Manitoba Rural Learning Consortium
Early Years Science
Revised 2015
Essential Learning Document

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Introduction

This **revised** draft document is intended to support Early Years teachers in planning, teaching, assessing, and reporting on their Science programs. The document has been designed to correlate the categories from the provincial report card with the clusters, essential learning (big ideas), and specific learning outcomes from the Manitoba Science Curriculum. It is important to note that the attached templates are intended to serve as an example of how teachers might identify essential learning and cluster specific learning outcomes. Therefore, the templates may be viewed as a '"pathway" and support document to help teachers in implementing the Science curriculum and the new provincial report card. Teachers are encouraged to continue to innovate their practice and inspire their students. Aboriginal content, and sustainable development have been integrated into the essential questions wherever possible to assist teachers with integrating this content with the science curriculum.

The document should be used alongside the Manitoba Curriculum Framework of Outcomes for Science, as well as the Foundation for Implementation documents.

What is scientific literacy?

- Scientifically literate individuals can more effectively interpret information, solve problems, make informed decisions, accommodate change, and create new knowledge.
- Scientific literacy is an evolving combination of the science-related attitudes, skills, and knowledge.
- Students need to develop inquiry, problem-solving, and decision-making abilities, to become lifelong learners, and to maintain a sense of wonder about the world around them.
- Scientifically literate students are able to explore, analyze, evaluate, synthesize, appreciate, and understand the interrelationships among science, technology, society, and the environment that will affect their personal lives, careers, and their future.
- To achieve the vision of scientific literacy, students must increasingly become engaged in the planning, development, and evaluation of their own learning experiences. They should have the opportunity to work cooperatively with other students, to initiate investigations, to communicate their findings, and to complete projects that demonstrate their learning.
  (adapted from The *Manitoba Curriculum Framework of Outcomes*, 1999)

Grade One
Cluster 1: Characteristics & Needs of Living Things

Report Card Subject Categories	Essential Learning		Essential Questions	Concepts	Specific Learning Outcomes	Essential Vocabulary
	Enduring Understandings Students should understand these ideas long after the teaching is done	**Skills** Students need to demonstrate the following skills when learning the ideas in this cluster	When students can answer these questions adequately, then there is evidence that they understand the big ideas in this cluster	Students should be able to demonstrate understanding by applying the concept when problem solving.	Students need to meet these outcomes. In doing so, they will have enough basic knowledge to understand the big ideas	Students need t understand the terms in contex and use them ir their work.
Knowledge and Understanding	Life takes many different forms. All living things, including you, have needs. All living things have general characteristics with similarities and differences.	Use and understand related vocabulary Identify and describe characteristics and needs of animals. Identify and describe characteristics and needs of humans. Identify and describe characteristics and needs of plants.	What are the characteristics and needs of living things? What makes plants and animals unique in the world? How are living things alike? Different?	There are many different life forms (trees, shrubs, grass, etc.), Living things have physical features, life processes, needs, meeting needs, senses, locomotion Some of these characteristics are similar and some are different depending on the needs of the life form. Living things have unique variations in body parts and functions, physical features, life processes, needs, senses that help them survive.	1-1-01 1-1-03, 1-1-06, 1-1-07, 1-1-08, 1-1-09, 1-1-10, 1-1-12, 1-1-14 1-1-02, 1-1-03, 1-1-04, 1-1-06, 1-1-07, 1-1-09, 1-1-10, 1-1-12 1-1-05, 1-1-06, 1-1-07, 1-1-08, 1-1-10, 1-1-12, 1-1-14	characteristics human animal plant living thing needs *as well as descriptive wo related to life processes -
Scientific Inquiry Process	Living things can often have similar needs, but that particular needs may be unique to individual living things.	Observe, compare, and research animals. Observe and compare humans. Observe and compare plants.	How are the characteristics and needs of plants and animals similar? Different?		1-1-03, 1-1-06, 1-1-07, 1-1-09 1-1-02, 1-1-03, 1-1-04, 1-1-06, 1-1-07, 1-1-09 1-1-05, 1-1-06, 1-1-07	

Design Process/ Problem Solving	While the emphasis is on shared characteristics and needs among living things, diversity is also recognized, including the variations that make each human unique.	Design, construct, and evaluate an environment to meet the needs of an animal. Create, implement, and evaluate action plans to demonstrate respect and care for all livings things.	How does the environment support the basic needs of animals? When can't the environment support the basic needs of animals? In what ways do traditional First Nations people live in harmony with the environment?		1-1-11 1-1-13, 1-1-14	

Grade One
Cluster 2: The Senses

Report Card Subject Categories	Essential Learning		Essential Questions	Concepts	Specific Learning Outcomes	Essential Vocabulary
	Enduring Understandings Students should understand these ideas long after the teaching is done	**Skills** Students need to demonstrate the following skills when learning the ideas in this cluster	When students can answer these questions adequately, then there is evidence that they understand the big ideas in this cluster	Students should be able to demonstrate understanding by applying the concept when problem solving.	Students need to meet these outcomes. In doing so, they will have enough basic knowledge to understand the big ideas	Students need to understand these terms in context, and use them in their work.
Knowledge and Understanding	Our senses make us aware of the environment and the many materials that are found in the environment. Through our senses, we can detect items that may be good to eat, pose danger, or be useful. Our senses are immediate and automatic.	Use and understand related vocabulary Identify what the senses are, how they operate, and how they must be protected.	What are the senses? Why do people/animals need senses? How does a guide dog use their senses?	Relate sight to eyes; smell to nose; hearing to ears; taste to tongue; touch to skin. We protect senses by wearing sunglasses, gloves, earplugs, washing hands etc.	1-2-01 1-2-02, 1-2-04, 1-2-05, 1-2-06, 1-2-08, 1-2-09	senses sight smell hearing taste touch eye nose ear tongue skin eyelash eyebrow eyelid nostril cartilage nose hair *as well as descriptive words related to shape, colour, lustre, wetness, temperature, taste, odour, size, texture, pitch
Scientific Inquiry Process	To use our senses safely and effectively involves focus, discernment, awareness, and judgment.	Use the senses to sort and classify objects and identify familiar substances using safe procedures. Investigate objects and procedures that protect the body and preserve the senses.	How do your senses keep you safe at home? How do people/animals use senses to protect themselves? How do people use aids to enhance their senses? (e.g. Beethoven was almost completely deaf when he	Use senses to protect ourselves. We can use aids (guide dogs, hearing aids) to assist us in daily	1-2-03, 1-2-07 1-2-10, 1-2-12, 1-2-13	

