



International Preparatory School Science Benchmarks and Skills - 2018-2020

Strands:	By the end of <b>Nursery</b> , learners will:	By the end of <b>Reception</b> , learners will:	By the end of <b>Year One</b> , learners will:	By the end of <b>Year Two</b> , learners will:	By the end of <b>Year Three</b> , learners will:	By the end of <b>Year Four</b> , learners will:	By the end of <b>Year Five</b> , learners will:	By the end of <b>Year Six</b> , learners will:
<p><b>Living Things</b></p> <p><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></p>	<p><b>Sharing the planet:</b> Explore the basic needs of living things (air, water, food, and shelter) that are met from the environment.</p> <p>Appreciate that all living things are important and should be treated with care and respect.</p> <p>Identify animals that do and do not live in the ocean.</p> <p>Identify ways in which they can care for and show respect for oceans.</p>	<p><b>How the world works:</b> Sort and classify groups of living and nonliving things in their own way.</p> <p>Explore the characteristics of living things.</p> <p>Use senses to describe change.</p> <p>Identify and describe how living things change (life cycle).</p> <p>Identify and describe how non-living things can be changed (human action, nature)</p> <p>Conduct an experiment to determine if an object can be changed</p> <p>Conduct experiments to explore permanent versus reversible change (ie. water can change between frozen and liquid, but baking ingredients together is irreversible change)</p> <p><b>Sharing the planet:</b> Identify the conditions and requirements for healthy growth (ie. food, water, light).</p> <p>Identify ways in which they can care for and show respect for nature, animals and their habitats.</p>	<p><b>How the world works:</b> Name and classify a variety of common animals including vertebrate (fish, amphibians, reptiles, birds and mammals) and invertebrate.</p> <p>Give reasons for classifying animals based on specific characteristics.</p> <p>Classify animals that are carnivores, herbivores and omnivores.</p> <p>Explore and compare the differences between things that are living, dead, and things that have never been alive.</p> <p>Investigate ways to find out about animals that are extinct.</p> <p>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.</p> <p>Identify features of fossils that can be used to compare them to living organisms that are familiar (e.g., shape, size and structure of skeleton, patterns of leaves).</p> <p>Make conclusions about the behaviour of extinct</p>	<p><b>Who we are:</b> Identify that humans cannot make their own food; they get nutrition from what they eat.</p> <p>Explain the importance of good hygiene practices on health.</p> <p>Investigate how the sun's energy allows humans to meet their basic need for food.</p> <p>Identify the different food groups and what these groups provide our bodies (energy, minerals, vitamins, protein, etc...).</p> <p>Identify personal action that they themselves can take to help maintain a healthy lifestyle.</p> <p>Identify the five components of a healthy lifestyle (nutrition/hydration, rest, exercise, hygiene, and personal wellness) and their importance in daily life.</p> <p><b>How we organise ourselves:</b> Describe and diagram how all animals, including humans, depend upon plants whether or not they eat the plants directly.</p>		<p><b>Sharing the planet:</b> Investigate and describe how plants and animals have features that help them live in various environments.</p> <p>Observe, record, and describe changes in the health or behavior of an organism as a result of changes in its environment.</p> <p>Give examples of how changes in the environment (drought, cold) have caused some plants and animals to die or move to new locations (migration).</p> <p>Explore the relationship between the components of a habitat and the plants and animals that live there.</p>		<p><b>Who we are:</b> Assess the effects of social and environmental factors on human health, and propose ways in which individuals can reduce the harmful effects of these factors and take advantage of those that are beneficial.</p> <p>Recognize that living things go through predictable life cycles.</p> <p>Describe the changes that occur during puberty.</p> <p><b>Sharing the planet:</b> Explain the importance of biodiversity.</p> <p>Explain how energy is transferred through food webs in an ecosystem.</p> <p>Analyse the effects of changing a link in a food web.</p> <p>Explain how ecosystems, biomes and environments are interdependent.</p> <p>Explore how species develop interrelationships within species, between species, and between species and the environment and identify how these interrelationships sustain biodiversity.</p> <p>Analyse a local issue related to biodiversity.</p>

