

Student-s Name _____ Course Name Grade Seven Science

R - retain, D - delete, C - changed

Outcomes

R D C Changed Outcome

Characteristics of Living Things				
After completion of this unit, the student will be able to:				
Concept #1: Certain characteristics distinguish living things and nonliving things.				
! Distinguish between living, nonliving and dead.				
! Identify the major life processes common to most forms of life.				
! Distinguish between animal life and plant life.				
! Propose a definition for the term life.				
! Provide examples of living, nonliving and dead components in the local area.				
! Demonstrate an appreciation for both living and nonliving components of the local environment.				
Concept #2: Variations exist among organisms. Organisms move in different ways and a variety of structures make such movements possible.				
! Distinguish between locomotion and motion.				
! Observe differences in locomotion among				

various invertebrates.				
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! Give examples of different types of motion in plants.				
! Compare structures that enable animals to move in different mediums (i.e., on land, in water, in air)				
Concept #3: Internal movements are important in the body.				
! Identify internal movements which occur within our bodies.				
! Identify the body=s vital signs.				
! Locate and monitor pulse before and after exercising.				
! Discover the effect of exercise on pulse rate by conducting an investigation in which the control, manipulated and responding variables are identified.				
! Construct a line graph of the data collected from the investigation of the pulse rate.				
! Devise and conduct an investigation which compares the pulse rates of adults and grade				

seven students.				
! Infer why differences may have been observed in the pulse rate investigation.				

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Concept #4: Growth is a fundamental characteristic of all living things. It means more than just getting bigger.				
! Define growth as <i>the characteristic of life that allows all organisms to get bigger, change and repair themselves.</i>				
! Appreciate the fact that growth patterns may differ from one individual to the next.				
! Measure and record variations which exist among classmates for a chosen characteristic.				
! Define regeneration as <i>the process by which an organism grows new tissue or body parts to replace those that have been destroyed.</i>				
! Give examples of animals from the coastal waters of Newfoundland which are capable of regeneration.				
Concept #5: Reproduction is a life process essential for the survival of the species.				
! Define reproduction as <i>the replacement of</i>				

	<i>an old generation by a new generation.</i>			
!	Identify several methods by which organisms reproduce.			
!	Demonstrate various methods of reproduction in plants.			

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	Concept # 6: An organism-s survival depends upon its ability to respond appropriately to stimuli within its environment.				
!	Define stimulus as <i>anything which causes activity or change in an organism and can either be internal or external.</i>				
!	Define response as <i>reaction(s) made to a particular stimuli.</i>				
!	Identify various stimuli and the specific response which each may evoke.				
!	Define reaction time as <i>the time interval between the stimulus and the response.</i>				
!	Illustrate the importance of reaction time to an organism in responding to stimuli within its environment.				
	Concept #7: Optical microscopes offer technology for				

	h l o r o p l a s t				
	- cell membrane				
	- vacuole				
!	Prepare and stain a wet mount slide of onion skin.				
!	Determine the length and width of a typical onion cell.				
!	Diagram and label a typical plant and animal cell.				
!	Compare and contrast typical plant and animal cells.				

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! Identify and describe as many micro-organisms as possible from a sample of pond water.				
Unit 2: Structure and Design				
After completion of this unit, the student will be able to:				
Concept #1: Structures are of two types, manufactured and natural.				
! Compare natural and manufactured structures.				
! Given a description of a manufactured structure (or an actual structure) explain how it is modeled after natural structures.				
Concept #2: The design of a structure refers to the shape of its parts and how they are put together.				
! Analyze the similarities and differences in the design of various structures.				
Concept #3: Function is the purpose or use for something.				
! Describe the function(s) of given natural and manufactured structures.				
! Explain that the design of a structure is determined by its intended function.				

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Concept #4: The selection of materials for a structure involves a consideration of the properties of those materials.				
! Describe the properties of materials (strength, stretchability, hardness, and lightness) used in structures.				
! Describe the properties of a given material which make it useful for certain functions.				
Concept #5: The selection of materials for a structure involves a consideration of the forces that act upon the materials used in the structure.				
! Distinguish between tensile, compressive, and shear forces in a material.				
! Identify the effect(s) of compressive and tensile forces on materials.				
! Investigate the effect of compressive, tensile, and shear forces on materials used in some structures.				
Concept #6: The strength of a structure is related to its components and how they are arranged within the structure.				