		Explore to determine ways that appearance, texture, sound, smell and taste of objects can be altered.	composed his 9th symphony! How did he manage to compose this symphony?) How do traditional First Nations people use their senses in order to live off the land?	life Objects can be altered by sanding, cooking, painting, tuning instruments, tanning hides, shaping clay	1-2-11	
Design Process/ Problem Solving	There are 5 senses that operate to enrich our experiences and to make us more aware of what is enjoyable or what is harmful. It's important to protect your senses.	Design, construct, and evaluate a game that uses your senses to sort and classify objects. How would a person who can't see be able to play your game? Refine observation skills.	How would your life change if you lost one of your senses? Explain	Identify familiar substances by smell, texture, sound, taste, smell, sight	1-2-03 1.2-12 1-2-13	

Grade One
Cluster 3: Characteristics of Objects & Materials

Report Card Subject Categories	Essential Learning		Essential Questions	Concepts	Specific Learning Outcomes	Essential Vocabulary
	Enduring Understandings Students should understand these ideas long after the teaching is done	**Skills** Students need to demonstrate the following skills when learning the ideas in this cluster	When students can answer these questions adequately, then there is evidence that they understand the big ideas in this cluster	Students should be able to demonstrate understanding by applying the concept when problem solving.	Students need to meet these outcomes. In doing so, they will have enough basic knowledge to understand the big ideas	Students need to understand these terms in context, and use them in their work.
Knowledge and Understanding	Objects and materials have different characteristics. Objects are made from materials with specific characteristics.	Use and understand related vocabulary Distinguish between objects and materials. Determine that objects are made from materials with specific characteristics.	What's the difference between objects and materials? What materials would a toy maker use to make a doll house? A train set? A computer game? (In the story, The Three Little Pigs, how did the 3 Little Pigs use materials to build their houses? What were the results?) What materials did First Nations use to make a shelter? Tools? A canoe? To decorate their traditional clothes and items?	Objects are made of one or more materials (wood, metal, plastic, cloth, leather, wicker, etc. or any combination) Materials relate to an object's use (steel is hard for nails, rubber is waterproof for boots, etc.)	1-3-01 1-3-03, 1-3-04 1-3-02, 1-3-05, 1-3-06	characteristics objects materials wood metal plastic cloth waterproof absorbent join recycle rigid pliable

Scientific Inquiry Process	Describe these characteristics of objects and materials clearly and precisely.	Test and evaluate the suitability of materials for a particular function/task. Test and evaluate the ways that material can be joined.	Describe some ways that traditional First Nations used natural materials as everyday objects? How might you make an object that meets specific needs?	Materials selection and construction techniques are important when making a useful object. Not all materials can be joined by the same technique: gluing, taping, stapling, buttoning, interlocking, etc.	1-3-07, 1-3-08 1-3-09	
Design Process/ Problem Solving	Make objects from various materials in order to understand the connection between a material's characteristics and the specific purpose(s) for which the material is used.	Construct a useful object by selecting, combining, joining and shaping materials. http://www.sciencebob.com/experiments/straw_hoop_plane.php Identify ways of reducing, reusing and recycling materials. http://www.sciencebob.com/experiments/duckcall.php	What makes an object useful and environmentally friendly? Think about a First Nations structure (teepee, igloo, long house, sweat lodge or tool.)	Materials selection and construction techniques are important when making a useful object.	1-3-10 1-3-11	

Grade One
Cluster 4: Daily and Seasonal Change

Report Card Subject Categories	Essential Learning		Essential Questions	Concepts	Specific Learning Outcomes	Essential Vocabulary
	Enduring Understandings Students should understand these ideas long after the teaching is done	**Skills** Students need to demonstrate the following skills when learning the ideas in this cluster	When students can answer these questions adequately, then there is evidence that they understand the big ideas in this cluster	Students should be able to demonstrate understanding by applying the concept when problem solving.	Students need to meet these outcomes. In doing so, they will have enough basic knowledge to understand the big ideas	Students need to understand these terms in context, and use them in their work.
Knowledge and Understanding	The environment changes. Changes occur in cycles. These changes are in short(day cycle) and long cycles (seasonal changes). Changes that occur are: temperature, wind, and light, These changes impact human, plant and animal life.	Use and understand related vocabulary Describe the cycle of day and night. Describe the cycle of the seasons. Identify that plants, animals and humans must make preparations for the daily and seasonal changes in their environment..	How does the environment change everyday? What are the characteristics of the weather in each season? How do people/ animals prepare for seasonal changes?	Changes occur in cycles. Short cycle of day and night and the longer cycle of a season. All living things prepare for these cyclical changes. The sun is a source of light and heat and daily and seasonal changes. Characteristics of the four seasons such as length of day, type of precipitation and temperature	1-4-01 1-4-02, 1-4-03, 1-4-04, 1-4-05, 1-4-06 1-4-02, 1-4-04, 1-4-09 1-4-10, 1-4-14, 1-4-16	sun light heat day night day time night time morning afternoon days of the week yesterday today tomorrow seasons shadow characteristic behavior living things cycle

Scientific Inquiry Process	Short and seasonal cycles impact human, animal and plant behaviours.	Record, describe and compare changes in temperature at different times of the day. Investigate and describe changes that occur in characteristics and behaviours of living things throughout the day. Sort clothing to suit each season, and justify their decisions. Classify and compare the physical and behavioural changes that occur seasonally among plants and animals	How do changes affect plants? Animals? People? How did First Nations people and early settlers adapt to changes in weather?	Temperature decreases during the night and increases during the day Cyclical changes impact human animals, and plant behaviours . (choice of clothing dependent upon temperature and weather conditions thicker fur, migration, hibernation, dormancy, etc.)	1-4-07 1-4-08 1-4-13 1-4-16	
Design Process/ Problem Solving	Humans, animals and plants make changes in order to be able to live comfortably through the seasons.	Construct a device or structure that helps animals adjust to seasonal changes.	How would you design a healthy and safe environment for an animal that lives outdoors in the winter/summer in northern Manitoba (e.g. Inuit) / southern Manitoba?	Different environments require unique materials and structures to make safe and comfortable housing	1-4-17	