		<p>Classify animals based on their relationships with humans (pets, farm animals, wild animals, pests, etc...)</p>	<p>animals based on how extant animals behave.</p> <p><b>Sharing the planet:</b> Classify plants as vascular (have tubes to transport food) or non-vascular (absorb food via leaves).</p> <p>Investigate the physical characteristics of plants (e.g., basic parts, size, shape, colour) and explain how they help the plant meet its basic needs (e.g., roots anchor the plant and help provide the plant with food and water; some plants have brightly coloured flowers to attract bees).</p> <p>Identify what plants provide for other living things (e.g., trees produce the oxygen that other living things breathe; plants such as tomatoes and apple trees provide food for humans and for other animals; a tree stump provides a home for a chipmunk, etc...)</p> <p>Investigate ways they can sustain plant life.</p>					
<p><b>Earth and Space Science</b></p> <p><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></p>		<p><b>How we express ourselves:</b></p> <p>Classify objects found in nature using identifiable features (colour, source, shape).</p> <p>Explore the distinctive features of nature, such as plants, seeds, animals, trees, outdoors, sunshine, rain, etc...</p>		<p><b>How we organise ourselves:</b> Identify the natural resources required in a variety of production processes.</p> <p><b>Sharing the Planet:</b> Explore the impact of waste on the environment (eg. water pollution, air pollution, sanitation).</p> <p>Explain that the supply of many resources is limited but the supply can be extended through careful use, decreased use, reusing and/or recycling.</p>	<p><b>Sharing the planet:</b> Describe ways in which living things, including humans, depend on freshwater (e.g., all living things need to drink or absorb water to stay alive)</p> <p>Identify sources of water in the natural and built environment (e.g., natural: oceans, lakes, ponds, streams, springs, water tables; human-made: wells, sewers, water supply systems, reservoirs, water towers) and which of these supply fresh water.</p>	<p><b>How the world works:</b> Describe the movement of the Earth and other planets relative to the sun in the solar system</p> <p>Describe the movement of the moon relative to the Earth</p> <p>Describe the sun, Earth and moon as approximately spherical bodies</p> <p>Use models to demonstrate how the rotation of the Earth on its axis every 24 hours produces the night-and-day cycle and</p>		<p><b>How the world works:</b> Describe how natural phenomena (waves, wind, water, glacier movement, and ice) shape and reshape the planet.</p> <p>Develop models to demonstrate the effects of forces from natural phenomena (e.g., tornadoes, hurricanes, earthquakes, tsunamis) on the natural and built environment.</p> <p>Describe changes in Earth's surface that are due to rapid processes (including landslides,</p>