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<p>! Illustrate and briefly describe the differences among the following components:</p> <ul style="list-style-type: none"> - Rectangular beam - I-beam - Arch - Cantilever - Column - Dome 				
<p>! Conduct a test of the load bearing abilities of different shaped beams.</p>				
<p>! Identify the type of force(s) responsible for the bending and/or breaking of beams.</p>				
<p>! Demonstrate and explain how a brace can be used to increase the load bearing ability of beams.</p>				
<p>! Explain why components of structures often have triangular shapes.</p>				
<p>! Explain why an arch or dome is able to support a vertical load better than a simple beam can.</p>				

Concept #7: There are many common approaches to the design of bridges.				
! Identify several common types of bridges.				

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! Describe some of the structural elements which occur regularly in the design of the more common types of bridges.				
! Label all of the parts on a bridge which give it strength and support.				
! Predict where compressive, tensile, and shear forces may occur on a given bridge.				
! Design, build and test a model bridge using simple materials.				
Unit 3: Force and Motion				
After completion of this unit, the student will be able to:				
Concept #1: A force is a push or pull exerted on an object.				
! Define force as <i>a push or pull exerted on an object.</i>				
! Give examples of natural and manipulated forces.				

Concept #2: Forces cause a change in the shape or the motion of an object.				
! Explain the effect a force has on an object's shape or movement.				

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Concept #3: There are many types of forces: buoyant, magnetic, electrical, gravitational, elastic, and frictional.				
! Describe the various types of forces: buoyant, magnetic, electrical, gravitational, elastic, and frictional.				
! Describe and classify examples of forces.				
Concept #4: Our present state of knowledge about force is the result of the collective work of many years of research.				
! Appreciate the work of many scientists in developing scientific theories and ideas.				
! Explain Newton's contribution to the understanding of forces.				
Concept #5: Gravity is the force of attraction between two objects having mass.				
! Define gravity as the force of attraction				

	between two objects having mass.			
!	Explain that the amount of gravitational force is directly related to the mass of the object.			
!	State that weight is a measure of gravity			
!	Distinguish between mass and weight.			

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!	Demonstrate how the mass of an object can be determined under varying gravitational forces.				
!	Analyze the effect that the absence of gravity would have on our lives.				
Concept #6: Standard units are units of measurement that have been developed and agreed upon to allow for consistency of measurement all over the world.					
!	Explain that units of measurement are human conventions that have been agreed upon.				
!	Propose a unit of measurement for distance and use it to measure objects in the classroom setting.				
!	Explain the importance of having standardized units of measurement.				
!	State that the standard unit of force is the				

Newton (N).				
! State that 1 N is approximately the same as the amount of gravitational force the Earth exerts on an object with a mass of 110 grams. (1 N = 100 g).				
! Estimate the approximate force required to support objects of varying masses.				

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Concept #7: Measuring devices are inventions that have become accepted over time. The devices are not a part of nature - they are used to describe nature.				
! Build and calibrate a device to measure forces.				
! Use the device to measure a variety of forces.				
! Repeat measurements to establish their reliability.				
! Calculate averages of repeated measurement.				
! Develop an awareness and understanding that the validity of scientific research depends highly on the reliability and consistency of results.				
Concept #8: A graph is an efficient means of presenting information.				

!	Construct a bar graph of the data collected with the student-made force meter.				
!	Rank order, according to the magnitude of force, the measurements on the bar graph.				
Concept #9: Friction is a force that opposes the movement of one surface sliding or moving over another.					
!	Define friction as <i>the force that results when one object moves against another.</i>				

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!				Demonstrate the effects of friction.
!				Predict how the following factors affect friction: weight of the object, smoothness of the surface and lubrication.
!				Investigate and describe various ways in which frictional forces can be increased or decreased.
!				Explain and give examples of beneficial and harmful frictional forces.
Concept #10: Motion is created through unbalanced forces.				
!				State that unbalanced forces will affect the speed and the direction of an object.
!				Predict and demonstrate the effect of balanced

and unbalanced forces on objects in motion and at rest.				
Concept #11: Inertia is the tendency of an object at rest to remain at rest and an object in motion to remain in motion unless an unbalanced force acts upon it.				
! Define inertia as <i>the tendency of an object at rest to remain at rest and an object in motion to remain in motion at the same speed and direction.</i>				

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! Give examples of the effect inertia can have on objects at rest and in motion.				
! Investigate and describe the effect mass has on the inertia of an object.				
Concept #12: For every action there is an equal but opposite reaction.				
! Explain that if object A places a force on object B, then object B places a force back on object A, which is equal in size and opposite in direction.				
! State that the forces occur in pairs. They are called action and reaction.				
! Demonstrate action and reaction pairs and the				

forces they represent for varying situations.				
Unit 4: Measuring Temperature				
After completion of this unit, the student will be able to:				
Concept #1: Temperature is the measure of how hot or cold a substance is.				
! Define temperature as <i>the measure of how hot or cold a substance is.</i>				
! Estimate temperatures of varying substances using means other than thermometer.				

