - SCIENCE

A student will ...	G1	G2
<b>COMMUNICATION</b>		
<b>Sub-objectives</b>	<ul style="list-style-type: none"><li><input type="checkbox"/> describe simple features of objects and events</li><li><input type="checkbox"/> represent findings using pictures and models</li><li><input type="checkbox"/> ask inquiry questions</li></ul>	<ul style="list-style-type: none"><li><input type="checkbox"/> describe what is happening using increasingly scientific language</li><li><input type="checkbox"/> reflect on and build upon their own current scientific theories and applications</li><li><input type="checkbox"/> discuss how people investigate scientific questions</li><li><input type="checkbox"/> ask inquiry questions</li></ul>
<b>INVESTIGATIONS-ATL SKILLS</b>		
<b>Sub-objectives</b>	<ul style="list-style-type: none"><li><input type="checkbox"/> observe changes in living things, objects and events over a period of time</li><li><input type="checkbox"/> use standard and non-standard units of measure</li><li><input type="checkbox"/> show curiosity and ask about the natural and physical environment</li><li><input type="checkbox"/> suggest approaches and methods for solving problems based on prior learning and/or observations, suggest</li></ul>	<ul style="list-style-type: none"><li><input type="checkbox"/> distinguish between significant and less significant observations</li><li><input type="checkbox"/> measure, compare and record data including mass, weight, time and temperature</li><li><input type="checkbox"/> ask questions or identify problems that may lead to investigations</li><li><input type="checkbox"/> identify one or two variables relevant to an investigation</li><li><input type="checkbox"/> make justified predictions</li><li><input type="checkbox"/> compare results of different investigations</li></ul>



**Science Overall Expectations Phase 3 (7-9 years old – grade 3,4)**

- Students will develop their observational skills by using their senses and selected observational tools.
- Students 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.
- Students will examine change over time, and will recognize that change may be affected by one or more variables.
- Students will examine how products and tools have been developed through the application of science concepts.
- Students 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.

(Source: IB Primary Years Programme- Science scope and sequence, 2008)

A student will...	G3	G4
<b>SCIENCE IN SOCIETY: KNOWLEDGE AND UNDERSTANDING</b>		
<b>Strand sub-objectives</b> Related Concepts	<b>1. Living Things (bacteria &amp; germs) - organism</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> identify different forms of bacteria and germs</li> <li><input type="checkbox"/> observe and investigate the function of various bacteria and germs</li> <li><input type="checkbox"/> investigate the impact of bacteria and germs in our lives</li> <li><input type="checkbox"/> reflect on and self-assess own personal hygiene</li> <li><input type="checkbox"/> suggest ways how to prevent negative effects of bacteria and germs in our lives</li> </ul> <b>2. Earth and Space (healthy food) – climate, evidence, geography, geology, seasons, systems</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> define healthy food</li> <li><input type="checkbox"/> investigate the origin of healthy food in relation to equal accessibility around the world</li> <li><input type="checkbox"/> analyze the relationship between food, climate and landscape around the world</li> <li><input type="checkbox"/> examine the positive and negative effects people have on the environment</li> <li><input type="checkbox"/> suggest ways that they could have a positive impact in their</li> </ul>	<b>2. Earth and Space – space, atmosphere, climate, evidence, gravity, sustainability, solar system, theory of origin</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> recall details of the sun, planets and space objects including their place in the solar system</li> <li><input type="checkbox"/> classify and describe objects in space</li> <li><input type="checkbox"/> describe how earth’s position in space affects life on earth</li> <li><input type="checkbox"/> investigate the theory of origin of the Earth</li> <li><input type="checkbox"/> investigate how our understanding of space has changed over time</li> <li><input type="checkbox"/> explore the role of humans in space over time (past, present, future)</li> </ul>