				<p>Apply and justify a personal action that can reduce their use of limited resources.</p>	<p>Investigate evaporation, condensation and precipitation through simulations.</p> <p>Explain the water cycle.</p> <p>Explain why fresh water is a limited resource, referencing the water cycle.</p> <p>Differentiate between potable and non-potable water.</p> <p>Assess personal and family uses of fresh water as responsible/efficient or wasteful, and create a plan to reduce the amount of water used, where possible.</p> <p>Illustrate the locations of freshwater (including oceans, seas, rivers, lakes, ponds, streams, and glaciers) on Earth by using drawings, maps, or models.</p> <p><b>Where we are in place and time:</b> Observe and describe weather associated with seasons.</p> <p>Observe and record daily changes in weather (e.g., clouds or air temperature).</p> <p>Graph recorded weather data to show daily and seasonal patterns in weather.</p> <p>Describe weather by measurable quantities such as temperature, wind direction, wind speed, precipitation and barometric pressure.</p> <p>Identify and use the tools of a meteorologist (e.g., measure rainfall using rain gauge, measure air pressure using barometer,</p>	<p>explain the apparent movement of the sun across the sky</p> <p>Explain what makes Earth a unique planet that can sustain human life, referencing its natural resources and position in the solar system.</p>	<p>volcanic eruptions, floods, and earthquakes).</p> <p>Explore scientific and technological developments that help people understand and respond to natural disasters.</p> <p>Make suggestions as to how effects of natural disasters can be minimized.</p> <p>Explain, using examples, that hazard + vulnerability = natural disaster (both of these factors must exist for it to be considered a disaster)</p>
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<p><b>Materials and Matter</b></p> <p><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></p>	<p><b>How the world works:</b> Use senses to describe observable properties of familiar materials.</p> <p>Choose materials with a purpose as play evolves.</p> <p>Experiment with different construction materials to identify their features.</p> <p>Demonstrate how the features of different materials make them suitable/unsuitable for building (i.e., round objects don't stack, plasticity).</p> <p>Identify the simple physical properties of a variety of everyday materials (sink and float, rough and smooth, strong and weak) and explore these properties in their play.</p>	<p><b>How the world works:</b> Explore the characteristics of non-living things.</p> <p>Explore materials that undergo a physical change (changes the appearance only) using their senses.</p> <p>Explore materials that undergo a chemical change (changes into an entirely different substance) using their senses.</p> <p>Conduct an experiment to determine if an object can be changed.</p>		<p><b>How the world works:</b> Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock</p> <p>Distinguish between an object and the material from which it is made.</p> <p>Compare and group together a variety of everyday materials on the basis of their simple physical properties.</p> <p>Describe how the properties of certain materials can change when specific actions are applied to them, such as freezing, mixing, heating, cutting, dissolving and bending.</p> <p>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.</p>		<p><b>How we express ourselves:</b> Explore key concepts and principles of photography</p> <p>Recognise that we need light in order to see things and that dark is the absence of light</p> <p>Recognise that shadows are formed when the light from a light source is blocked by an opaque object.</p> <p>Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye</p> <p>Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes</p>	
<p><b>Forces and Energy</b></p> <p>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.</p>					<p><b>How we express ourselves:</b> Demonstrate how sounds is made in a variety of ways (singing, whispering, striking an object), and associating some of them with something vibrating.</p> <p>Recognise that vibrations from sounds</p>	<p><b>Sharing the Planet:</b> Identify a variety of renewable and non-renewable sources of energy and give everyday examples of how that energy is used.</p> <p>Identify and describe forms of energy as potential or kinetic.</p>	

					<p>travel through a medium to the ear.</p> <p>Investigate the basic properties of sound (frequency, pitch, loudness, duration, timbre, location)</p> <p>Find patterns between the pitch of a sound and features of the object that produced it.</p> <p>Find patterns between the volume of a sound and the strength of the vibrations that produced it.</p> <p><b>How the world works:</b> Explore simple and compound machines.</p> <p>State and apply the principles of work, effort, and force.</p> <p>Identify the six basic types of simple machines – lever; inclined plane; pulley; wheel and axle, including gear; screw; and wedge – and give examples of ways in which each is used in daily life to make tasks easier.</p> <p>Experiment with the design cycle.</p> <p>Use diagrams to show simple machines in action.</p> <p>Explain and demonstrate how simple machines interact to create compound machines.</p>		<p>Explain and demonstrate an energy transformation.</p> <p>Explain and demonstrate how energy has been transformed, recognizing that energy cannot be created or destroyed.</p> <p>Analyse the long-term impacts on society and the environment of human uses of energy and natural resources.</p> <p>Evaluate the effects of various technologies on energy consumption and propose ways individuals can improve energy conservation.</p> <p><b>How the world works:</b> Demonstrate Newton's three physical laws of motion.</p> <p>Identify different kinds of forces.</p> <p>Describe how different forces (e.g., magnetism, muscular force, gravitational force, friction) applied to an object at rest can cause the object to start, stop, attract, repel, or change direction.</p> <p>Conduct investigations to determine the effects of increasing or decreasing the amount of force applied to an object.</p> <p>Design and build devices that use forces to create controlled movement.</p>	
<b>Science Skills</b>	<b>By the end of Nursery, learners will:</b> 1. explore ideas, manipulate materials and trial designs □through play.	<b>By the end of Reception, learners will:</b> 1. follow a planning process,	<b>By the end of Year One, learners will:</b> 1. explore ideas, manipulate materials and trial designs□ using digital and	<b>By the end of Year Two, learners will:</b> 1. conduct guided investigations by observing,	<b>By the end of Year Three, learners will:</b> 1. conduct guided investigations by observing,	<b>By the end of Year Four, learners will:</b> 1. design and conduct guided investigations by observing,	<b>By the end of Year Five, learners will:</b> 1. design and conduct investigations to observe, questioning,	<b>By the end of Year Six, learners will:</b> 1. design and conduct investigations to observe, questioning,