Grade Two
Cluster 1: Growth and Changes in Animals

Report Card Subject Categories	Essential Learning		Essential Questions	Concepts	Specific Learning Outcomes	Essential Vocabulary
	Enduring Understandings Students should understand these ideas long after the teaching is done	**Skills** Students need to demonstrate the following skills when learning the ideas in this cluster	When students can answer these questions adequately, then there is evidence that they understand the big ideas in this cluster	Students should be able to demonstrate understanding by applying the concept when problem solving.	Students need to meet these outcomes. In doing so, they will have enough basic knowledge to understand the big ideas	Students need to understand these terms in context, and use them in their work.
Knowledge and Understanding	All animals grow and change from birth until adulthood. Animals build upon their knowledge of living things.	Use and understand related vocabulary Understand that: - foods come from plants and animals. - food is a form of energy. - healthy eating is based on Canada's Food Guide to Healthy Eating is essential for growth and development. Identify and describe that offspring, including humans, generally resemble their parents and will have constantly changing characteristics as they grow and develop at different rates.	What kinds of foods make a body healthy? Why? In what ways do human/animal babies resemble their parents? How are you like your parents? Different?	Food is a vital form of energy for the body. There are 4 food groups which have both plant-based and animal-based foods There are similarities in differences in human development. (height, weight, when start to walk, talk, etc.)	2-1-01 2-1-04, 2-1-05, 2-1-07 2-1-02, 2-1-03, 2-1-08, 2-1-11 2-1-14	food groups Canada's Food Guide offspring adult behavior life cycle stage life processes

		Describe changes in the appearance and activity of various animals as they go through a complete life cycle. Identify and describe ways in which humans help other animals.	How did you changed from the first day you were born to your first birthday? To today?	Offspring have similar characteristics to their parents. (human, animal, birds etc)		
Scientific Inquiry Process	All life needs certain conditions to support healthy development.	Compare the constant and changing characteristics of humans and other animals as they grow and develop from birth to adulthood. Describe, classify and compare a wide range of animals according to various characteristics and behaviours, including the way in which they care for their offspring. Compare the life cycles of animals that have similar life cycles and those that have different life cycles. Observe and describe an animal's life processes.	How is your life cycle different than the life cycle of a dog or cat?	Offspring have the same characteristics and needs as their parents. (appearance, habits, food, day and night activity, mammals, amphibian etc)	2-1-09, 2-1-10 2-1-12, 2-1-13 2-1-15 2-1-16	

Design Process/ Problem Solving	The human body needs specific nutrition for health and strength.	Plan a menu for one day, based on the four food groups in Canada's Food Guide to Healthy Living.	What makes a healthy meal? How does the body use food? How did a traditional First Nations diet and life style keep people strong and healthy?	The human body needs specific nutrition for health and strength.	2-1-06	

Grade Two
Cluster 2: Properties of Solids, Liquids and Gases

Report Card Subject Categories	Essential Learning		Essential Questions	Concepts	Specific Learning Outcomes	Essential Vocabulary
	Enduring Understandings Students should understand these ideas long after the teaching is done	**Skills** Students need to demonstrate the following skills when learning the ideas in this cluster	When students can answer these questions adequately, then there is evidence that they understand the big ideas in this cluster	Students should be able to demonstrate understanding by applying the concept when problem solving.	Students need to meet these outcomes. In doing so, they will have enough basic knowledge to understand the big ideas	Students need to understand these terms in context, and use them in their work.
Knowledge and Understanding	Materials have similarities and differences in their characteristics,(look, feel, sound, or change). Solids, liquids and gases have different properties.	Use and understand related vocabulary Identify substances, materials and objects as solids and liquids https://www.youtube.com/watch?v=pmHxYE_vDBs	How are liquid, solids and gases the same? Different? How do liquids, solids and gases change?	Solids and liquids have different characteristics.	2-2-01 2-2-02	solid liquid substance property mass/weight dissolve gas changes of state water vapour freeze melt condense evaporate boil float sink buoyancy
Scientific Inquiry Process	.Solids and liquids interact.	Investigate, compare and explore properties of familiar solids and liquids Experiment to identify and explore the properties of gases.	What happens when solids and liquids mix? How can we make sinking materials float and floating materials sink?	Solids maintain their shape, have mass/weight, and take up space. Liquids have no definite shape, have mass/weight & take up space, Materials have different capacities, which determine their	2-2-03, 2-2-04, 2-2-05, 2-2-06, 2-2-07, 2-2-08, 2-2-09, 2-2-10 2-2-11, 2-2-12, 2-2-13	

		Explore and recognize that the states of solids and liquids remain constant in some circumstances, but may change in other circumstances. http://www.sciencebob.com/experiments/lavacup.php Predict and test the buoyancy of materials.	Why do some materials float and others sink in water?	use. (e.g. absorption) Mixing different materials can make a new material.(water and drink crystals, cake mix and water) Air is a substance around us and is make up of several gases like carbon dioxide, oxygen, nitrogen, water vapour. Gases occupy space not taken up by solids and liquids and have no definite shape	2-2-14, 2-2-15 2-2-17, 2-2-18	
Design Process/ Problem Solving	The properties of solids and liquids determine their uses. Some of these uses become garbage which needs to be disposed of safely.	Research, evaluate and propose a course of action to dispose of solids and liquids to maintain a clean and healthy environment. Design an object that is buoyant and able to support a given mass/weight.	How can garbage become less harmful to the environment? (used car oil, old paints, cell phones, glass bottles, newspapers, etc) How can wastewater and sewage disposal be more environmentally friendly? How did First Nations design objects that float? e.g. Birch bark canoe? How can you make an object that floats and supports mass? (buoyancy, shape of material/object)	The properties of solids and liquids determine their uses.	2-2-16 2-2-19	

