

Lower School Science Standards & Benchmarks

1. SCIENTIFIC INQUIRY

a) Students will demonstrate their understanding of the importance of curiosity, honesty, open-mindedness, and scepticism in their own efforts to understand how and why universal phenomena exist and occur.

Pre-school	K1	K2	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Ask questions about the world around them	Ask questions about the world around them and exhibit willingness to seek answers	Ask questions about the world around them and exhibit willingness to seek answers		Ask questions about the world around them and exhibit willingness to seek answers to selected questions by carefully observing, experimenting and predicting the outcome of an investigation.			
					Keep records of investigations and observations and not alter the records.	Distinguish observations from ideas and speculations and predictions about observations.	
					Support statements with facts found in books, articles and other resources.	Offer reasons for findings and also consider reasons suggested by others.	
							Identify when comparisons might not be accurate or appropriate because some conditions are different.

b) Students will communicate scientific ideas and activities clearly.

Pre-school	K1	K2	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Illustrate an event that has occurred.	Illustrate an object from the natural world including relevant details	Illustrate an object from the natural world including relevant details					
	Know how to describe and compare things in terms of texture, size colour and motion.			Know how to describe and compare features of an object being observed.			
					Know how to make sketches or models to aid in explaining scientific procedures or ideas.	Know how to make sketches or models to aid in explaining scientific procedures or ideas.	Know and demonstrate understanding of the scientific processes through communicating to others.

c) Students will be familiar with the character of scientific knowledge and inquiry and how it is achieved.

Pre-school	K1	K2	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
		Explain why, in doing science, it is often helpful to work with a team and to share findings with others.			Describe some of the many different forms of scientific investigation.		
				Explain why accurate descriptions are important in science.			
				Know that tools such as hand lenses and rulers aid inquiry by gaining more information.		Explain why scientists use technology in investigation, including increasing their power of observation and to measure and compare accurately.	
							Offer justifiable explanations when scientific investigations do not produce exactly the same results.
							Explain why clear and active communication is an essential part of doing science, including informing others about scientific work and exposing ideas to criticism.
							Offer some examples of old scientific knowledge that is still applicable today, and explain that new scientific knowledge is still being discovered.

d) Students will be able to select and use tools and instruments to conduct scientific activities.

Pre-school	K1	K2	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Can use simple tools such as mirror, magnet and magnifying glass.	Use ordinary hand tools and instruments to construct, measure and look at objects.	Make a model, invention or tool that has a function.	Use ordinary hand tools to construct, measure and look at objects.	Use tools and instruments to measure and examine objects.	Use a variety of scientific tools to collect data.		
						Use technology, including cameras, tape recorders, and computers, to store and retrieve verbal and graphic information and data.	Use simple and compound microscopes to observe, compare and make conclusions regarding discoveries.
		Assemble, describe, take apart and reassemble constructions.					

e) Students will understand and demonstrate the ideas of system, model, change, and scale in exploring scientific and technological matters.

Pre-school	K1	K2	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Assemble and take apart simple constructions.	Know how to assemble, disassemble constructions and explain in a simple way.						
Talk about what they have made. Knows how a simple system works e.g. Lego, Magnetio, Duplo.		Use a model- such as a toy or picture- to describe the features of an object or a system.					
			Describe changes in size, weight colour, or movement of objects and note which of their other qualities remain the same.	Describe changes in size, colour, movement or transformation of objects.			
			Understand that range of sizes weights, ages and speeds of natural things.				
						Understand how parts influence on e another in systems with many parts.	
							Identify patterns of change, such as steady, repetitive, or irregular

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							change, using records, tables, or graphs of measurements where appropriate.
							Identify the range of reasonable values for certain observations, events or conditions.