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! Compare the estimated temperatures with actual temperatures.				
Concept #2: A thermometer is required for accurate temperature measurement.				
! State that the Celsius scale is the most frequently used scale for measuring temperature.				
! Measure the temperature to an accuracy of 1 Celsius degree.				
! Identify instances where accurate temperature measurement is important.				

Concept #3: Thermometers have been calibrated with respect to agreed upon fixed points.				
! Identify the fixed points commonly used in calibrating a Celsius thermometer as the boiling point and freezing point of water.				
! Build and calibrate a thermometer.				
! Measure the temperature of varying substances using the built thermometer.				
! Compare the accuracy of the built thermometer by comparing the temperature measurements obtained with the built thermometer to those obtained using a laboratory thermometer.				

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! Suggest ways of improving the built thermometer.				
Concept #4: A thermometer-s structure, design and materials are related to its function.				
! Describe different types of thermometers: liquid, gas, bimetallic strip and thermocouples.				
! Measure temperature change using each of the above thermometers.				
! Describe how the structure, design and				

materials of a thermometer are related to its function.				
Concept #5: Probes can be connected to microcomputers in order to measure temperature.				
! Use microcomputer interface technology to measure and record temperature.				
! Appreciate the improvement in the data collection and recording made possible by this technology.				
Concept #6: Thermometers work because of the uniform expansion and contraction of specific substances.				
! Using knowledge of expansion and contraction, explain how liquids, gas and bimetallic strip thermometers work.				

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Unit 5: Chemicals and You				
After completion of this unit, the student will be able to:				
Concept #1: Survey techniques are valid means of collecting scientific data.				
! Use survey research techniques as a means of collecting data.				
! Use a chart or table to organize data collected				

	from a survey.			
!	Analyze data through grouping respondents and tallying results.			
!	Relate the impact of sampling techniques on the validity of a survey.			
Concept #2: Matter consists of chemicals.				
!	Distinguish between natural chemicals and manufactured chemicals.			
!	Identify everyday substances as being natural chemicals or manufactured chemicals.			
!	Appreciate the role of chemicals in society.			
Concept #3: Water is a natural chemical which plays a vital role in society.				
!	Identify the many uses of water.			

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! Recognize the need to protect water from various sources of contamination.				
! Identify local and global causes of water contamination.				
Concept #4: Solutions form when two or more substances dissolve.				

!	Define mixture as <i>a combination of two or more substances</i> .				
!	Define soluble as <i>the ability to dissolve</i> .				
!	Observe differences in a substance's ability to dissolve in water.				
!	Construct a definition for the term solution .				
!	Investigate and identify the properties of a solution.				
!	Select solutions from a group of mixtures.				
!	Distinguish between solute and solvent .				
!	Identify the solute and solvent in everyday solutions.				
!	Appreciate that solutions are widely used in our everyday life.				

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Concept #5: The concentration of a solution is dependent upon the amount of solute dissolved in a given amount of solvent.				
!	Observe differences between dilute solutions and concentrated solutions.			

!	Construct definitions for dilute solutions and concentrated solutions.			
!	Give examples of the use of dilute and concentrated solutions.			
!	Express the concentration of a solution as a ratio of the amount of solute to the amount of solution.			
!	Convert the concentration of a solution into a percent.			
!	Convert percent concentration as a ratio of amount of solute to amount of solution.			
!	Prepare a 10 percent solution.			
!	Successfully dilute a solution by 10 percent.			
!	Calculate the concentration of a solution when it is diluted by 10 percent.			
!	Define 1 ppm as <i>representing one part solute per one million parts solution</i> .			