Grade Two
Cluster 3: Position and Motion

Report Card Subject Categories	Essential Learning		Essential Questions	Concepts	Specific Learning Outcomes	Essential Vocabulary
	Enduring Understandings Students should understand these ideas long after the teaching is done	**Skills** Students need to demonstrate the following skills when learning the ideas in this cluster	When students can answer these questions adequately, then there is evidence that they understand the big ideas in this cluster	Students should be able to demonstrate understanding by applying the concept when problem solving.	Students need to meet these outcomes. In doing so, they will have enough basic knowledge to understand the big ideas	Students need to understand these terms in context, and use them in their work.
Knowledge and Understanding	Develop a sense of space as well as an understanding of the relationship between stationary and moving objects, including themselves.	Use and understand related vocabulary Describe the position of objects by using observations and comparisons. Describe the motion of objects and living things. Describe how simple machines can be used to make motion easier. Describe how friction can affect the motion of objects and humans across different surfaces.	How do maps work? How did First Nation people describe locations? (e.g. How to find Head Smashed in Buffalo Jump? The Forks?) How many different types of motion could you use in the game "Simon Says"? Why does a rolling ball stop?	There is a relationship between stationary and moving objects known as space.	2-3-01 2-3-02, 2-3-03, 2-3-04, 2-3-05 2-3-06, 2-3-07 2-3-09, 2-3-10, 2-3-12, 2-3-13 2-3-08	position stationary above between near far from next to below in front of behind to the right/left perspective motion push pull friction slope inclined plane wheel axle rotate clockwise counter-clockwise

Scientific Inquiry Process	Develop the ability to describe the position and motion of objects and recognize the effects of pushes and pulls on the motion of an object.	Conduct experiments to investigate simple machines. Conduct experiments to investigate friction. Investigate inclined planes, and wheels and axles as types of simple machines	If we were to totally remove friction when rolling a ball, would it keep moving forever? How can you lift something that is too heavy to lift? (inclined planes, wheels and axles..) You're in a contest. The person who can get the ball to roll the farthest wins. What would you do to make your ball roll as far as possible? (effects of changing the slope of inclined planes and the effect of wheels of a toy on tile, sandpaper or foam rubber; shoes on carpet, tile or ice)	Forces like friction and gravity affect the movement of objects. There is a relationship between the position and motion of objects. Pushes and pulls have an effect on the motion of an object.	2-3-09, 2-3-11 2-3-08	
Design Process/ Problem Solving	Determine how these simple machines make it easier to move things and how friction affects the motion of objects.	Design a vehicle with wheels and axles that meets given criteria.	How can a vehicle be designed in order to move? (wheels and axles design, use of different materials, consider friction)	Friction affects the motion of objects.	2-3-14	

Grade Two
Cluster 4: Air and Water in the Environment

Report Card Subject Categories	Essential Learning		Essential Questions	Concepts	Specific Learning Outcomes	Essential Vocabulary[1]
	Enduring Understandings Students should understand these ideas long after the teaching is done	**Skills** Students need to demonstrate the following skills when learning the ideas in this cluster	When students can answer these questions adequately, then there is evidence that they understand the big ideas in this cluster	Students should be able to demonstrate understanding by applying the concept when problem solving.	Students need to meet these outcomes. In doing so, they will have enough basic knowledge to understand the big ideas	Students need to understand these terms in context, and use them in their work.
Knowledge and Understanding	Air and water are major parts of our physical environment and are essential for life.	Use and understand related vocabulary Explain that air has unique characteristics. Identify the various forms of water in the environment that encompass the water cycle. Describe how humans use water. Describe how clean air and water are important in our environment.	How do we know there is air? What impact does air have on our daily life? Where can water be found? Why are there different forms of water in the water cycle? How important is water to your daily life? Explain	Air and water are vital life sources for all living things. Air moves (wind, air currents); has temperature, takes up space, etc. Water takes various forms in the environment. Water has multiple uses.	2-4-01 2-4-02, 2-4-04 2-4-06, 2-4-07 2-4-09, 2-4-10 2-4-10, 2-4-11	wind air current temperature changes of state water cycle freeze melt condense evaporate sources of drinking water water pollution air pollution

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Scientific Inquiry Process	Characteristics of air, and the various forms of water in the environment.	Observe and explore air movement. Identify the processes of the water cycle through observation and exploration. Investigate factors that cause things to dry quickly or slowly.	How does inside air differ from outside air? (leaves blowing, drapes moving, flag, etc winter/summer) What is the water cycle? How important is it? (- evaporation, transpiration, condensation, precipitation, collection) What effects air temperature? (amount of moisture in the air, amount of wind) Which processes of the water cycle are similar? What speeds up drying/melting?	Changes in air temperature and air movement have positive and negative effects.	2-4-03 2-4-06, 2-4-07 2-4-08	
Design Process/ Problem Solving	Air and water contribute to the health and survival of living things. Everyone has a responsibility to protect these vital resources.	Construct and test a device that shows evidence of air movement. (windsock, wind chime, pinwheel, sailboat, kite, etc.) Identify substances that pollute air and water, identify and act upon solutions to reduce air and water pollution. (car exhaust, smoke, carbon monoxide, oil, house paints, sewage, etc.)	What proof is there that air moves? What responsibility do you have to ensure clean air/water? Describe what you will do. What are the issues and some solutions regarding water on some First Nations communities?		2-4-05 2-4-12 2-2-13, 2-4-14	

		Identify and act upon ways to reduce water usage. ([2]shower, turn off taps when brushing teeth, wash clothes when washing machine is full, etc.)				