## HKCA PLKS CONTINUUM - SCIENCE

	<p style="text-align: center;">community</p> <p><b>2. Earth and Space (forces) – gravity, renewable and non-renewable energy sources, resources</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> demonstrate the function of gravity</li> <li><input type="checkbox"/> identify and compare renewable and non-renewable energy sources</li> </ul> <p><b>3. Materials and Matter (forces)-properties and uses of materials, structures</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> investigate the relationship between a variety of materials and forces</li> <li><input type="checkbox"/> explore how different structures impact forces</li> </ul> <p><b>4. Forces and Energy – conservation of energy, efficiency, forms of energy (electricity, heat, kinetic, potential), mechanics, physics, power, technological advances, transformation of energy</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> classify forms of energy and state their uses</li> <li><input type="checkbox"/> identify the basic principles of the scientific method</li> <li><input type="checkbox"/> apply the scientific method in researching about forces and energy</li> <li><input type="checkbox"/> investigate famous scientists in relationship with forces and energy</li> <li><input type="checkbox"/> demonstrate the power of a variety of forces</li> <li><input type="checkbox"/> compare the use of energy in daily life in the past, present and the future</li> <li><input type="checkbox"/> investigate the role of technology in the development of forces and energy over time</li> <li><input type="checkbox"/> demonstrate the process of storage, conversion and transformation of energy</li> <li><input type="checkbox"/> explore different types and sources of energy and investigate renewable and sustainable energy</li> <li><input type="checkbox"/> compare and contrast renewable and sustainable energy</li> <li><input type="checkbox"/> assess renewable and sustainable energy sources (i.e. wind, solar, water) in your local environment</li> <li><input type="checkbox"/> examine ways in which the local community could be improved in relation to the conservation of energy</li> </ul>	<p><b>4. Forces and Energy – conservation of energy, efficiency, forms of energy (electricity), magnetism, physics, power, technological advances, transformation of energy.</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> identify the principles and processes of the scientific method</li> <li><input type="checkbox"/> apply the scientific method in researching about electricity and magnetism</li> <li><input type="checkbox"/> identify the properties and function of electricity and magnetism</li> <li><input type="checkbox"/> investigate the origins of magnetism and electricity</li> <li><input type="checkbox"/> experiment showing the force of magnetism and electricity</li> <li><input type="checkbox"/> compare and contrast magnetism and electricity</li> <li><input type="checkbox"/> explore the impact of magnetism and electricity on everyday life</li> <li><input type="checkbox"/> describe the change of use of magnetism and electricity due to technological advances</li> <li><input type="checkbox"/> suggest ways to use forces of energy in the most efficient and sustainable way</li> </ul>
<b>COMMUNICATION</b>		
<p><b>Sub-objectives</b></p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> describe what is happening using increasingly scientific language</li> <li><input type="checkbox"/> reflect on and build upon their own current scientific theories and applications</li> <li><input type="checkbox"/> discuss about effective inquiry questions</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> record and present findings and conclusions using a variety of strategies and appropriate scientific vocabulary</li> <li><input type="checkbox"/> apply scientific knowledge to reconstruct or refine their understandings of the physical, chemical and biological worlds</li> <li><input type="checkbox"/> reflect on effective inquiry questions</li> </ul>



## HKCA PLKS CONTINUUM - SCIENCE

### INVESTIGATIONS-ATL SKILLS

#### Sub-objectives

- |  |  |
|--|--|
| <input type="checkbox"/> distinguish between significant and less significant observations             | <input type="checkbox"/> record observations in a systematic way   |
| <input type="checkbox"/> measure, compare and record data including mass, weight, time and temperature | <input type="checkbox"/> select appropriate tools and measurement units  |
| <input type="checkbox"/> ask questions or identify problems that may lead to investigations            | <input type="checkbox"/> pose questions that will lead to effective investigations or inquiries                          |
| <input type="checkbox"/> identify one or two variables relevant to an investigation                    | <input type="checkbox"/> recognize the way in which an experiment is unfair if the relevant variables are not controlled |
| <input type="checkbox"/> make justified predictions  | <input type="checkbox"/> propose ideas or simple theories that may be explored or tested                                 |
| <input type="checkbox"/> compare results of different investigations                                   | <input type="checkbox"/> interpret information and offer explanations  |



### Science Overall Expectations Phase 4 (9-12 years old – grade 5)

- Students will develop their observational skills by using their senses and selected observational tools.
- Students 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.
- Students 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.
- Students 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.
- Students 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.

(Source: IB Primary Years Programme- Science scope and sequence, 2008)

A student will ...	G5
<b>Strand sub-objectives</b> <b>Related Concepts</b>	<b>0. Scientific Method</b> <ul style="list-style-type: none"><li><input type="checkbox"/> recall the principles and processes of the scientific method</li><li><input type="checkbox"/> conduct a research according to the scientific method</li><li><input type="checkbox"/> research various scientists and describe their discoveries that impacted our world</li><li><input type="checkbox"/> explore alternative approaches to scientific inquiry</li></ul> <b>1. Living Things (human body) – biology, evolution, genetics, growth, homeostasis, systems (digestive, nervous, reproductive, respiratory)</b> <ul style="list-style-type: none"><li><input type="checkbox"/> recall body parts, body systems and describe their function in detail</li><li><input type="checkbox"/> compare and contrast body systems</li><li><input type="checkbox"/> investigate and describe how internal and external factors affect the body</li><li><input type="checkbox"/> self-assess how well you take care of your body</li><li><input type="checkbox"/> explore how lifestyle choices affect our well-being</li><li><input type="checkbox"/> suggest healthy lifestyle choices</li></ul>