2. EARTH SCIENCE

a) Identify and describe how the earth changes and how humans use and abuse its resources

Pre-school	K1	K2	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
		Explain/ describe the differences in the 4 seasons and how the weather follows different patterns in different parts of the world.					
				Recognize basic features of the earth's surface.			
				Explain how plants affect changes in their environment.	Demonstrate and explain what happens when cold and hot air meet.	Describe how wind and water in various forms shape the Earth's surface, including the processes of erosion and deposit.	
				Explain the effects of earthquakes and volcanic eruptions.	Describe the steps of the water cycle.	Describe the composition of rocks and the rock cycle.	
					Air is a mixture of gases that surrounds us, takes up space, and whose movement we feel as wind.	Understand the rate of the change of the earth's surface can range from abrupt (such as earthquakes and volcanic eruptions), to very slow (such as uplift and the wearing down of mountains).	
						Understand how fossils are formed.	

b) Describe our extraterrestrial environment

Pre-school	K1	K2	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Explain when the sun, the moon and the stars can be seen.			Understand that there are more stars in the sky than anyone can count, but they are not scattered evenly, and they are not all the same brightness or colour.				
			Know that the sun is a star and that some stars are smaller and some are larger, but so far away that they look like points of light.				
			Explain when the sun, moon and stars can be seen and how they appear to move across the sky. Describe in simple terms the daily and monthly changes of the moon's appearance.				

3. LIFE SCIENCE

a) Relate life processes to the structure and function of living things.

Pre-school	K1	K2	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Describe a plant or animal in a simple way.	List the basic needs of living organisms.			List the basic needs of plants			Identify the cell as the fundamental unit of living organisms and recognize that some organisms are unicellular, while others are multi-cellular.
Know how to use the senses to discover things in their environment.		Explain how the senses are used to find out about and interact with the environment.					Know that cells continually divide to make more cells for growth and repair.
		Observe, discuss and record differences and similarities between people (such as eye colour, hair colour, type of hair, height, handedness etc.)					
			Sort living things depending on which features are used to group them.				Classify organisms as either plants or animals and explain why some organisms cannot be classified as either.
		Recognize that the brain controls the body.					
			Identify features of different animals that help them thrive in different environment.	Identify the features of different plants that help them thrive in different environments.			
				Identify the external and internal structures that contribute to the ability of plants to obtain food.			
		Describe means by which the spread of germs and infections can be stopped, including washing hands, covering one's mouth, washing and covering cuts and scrapes, and not sharing personal items.					
		Describe the basic needs of humans such as water, food and air .			Know that humans have basic needs such as water, food and sleep		

					(air, shelter, waste removal and a range of temperatures in the environment).		
			Know that offspring are different from their parents yet closely resemble them.				Distinguish between traits inherited from parents and behaviours that are learned.
							Understand that traits are influenced by environmental conditions.
Name basic human body parts and what they are used for.		Describe human body parts and how they are used to see, find and take in food.				Describe human body systems for obtaining and providing energy.	
Recognize that humans have different external features such as the size and shape of eyes and different colour of hair skin and eyes.	Recognize that all humans are part of the same group, even though they have different external features such as the size and shape of eyes and different colour of hair skin and eyes.	Recognize that all humans are part of the same group, even though they have different external features such as the size and shape of eyes, and different colour of hair, skin and eyes.	Explain the similarities and differences in the way animals look and in what they do.	Explain the similarities and differences in the appearance and behaviour of plants.			Outline the steps of inutero development for a human being.
Recognize and explain that a human baby grows inside its mother until its birth.				Describe reproduction, seed dispersal, germination, and growth in plants.			Describe how the mother nourishes human embryos.
							Recognize that substances a pregnant woman takes in will affect how well or poorly the baby develops.
							Explain that fertilization occurs when sperm from a male's testes are deposited near an egg cell from the female ovary and one of the sperm cells enters the egg cell.
	Recognize and compare how we grow and change.	Recognize, compare and record how we change and grow over time.					Recognize the usual sequence of development among human beings from fertilization to death.
Explain in a simple way why a human baby needs to be cared for.	Demonstrate understanding of life cycles.		Compare and contrast life cycles of animals.	Describe, compare and contrast life cycles of plants.			Recognize there is some variation in age at which individuals' development occurs

b) Connect factors that influence the ways organisms live together – past, present and future