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Grade Three
Cluster 1: Growth and Changes in Plants

Report Card Subject Categories	Essential Learning		Essential Questions	Concepts	Specific Learning Outcomes	Essential Vocabulary
	Enduring Understandings Students should understand these ideas long after the teaching is done	**Skills** Students need to demonstrate the following skills when learning the ideas in this cluster	When students can answer these questions adequately, then there is evidence that they understand the big ideas in this cluster	Students should be able to demonstrate understanding by applying the concept when problem solving.	Students need to meet these outcomes. In doing so, they will have enough basic knowledge to understand the big ideas	Students need to understand these terms in context, and use them in their work.
Knowledge and Understanding	Plants have characteristics and needs that are necessary for their survival.	Use and understand related vocabulary Identify the conditions for healthy plants to grow. Identify the characteristics of plants and its adaptations. Recognize and explain the relationship between plants and animals, including humans and the environment.	How are plants, animals and humans alike/different? Do different conditions affect plants? Explain How have plants/ animals/ humans changed in order to survive? How did First Nations people use their knowledge of plants to help early settlers?	All living things have basic needs. (light, water, air, space, warmth, growing medium, nutrients, etc.) Living things are designed to survive. (plant parts and functions, characteristics of plant parts physical adaptations) Living things are interdependent. Living things can die if they don't have their basic need met.	3-1-01 2-1-04, 3-1-05, 3-1-10 3-1-07, 3-1-08, 3-1-11 3-1-03, 3-1-12, 3-1-13, 3-1-14, 3-1-15, 3-1-16, 3-1-17, 3-1-	growing medium nutrient energy root stem leaf flowers pistil stamen ovule pollen seed fruit life cycle adaptation air oxygen carbon dioxide

Scientific Inquiry Process	All living things have basic needs that must be met in order to survive. Plants are important to the environment and the survival of people and animals. (food, shelter, medicine, etc.	Plan and initiate experiments to determine ideal growing environments for plants. Observe, compare and contrast characteristics of plants. Research and reflect about the relationship between plants and animals, including humans and the environment	How do ideal growing conditions meet plant need? How are plants growing environments the same/different? How would life change if there were no bees? How are First Nations' relationships to plants and animals part of a sustainable existence? How would life change if there were no bees?	All plants need light, water, air, space, warmth, growing medium, nutrients Flowering plants require certain types of care throughout its life cycle. Plants have special parts that help them grow and reproduce. All living things are interdependent.	3-1-04, 3-1-10 3-1-02 3-1-13, 3-1-14, 3-1-15, 3-1-16, 3-1-17, 3-1-18	
Design Process/ Problem Solving	Different plants grow on different parts of the world.	Plan, design and evaluate ideal growing environments for plants.	How would you design a northern growing facility that would provide fresh food to the people living in the north? (shelter from elements, soil selection, window sill garden, green house, terrarium, trellis, vertical garden, etc)	Relationship between plants and the soils and the environments in which they are grown.	3-1-06	

Grade Three
Cluster 2: Materials and Structures

Report Card Subject Categories	Essential Learning		Essential Questions	Concepts	Specific Learning Outcomes	Essential Vocabulary
	Enduring Understandings Students should understand these ideas long after the teaching is done	**Skills** Students need to demonstrate the following skills when learning the ideas in this cluster	When students can answer these questions adequately, then there is evidence that they understand the big ideas in this cluster	Students should be able to demonstrate understanding by applying the concept when problem solving.	Students need to meet these outcomes. In doing so, they will have enough basic knowledge to understand the big ideas	Students need to understand these terms in context, and use them in their work.
Knowledge and Understanding	The properties of a material determines it use.	Use and understand related vocabulary Describe how shapes and materials provide strength and stability to natural and human-built structures from various cultures.	What shapes and materials create the strongest structures? Why does shape and material matter when building a house? (boat, bridge, igloo, teepee, animal den ….) (The Three Little Pigs)	Shapes like cylinders, triangles, domes, hexagons etc have specific characteristics that determine their uses. Materials characteristics, type, function, strength, flexibility, durability, surface texture, etc. determine their uses.	3-2-01 3-2-07, 3-2-08, 3-2-13	strength balance stability structure foundation frame structure natural structure human-built structure force
Scientific Inquiry Process	Strength and stability is important to all structures.	Conduct experiments to compare the strength of common materials, and determine ways to strengthen and join two materials for a specific use.	What makes a material strong? How can materials be strengthened? What is meant by a “sustainable” material?	The properties of a material determine it uses. (toothpicks, straws, paper, cardboard, fabric, foam) Strength sometime is determined by	3-2-02, 3-2-03, 3-2-04 3-2-05, 3-2-06	

		Recognize and explore how balance affects the stability of a structure, and ways to improve the strength and stability of a frame.		changing shape, bulk, and number of layers. How materials are joined affects the strength of a structure. (tape, glue, pin, plasticine, wire) Balance creates a more stable structure. Triangles and cross members add strength to structures.		
Design Process/ Problem Solving	Build structures, and select and use materials suitable to the task at hand.	Design and construct a structure that meets a given criteria related to strength, stability and function which can withstand the effects of various forces.	How would you build a bridge that allows two-way “dinkie cars” traffic. It should be strong enough to hold 10 cars at a time, must be able to span a distance of 50 cm, and must be 10 cm off the ground? How would you design a tower that is 20 cm high, and must be capable of holding a paper (or plastic) cup with 15 marbles in it while a fan set on medium speed is fanning it from 0.5 m away?	Forces like gravity, pressure, weight/mass, wind affect structures. Construction, engineering, and architecture	3-2-09, 3-2-10, 3-2-11, 3-2-12	