	<ol style="list-style-type: none"> <li>2. ask questions about the familiar world</li> <li>3. talk about their observations</li> </ol>	<ol style="list-style-type: none"> <li>2. explore ideas, manipulate materials and trial designs using digital and non-digital tools <ul style="list-style-type: none"> <li>□through play,</li> </ul> </li> <li>3. ask questions about the familiar world,</li> <li>4. talk about their observations</li> </ol>	<p>non-digital tools through play;</p> <ol style="list-style-type: none"> <li>2. use their imagination to propose a solution to make something □ work better;</li> <li>3. perform simple tests using simple equipment</li> <li>4. identify variables in simple investigations;</li> <li>5. suggest possible explanations in relation to what they have observed;</li> <li>6. gather and record data to help answer questions.</li> </ol>	<p>questioning and predicting;</p> <ol style="list-style-type: none"> <li>2. identify and generate a question or problem to be explored;□</li> <li>3. identify variables in simple investigations;</li> <li>4. perform simple tests using simple equipment</li> <li>5. suggest possible explanations in relation to what they have observed;</li> <li>6. gather and record data to help answer questions.</li> </ol>	<p>questioning and predicting;</p> <ol style="list-style-type: none"> <li>2. identify and generate a relevant question or problem to be explored using different types of scientific inquiries*.□</li> <li>3. manipulate a variable in conducting an investigation in order to conduct a fair test;</li> <li>4. discuss the ways in which □an experiment is unfair if the relevant variables are not controlled;</li> <li>5. combine prior knowledge with observations to suggest an answer to the question posed in the investigation</li> <li>6. record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</li> <li>7. use technology to make a task easier or repeatable in real-world tasks</li> </ol> <p>* recognise when a simple fair test is necessary and help to decide how to set it up; talk about criteria for grouping, sorting and classifying; and use simple keys</p>	<p>questioning and predicting;</p> <ol style="list-style-type: none"> <li>2. identify and generate a relevant question or problem to be explored using different types of scientific inquiries*.</li> <li>3. formulate a testable hypothesis;</li> <li>4. suggest approaches and methods for solving problems;</li> <li>5. manipulate a variable in conducting an investigation in order to conduct a fair test;</li> <li>6. discuss the ways in which □ an experiment is unfair if the relevant variables are not controlled;</li> <li>7. suggest and justify possible explanations, making reference to prior knowledge/ observations;</li> <li>8. record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</li> <li>9. use technology to make a task easier or repeatable in real-world tasks</li> </ol> <p>* recognise when a simple fair test is necessary and help to decide how to set it up; talk about criteria for grouping, sorting and classifying; and use simple keys</p>	<p>predicting and suggesting possible explanations to a question they have posed;</p> <ol style="list-style-type: none"> <li>2. formulate a testable hypothesis;</li> <li>3. suggest approaches and methods for solving □problems;</li> <li>4. identify and manipulate a variable in an investigation in □order to test a student-generated hypothesis;</li> <li>5. explain the ways in which an experiment is unfair if the relevant variables are not controlled;</li> <li>6. record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</li> <li>7. take measurements, using a range of scientific equipment, with increasing accuracy and precision</li> <li>8. report and present findings from inquiries, including conclusions, causal relationships and explanations of and a degree of trust in results</li> <li>9. use technology to make a task easier or repeatable in real-world tasks</li> </ol>	<p>predicting and suggesting possible explanations to a question they have posed;</p> <ol style="list-style-type: none"> <li>2. suggest approaches and methods for solving □problems;</li> <li>3. identify and manipulate a variable in an investigation in □order to test a student-generated hypothesis;</li> <li>4. explain the ways in which an experiment is unfair if the relevant variables are not controlled;</li> <li>5. record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</li> <li>6. take measurements, using a range of scientific equipment, with increasing accuracy and precision, take repeat readings when appropriate</li> <li>7. report and present findings from inquiries, including conclusions, causal relationships and explanations of and a degree of trust in results</li> <li>8. identifying scientific evidence that has been used to support or refute ideas or arguments</li> <li>9. use technology to make a task easier or repeatable in real-world tasks</li> </ol>
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**Reference documents:**

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