Pre-school	K1	K2	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Know that living things need food.	Know that living things need food.		Know that animals need to take in food. Describe examples of simple food chains.	Identify the sun as the source of food energy for plants.			Students will understand and explain the transformation of energy through food chains and food webs.
			Define and provide examples of herbivores, carnivores and omnivores.				Define the roles of consumers, producers and decomposers in an ecosystem and provide examples.
							Define ecosystem and provide examples of different ecosystems.
	Know that living things are found almost everywhere in the local environment and describe where they are found.						Provide examples showing relationships among organisms, such as mutually beneficial and competitive relationships.
				Describe the response of plants to changing environmental conditions such as light and water.	Know that changes in an organism's habitat are sometimes beneficial and sometimes harmful to the organism.		Know that individuals vary, and those best adapted to an environment are the ones most likely to survive and reproduce.
				Define endangered, provide examples, and identify reasons why some animals are endangered.			
				Define extinct, provide examples, and identify reasons why some animals became extinct.			
				Know that some animals that lived long ago are similar to existing animals, and some are quite different.		Relate the age of fossils to their position in a rock layer and explain why the fossils in more recently formed rock layers are more likely to resemble existing species.	
				Identify fossils as the remains of imprints of once living animals.			

4. CHEMICAL SCIENCE

a) Model and describe the structures, properties and uses of substances

Pre-school	K1	K2	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
		Describe the different states of water (liquid, solid, gas.)				Describe the different states of water (liquid, gas and solid). Understand that if water is turned to ice then the ice is allowed to melt, the amount of water is the same as it was before freezing.	
			Understand that objects can be described in terms of the materials they are made of (clay, cloth, paper etc.) and their physical properties (colour, size, shape, weight, texture, flexibility etc.)			Understand that materials are composed of parts that are too small to be seen without magnification.	
						Explain in simple terms the properties of air and its importance to the earth.	
						Describe and explain how basic types of materials can be used to make many different materials, the properties of which might be different from those of the original materials.	

b) Comprehend and explain chemical change

Pre-school	K1	K2	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
		Understand that if water is turned into ice and then ice is allowed to melt, the amount of water is the same as it was before freezing.					
			Processes can change some of the properties of materials, but not all materials respond the same way to processes (for example, when heat is applied, some things burn and some things melt).			Describe and explain how temperature can change materials' properties and the effects of extreme heat.	

5. PHYSICAL SCIENCE

a) Understand energy; what it is and how it is used

Pre-school	K1	K2	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
			Understand that heat keeps and makes things warm and removing heat makes things cold.				
			Explain how fire and electricity are important for mankind.				
					Describe and explain sound as vibrations.		
							Describe different types of energy and that they can be converted from one to another.
							Explain the importance of conserving energy and the various ways to do it.
							Describe the various means of energy conservation and their impact on the environment and society.

b) Explain what forces are, their effects and how they can be used

Pre-school	K1	K2	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
			Discover and describe how objects move in many different ways (directionality, speed, pulling/pushing)		Understand that forces cause changes in speed or direction of motion.		
					Understand that the greater the force, the greater the change in motion will be, for a given mass, and that a given force will have less effect on more massive objects.		
			Compare and describe how objects fall differently according to shape. A magnet can be used to make some metal objects move without being touched, and either pushes or pulls other magnets.		Understand that the earth's gravity pulls any object toward it and compare and describe the force of gravity using objects with different physical properties.		
							Understand that material that has been electrically charged pushes or pulls other charged materials.
							Describe how electrical currents and magnets can exert force on each other.
							Understand that electricity involves the movement of electrons.