Grade Three
Cluster 3: Forces That Attract or Repel

Report Card Subject Categories	Essential Learning		Essential Questions	Concepts	Specific Learning Outcomes	Essential Vocabulary
	Enduring Understandings Students should understand these ideas long after the teaching is done	**Skills** Students need to demonstrate the following skills when learning the ideas in this cluster	When students can answer these questions adequately, then there is evidence that they understand the big ideas in this cluster	Students should be able to demonstrate understanding by applying the concept when problem solving.	Students need to meet these outcomes. In doing so, they will have enough basic knowledge to understand the big ideas	Students need to understand these terms in context, and use them in their work.
Knowledge and Understanding	Gravity, magnetism, and static electricity are forces that affect living things and objects. Objects and living things on or near Earth are affected by a force called gravity,	Use and understand related vocabulary Identify and describe the invisible forces that attract and repel (pull and push), including: magnetism, gravity and static electricity.	What are invisible forces and what role do they play in our daily life?	Magnetism can attract (pull), or repel (push), Forces can be helpful or harmful.	3-3-01 3-3-02, 3-3-03, 3-3-10, 3-3-11, 3-3-16, 3-3-17	force attract repel magnet gravity magnetism north pole south pole magnetic field compass electrostatic charge static electricity
Scientific Inquiry Process	Magnets have two poles and are surrounded by a magnetic field. The strengths of gravity, magnetism and static electricity forces vary in relation to certain conditions.	Predict, test and investigate magnetic properties including: attraction, repulsion, magnetizing materials, magnetic fields and poles. Explain and demonstrate, using a compass, that the Earth has magnetic fields and poles.	What conditions affect magnets? How do like and unlike poles interact? What's the impact of the earth's magnetic poles? How can you magnetize an iron nail? How can you prove that it has become	Magnetic forces vary at different distances. Some materials, when placed between two magnets, can affect the magnetic force. Earth's magnetic field are adjacent	3-3-04, 3-3-05, 3-3-06, 3-3-07, 3-3-14, 3-3-15, 3-3-16 3-3-08, 3-3-09	

		Investigate how electrostatically charged materials interact and can be managed.	magnetized? http://www.sciencebob.com/experiments/electromagnet.php What conditions affect the force of static electricity? Why? Do different types of clothes cause more static cling than others? Why do clothes dried in a clothes dryer have more static than the clothes on a clothes line?"	to the geographic poles. Earth's magnetic poles attract the needle of a compass. Electrostatic forces can be managed. (Cling spray, dust mops, spraying water on the affected area….)	3-3-12, 3-3-13, 3-3-14, 3-3-16	
Design Process/ Problem Solving	The strength of gravitational, magnetic and electrostatic forces varies under different conditions.	Plan and construct a game, toy, or device that uses gravitational, magnetic or electrostatic forces. http://www.sciencebob.com/experiments/bendwater.php	How can you get two balloons that are suspended on threads to move away from each other?	Charged materials can attract or repel each other and can attract uncharged materials.	3-3-18, 3-3-19	

Grade Three
Cluster 4: Soils in the Environment

Report Card Subject Categories	Essential Learning		Essential Questions	Concepts	Specific Learning Outcomes	Essential Vocabulary
	Enduring Understandings Students should understand these ideas long after the teaching is done	**Skills** Students need to demonstrate the following skills when learning the ideas in this cluster	When students can answer these questions adequately, then there is evidence that they understand the big ideas in this cluster	Students should be able to demonstrate understanding by applying the concept when problem solving.	Students need to meet these outcomes. In doing so, they will have enough basic knowledge to understand the big ideas	Students need to understand these terms in context, and use them in their work.
Knowledge and Understanding	Soil provides a base for gardens, forests, fields, and farms, supporting plant and animal life, and human activities. Soil composition and characteristics vary.	Use and understand related vocabulary Identify and describe various components within a sample of soil from the local environment, and the effect of water on different soils.	How does soil composition impact the environment? (plant growth, animal habitat, human settlement…)	Soil composition varies. The composition of soil determines how it can be used.	3-4-01 3-4-02, 3-4-06	soil soil component loam clay sand pebbles organic matter humus rocks sedimentation sieving water-holding capacity
Scientific Inquiry Process	Different soils impact plant growth. Animals and nutrient recycling is important to soil quality.	Explore ways to separate soil components, and compare samples collected at different locations. Experiment to determine how the characteristics of soils and water affect plant growth. Research animals found in soil and explain their importance to soil quality. Investigate how various culture use earth materials to make objects.	How has soil shaped the livelihood of a people past or present? What happens to animal habitats when soil and/ or water composition changes?	Soil quality is determined by the amount of clay, loam, pebbles, organic matter, humus and rocks, water-holding capacity, texture, cohesion, ability to hold shape. Worms, insects, and mammals help to aerate the soil and/or increase nutrients.	3-4-03, 3-4-04 3-4-05, 3-4-06, 3-4-07, 3-4-08 3-4-09 3-4-12	

				The type of soil makes a difference to how it is used.(to grow healthy plants or plant health or to make clay pots, sod houses, adobe bricks, jewelry, etc.		
Design Process/ Problem Solving	There is a strong connection between soils and plants.	Design and construct a simple composter that returns organic matter to the soil.	How does nature restore itself?	People have a role to ensure that they take care of the soil and replenish it.	3-4-10, 3-4-11	

Grade 4
Cluster 1: Habitats and Communities

Report Card Subject Categories	Essential Learning		Essential Questions	Concepts	Specific Learning Outcomes	Essential Vocabulary
	Enduring Understandings Students should understand these ideas long after the teaching is done	**Skills** Students need to demonstrate the following skills when learning the ideas in this cluster	When students can answer these questions adequately, then there is evidence that they understand the big ideas in this cluster	Students should be able to demonstrate understanding by applying the concept when problem solving.	Students need to meet these outcomes. In doing so, they will have enough basic knowledge to understand the big ideas	Students need to understand these terms in context, and use them in their work.
Knowledge and Understanding	Plant and animal communities satisfy their needs in particular habitats. Complex interactions take place between plant and animal populations within a community.	Use and understand related vocabulary Understand how plants and animals depend on specific habitats to meet their needs. (food, shelter, Identify and explain how plants and animals can adapt in order to survive in a specific habitat. Understand how plants and animals interact within a community through systems such as food webs and food chains.	What is an eco system? How does an eco system work? What happens to plant/animals/people when an eco system changes? How does a food chain work?	Plant and animal populations and their habitats need to be conserved. Science uses technological developments to increase knowledge of populations. Plants and animals can sometimes make physical and behavioural adaptations to survive. Organisms in a food chain have roles, (producer, consumer, herbivore, omnivore, carnivore, predator, prey, scavenger).	4-1-01 4-1-02, 4-1-03, 4-1-07, 4-1-15, 4-1-16 4-1-04, 4-1-06, 4-1-16 4-1-09, 4-1-10, 4-1-11, 4-1-13, 4-1-16	habitat population community adaptations food chain food web organism producer consumer herbivore omnivore carnivore predator prey scavenger endangered extinction conservation