## HKCA PLKS CONTINUUM - SCIENCE

	<p><b>3. Materials and Matter</b> – changes of state, chemical and physical changes, conduction and convection, density, gases, liquids, properties and uses of materials, solids</p> <ul style="list-style-type: none"><li><input type="checkbox"/> identify density in gases, liquids and solids</li><li><input type="checkbox"/> observe and identify chemical and physical change</li><li><input type="checkbox"/> experiment making and separating mixtures and solutions</li><li><input type="checkbox"/> research the impact of industries for the society and environment</li><li><input type="checkbox"/> show awareness of the responsibility of people to protect the environment from the negative impact of different industries</li></ul> <p><b>4. Forces and Energy</b> – technological advances</p> <ul style="list-style-type: none"><li><input type="checkbox"/> identify various applications of technology in relationship with the world of work and leisure</li><li><input type="checkbox"/> describe changes in technology in our daily life</li><li><input type="checkbox"/> investigate the impact of new technologies</li><li><input type="checkbox"/> identify reasons why technological advances occur</li><li><input type="checkbox"/> describe how technology can support people to solve problems</li><li><input type="checkbox"/> design new technology to solve a problem</li><li><input type="checkbox"/> predict future implications of technological advances</li></ul>
<b>COMMUNICATION</b>	
<b>Sub-objectives</b>	<ul style="list-style-type: none"><li><input type="checkbox"/> record and present findings and conclusions using a variety of strategies and appropriate scientific vocabulary</li><li><input type="checkbox"/> apply scientific knowledge to reconstruct or refine their understandings of the physical, chemical and biological worlds</li><li><input type="checkbox"/> discuss how lifestyle affects the body</li><li><input type="checkbox"/> reflect on effective inquiry questions using Bloom’s taxonomy</li></ul>
<b>INVESTIGATIONS-ATL SKILLS</b>	
<b>Sub-objectives</b>	<ul style="list-style-type: none"><li><input type="checkbox"/> record observations in a systematic way</li><li><input type="checkbox"/> select appropriate tools and measurement units</li><li><input type="checkbox"/> pose questions that will lead to effective investigations or inquiries</li><li><input type="checkbox"/> recognize the way in which an experiment is unfair if the relevant variables are not controlled</li><li><input type="checkbox"/> propose ideas or simple theories that may be explored or tested</li><li><input type="checkbox"/> interpret information and offer explanations</li></ul>





## HKCA PLKS CONTINUUM - SCIENCE

### Science Key Concepts

<b>Form:</b> What is it like?	<i>Most things have a form or shape with an outward or visible manifestation and an internal structure.</i>	<b>Connection:</b> How is it connected to other things?	<i>The world is full of interacting systems that depend on each other to form a working whole.</i>
<b>Function:</b> How does it work?	<i>The special activities, properties or purposes, natural or endowed, of a creature or thing.</i>	<b>Perspective:</b> What are the points of view?	<i>Events and findings can be interpreted differently, depending on knowledge, experience and motives. The difference between empirically proven facts and supposition must be emphasized.</i>
<b>Causation:</b> Why is it like it is?	<i>The effect brought about by an intended or unintended action or reaction.</i>	<b>Responsibility:</b> What is our responsibility?	<i>We have a responsibility to the world in which we live. This involves being aware of how scientific knowledge can be used to improve or worsen the quality of life of all living things. Responsibility entails action as well as awareness.</i>
<b>Change:</b> How is it changing?	<i>Also described as transformation, is a pervasive concept in science. Change is an inevitable aspect of the physical world as things become different or pass from one form to another. It can be natural or brought about and accelerated by outside influences.</i>	<b>Reflection:</b> How do we know?	<i>We must consciously reflect on, and be able to describe, how we gain our knowledge and develop our attitudes.</i>

Strand	1. Living things	2. Earth and Space	3. Materials and Matter	4. Forces and Energy
<b>Description</b>	<i>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.</i>	<i>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.</i>	<i>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.</i>	<i>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.</i>
<b>Related Concepts</b>	adaptation, animals, biodiversity, biology, classification, conservation, ecosystems, evolution, genetics, growth, habitat, homeostasis, organism, plants, systems (digestive, nervous, reproductive, respiratory).	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.	changes of state, chemical and physical changes, conduction and convection, density, gases, liquids, properties and uses of materials, solids, structures, sustainability.	conservation of energy, efficiency, equilibrium, forms of energy (electricity, heat, kinetic, light, potential, sound), magnetism, mechanics, physics, pollution, power, technological advances, transformation of energy.

Adapted from: IB Making the PYP Happen p.93-102