Scientific Inquiry Process	Both naturally occurring and human-caused, that can alter habitats and affect plant and animal populations.	Predict and test to determine an appropriate method for measuring a plant population within a given habitat. Investigate explanations of plant or animal adaptations. Investigate changes to habitats.	What is meant by adapt or die? How do scientist know if a species is endangered? What are some of the biggest threats to endangered species? What First Nations practices ensure that animal populations won't be depleted?	Changes to plant and animal populations need to be monitored and protected. All people are responsible to live sustainably.	4-1-08 4-1-05 4-1-14	
Design Process/ Problem Solving	Traditional knowledge and technology play a role in learning more about and caring for plant and animal populations.	Construct a model of a habitat and its associated populations of plants and animals. Construct food chains and food webs.	What is a food chain? What checks and balances do First Nations peoples have to live in harmony with the environment?	Populations live where they can find food and shelter. Organisms in a food chain are interdependent.	4-1-12 4-1-11	

Grade 4
Cluster 2: Light

Report Card Subject Categories	Essential Learning		Essential Questions	Concepts	Specific Learning Outcomes	Essential Vocabulary
	Enduring Understandings Students should understand these ideas long after the teaching is done	**Skills** Students need to demonstrate the following skills when learning the ideas in this cluster	When students can answer these questions adequately, then there is evidence that they understand the big ideas in this cluster	Students should be able to demonstrate understanding by applying the concept when problem solving.	Students need to meet these outcomes. In doing so, they will have enough basic knowledge to understand the big ideas	Students need to understand these terms in context, and use them in their work.
Knowledge and Understanding	Light is energy.	Use and understand related vocabulary Identify and explain the properties of light that interact with various objects in the environment. Identify and explain the technological developments for our vision.	Why is light important? How is light useful? How does light impact human sight?	Light is a form of energy Light has many uses and these uses are extended through technological developments.	4-2-01 4-2-02, 4-2-03, 4-2-05, 4-2-06, 4-2-09, 4-2-16 4-2-13, 4-2-15	energy reflect absorb transmit artificial natural light beam transparent translucent opaque brightness
Scientific Inquiry Process	Light interacts with various objects in the environment.	Observe and describe properties of light. Classify materials based on their ability to transmit, reflect, or absorb light and evaluate their usefulness.	Why is light energy? How has technology influenced our ability to see?	White light can be separated into colours. Light can be transparent, translucent or opaque.	4-2-04, 4-2-07, 4-2-08 4-2-10, 4-2-11 4-2-12	

		Investigate shadows based on the position of the light source relative to an object.	How would your shadow change in different seasons?	The size and shape of a shadow is based on the position of a light source relative to an object.		
Design Process/ Problem Solving	Light travels in a straight line and can be bent as it passes through other mediums.	Construct a device that transmits and reflects light. https://www.youtube.com/watch?v=fD1544bM_c4	How does the path of light change?	Light travels in a straight path and bends as it passes through other mediums.	4-2-14	

Grade 4
Cluster 3: Sound

Report Card Subject Categories	Essential Learning		Essential Questions	Concepts	Specific Learning Outcomes	Essential Vocabulary
	Enduring Understandings Students should understand these ideas long after the teaching is done	**Skills** Students need to demonstrate the following skills when learning the ideas in this cluster	When students can answer these questions adequately, then there is evidence that they understand the big ideas in this cluster	Students should be able to demonstrate understanding by applying the concept when problem solving.	Students need to meet these outcomes. In doing so, they will have enough basic knowledge to understand the big ideas	Students need to understand these terms in context, and use them in their work.
Knowledge and Understanding	Sound is energy and is a phenomenon that can be observed, measured, and controlled in various ways. Sound travels, Human and animal ears are designed to detect sound. Sound can be modified.	Use and understand related vocabulary Explain that sound is a form of energy. Explain that sound is caused by vibrations, and travels in waves. Explain that the human ear is designed to detect sound.	What is sound? How is sound useful? How does the ear work?	Sound is a form of energy Sounds are caused by vibrations, travels in waves in all directions Humans and animals can detect a different range of sounds. Ways to protect your hearing.	4-3-01 4-3-02, 4-3-03 4-3-05, 4-3-08 4-3-09, 4-3-10, 4-3-11, 4-3-12	energy sound vibration vocal chord pitch loudness sound waves outer ear middle ear inner ear brain transmit absorb reflect detect
Scientific Inquiry Process	Certain materials transmit, absorb, or reflect sound, These characteristics influence a material's function.	Identify and classify sounds. Explore pitch and loudness. Investigate to determine how sound vibrations travel differently through different mediums.	Why can dogs hear sounds humans can't hear? How did First Nations use sound to communicate? How is sound transmitted today?	Sound has pitch and loudness. Sound travels through solids, liquids, and gases Materials transmit or absorb sound in different situations	4-3-04 4-3-07 4-3-13, 4-3-14, 4-3-15 4-3-16, 4-3-17	

		Research inventions and devices related to sound/hearing, and their impact on humans/society.		Devices and inventions can extend our ability to produce, transmit, and detect sound		
Design Process/ Problem Solving	It's important to protect one's sense of hearing	Design a musical instrument. Design a device to protect hearing.	How does a guitar produce different sounds? A flute? A drum? … What could harm your hearing?	Sound is made of vibrations, pitch, and loudness.	4-3-06 4-3-11, 4-3-18	

Grade 4
Cluster 4: Rocks, Minerals and Erosion

Report Card Subject Categories	Essential Learning		Essential Questions	Concepts	Specific Learning Outcomes	Essential Vocabulary
	Enduring Understandings Students should understand these ideas long after the teaching is done	**Skills** Students need to demonstrate the following skills when learning the ideas in this cluster	When students can answer these questions adequately, then there is evidence that they understand the big ideas in this cluster	Students should be able to demonstrate understanding by applying the concept when problem solving.	Students need to meet these outcomes. In doing so, they will have enough basic knowledge to understand the big ideas	Students need to understand these terms in context, and use them in their work.
Knowledge and Understanding	The study of rocks and minerals is called geology. Various rocks and minerals are found in the Earth's crust,	Use and understand related vocabulary Identify the unique characteristics and properties of rocks and minerals. Explain that rock formations occur as a natural phenomenon. Explain how fossils help us understand the Earth's history. Conduct investigations to demonstrate how fossils are formed.	Why do First Nations refer to rocks as the 'Grandmother' of the earth?	Minerals are composed of one substance; rocks are composed of two or more minerals. Rocks and minerals are classified according to scratch test for hardness, streak test for colour; igneous, sedimentary, or metamorphic rock. Fossils help humans gain a better understanding of Earth's history, including identifying organisms that are now extinct.	4-4-01 4-4-04, 4-4-07 4-4-08 4-4-09, 4-4-10 4-4-14, 4-4-15	rock mineral characteristic property scratch test streak test igneous sedimentary metamorphic fossil organism extinct soil formation erosion natural phenomena

Scientific Inquiry Process	Rocks and minerals characteristics and properties determine how humans use rocks and minerals. Wind, water, and ice continue to reshape the landscape through erosion.	Classify rocks according to observations and tests. Research products derived from rocks and minerals. Explain how changes in the natural environment occur as a result of erosion, natural phenomena/disasters, and human activities Conduct research investigations to observe soil erosion by wind, water and ice, natural disasters in local and global communities	What's the difference between a rock and a mineral? What do tooth paste and rocks have in common? How might a natural disaster/erosion affect the natural environment?	effects of wind, water, and ice floods, avalanches, mud slides, hydroelectric dams, clearing land, clear-cut forestry, forest fires	4-4-02, 4-4-03, 4-4-05, 4-4-08 4-4-06 4-4-09 4-4-12 4-4-15	
Design Process/ Problem Solving	Rocks play a role in forming soil and in providing us with information about Earth's history. Humans can adapt to and prevent or make changes in the landscape.	Design models to demonstrate how various rocks are formed. Design a process to reduce soil erosion.	What important information about Earth's history can we learn form rocks? What might reduce soil erosion?	Windbreaks, retaining walls, terracing, cover crops, reforestation are ways to reduce soil erosion.	4-4-08 4-4-13	

Sample Grade Book

Grade Two Science
Cluster Three: Position and Motion

4 Very good understanding
3 Good understanding
2 Basic understanding
1 Limited understanding
ND Not yet demonstrated

Enduring Understanding: The study of position and motion helps children develop a sense of space as well as an understanding of the relationship between stationary and moving objects, including themselves.

Students	Report Card Categories														
	Knowledge and Understanding					**Scientific Inquiry Process**					**Design Process/Problem Solving**				
	Essential Questions What are the similarities and differences between the positions of objects? How can simple machines be used to make motion easier? How can friction affect the motion of objects?					Essential Questions How can different simple machines be used? How can friction be shown?					Essential Question How can a vehicle be designed in order to move?				
	Evidence from Learning Experiences					**Evidence from Learning Experiences**					**Evidence from Learning Experiences**				
	Position: Fixed and Change	Position: Perspective	Simple Machines	Friction	Vocabulary	Inclined plane experiments	Inclined plane: Communicating data	Wheels and Axles experiments	Wheels and Axles: Communicating data	Friction	Creates a plan	Collects appropriate materials	Develops the vehicle	Tests the vehicle	Evaluate the vehicle

Early Years Science Definitions –
Provincial Report Card Categories

Knowledge and Understanding

This report card category focuses on student progress related to learning experiences in which students demonstrate understanding of grade--specific science concepts.

Scientific Inquiry

This report card category focuses on student progress related to learning experiences in which students ask questions, generate possible explanations, collect and analyze evidence, and reach conclusions based on evidence. Scientific inquiry also involves the use of the science process skills, including: questioning, observing, classifying, measuring, communicating, inferring, predicting, hypothesizing, experimenting; and collecting, analyzing,and interpreting data.

Design Process/Problem Solving

This report card category focuses on student progress related to learning experiences in which students apply science knowledge to seek solutions to practical problems. Students solve scientific problems and/or use the steps related to the design process. The design process steps are:

1. Identify a need
2. Create a plan
3. Develop a product
4. Communicate the results.

The design process includes the proposing, creating, and testing of prototypes, products, and techniques in an attempt to reach an optimal solution to a given problem.

References:
The Manitoba Report Card Support Document. Manitoba Education. 2012.
Kindergarten to Grade 4 Science: Manitoba Curriculum Framework of Outcomes. Manitoba Education. 1999.

Essential Learning Terminology

Enduring understanding
"Enduring understandings are statements summarizing important ideas and core processes that are central to a discipline and have lasting value beyond the classroom. They synthesize what students should understand….as a result of studying a particular content area. Moreover, they articulate what students should "revisit" over the course of their lifetimes in relationship to the content area."

Key performance skills
Key performance skills draw on a variety of skills. Performance skills develop within the individual and grow in sophistication over time. Some examples of key performance skills include problem solving, critical thinking and inquiry, design process etc.

Values/attitudes/dispositions
Students need to develop the values and attitudes that assist them in understanding each discipline with some depth, then knowing how to communicate their understanding while seeing the relationship between each discipline.

Essential questions
Questions that are not answerable with finality in a brief sentence…their aim is to stimulate thought, provoke inquiry and spark more questions. *Wiggins/McTighe 2005*

Concepts
The broad concept provides a frame through which students filter information *(Erickson*). When a concept is truly understood it can be explained and is transferrable, or applied to problem---solving. *Wiggins/McTighe 2005*

Essential vocabulary
Vocabulary is introduced when needed to clarify experiences and ideas rather than in a list of new terms that start the unit. Essential vocabulary consists of figurative language, nuances in word meaning, roots, affixes, context clues, dictionary, thesaurus, pronunciation, parts of speech. *Wiggins/McTighe 2005*