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	Concept #6: An indicator-s color change is used to determine concentrations of solutions.			
!	Define an indicator as <i>a substance that will change color for a particular concentration</i>			

<i>of a solution.</i>				
! Observe the color that a universal indicator will turn in water, acids and bases.				
! Design an investigation to determine the identity of an unknown solution using a universal indicator.				
! Predict patterns that may be observed when a universal indicator is combined with varying amounts of different solutions.				
Concept #7: Litmus is an indicator used in the identification of acids and bases.				
! Describe litmus paper as a type of indicator used to identify acids and bases.				
! Distinguish between acids, bases and water using litmus paper and a universal indicator.				
! Construct operational definitions for the term acids and bases .				
! Discover that the dilution of acids and bases will result in successfully less color change.				

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! Evaluate the statement ADilution is the answer to pollution@.				

Unit 6: Changes in the Land				
After completion of this unit, the student will be able to:				
Concept #1: Change is an ongoing process. Landforms are continually undergoing change.				
! Classify photo study changes as: - fast or slow - natural or human-made - beneficial or harmful				
! Provide evidence of change in the land in their local area.				
Concept #2: Weathering is a basic process causing natural change in landforms.				
! Define weathering as <i>the process of breaking or wearing down rocks</i> .				
! Classify examples of weathering as being one of mechanical, chemical or biological.				
! Identify and record evidence of weathering in sidewalks, concrete building foundations, rocks and brick.				
! Infer the cause of weathering in examples form their local area.				

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! Analyze how factors such as freezing and				
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thawing, size of rock, and kind of rock determine the rate of weathering.				
! Appreciate that care and attention to detail are important attributes of a science student.				
Concept #3: Erosion follows weathering as a basic process causing change in the land.				
! Define erosion as <i>the wearing away and movement of weathered materials from place to place.</i>				
! State that the natural causes of erosion are gravity, running water, ice and wind.				
! Distinguish among examples of erosion, such as: - slump - avalanche - mudslide - landslide				
Concept #4: Running water is the most influential cause of erosion.				
! Define run-off as <i>rainwater that runs across the surface of the ground instead of sinking in.</i>				

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!	Analyze how the following variables might affect the rate of erosion: - stream slope - stream volume - particle size			
!	Describe the role of models and simulations in science investigations.			
Concept #5: Deposition represents the end of the journey (at least temporarily) for weathered material.				
!	Define deposition as <i>the settling of eroded materials</i> .			
!	Identify causes of deposition in a stream.			
Concept #6: Waves and tides work together to erode land.				
!	Give examples which provide evidence of the power of waves.			
!	Define tides as <i>the rise and fall of water on beaches bordering large bodies of water</i> .			
!	Explain how waves and tides produce various shoreline features such as: - beaches - caves - tunnels - stacks			

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Concept #7: Glaciers are moving masses of ice that have been responsible for shaping the land.				
! Define glacier as <i>a mass of ice which flows under the influence of gravity.</i>				
! Explain how glaciers are formed.				
! Distinguish between continental and alpine glaciers.				
! Compare and contrast the movement of alpine and continental glaciers.				
Concept #8: The theory on how glaciers had shaped the land developed as a result of collaboration between scientists.				
! Evaluate Charpentier's and Agassiz's arguments concerning the theory of glaciation.				
! Distinguish between till and outwash .				
! Describe how glaciers erode the land over which it moves.				
! Given a description or a diagram, identify landscape features produced by glaciers.				
! Discover evidence for glaciation in the local area.				

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! Appreciate that, through careful observation, it is possible to understand the natural processes which shape the land.				
! Appreciate that scientists are ordinary people, who are capable of realizing their misconceptions and changing (Agassiz).				
! Understand that inferring has a very fundamental role in the Earth Sciences because of its emphasis on the Earth-s past.				
Unit 7: Doing an Independent Science Project				
After completion of this unit, the student will be able to:				
Concept #1: Science is a system of knowledge which in itself is tentative, based on models of what went on before, strives to be free of bias and demands verification from different sources.				
! Explain that science is a knowledge system which attempts to explain events in the natural world.				
! Explain that a scientific theory is based on the extent of knowledge at the time it was proposed.				
! Explain that a scientific theory must be tested continually until such a time as it fails to give				

satisfactory answers.				
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! Explain that a theory can be modified or over-thrown as a result of new observations				
Concept #2: There is no such thing as a typical scientist.				
! Appreciate that a scientist should not be regarded as a person apart from others.				
! Appreciate that a scientist is an inquiring person governed by the desire to know.				
! Appreciate that the work of scientists is usually the consequence of a collective effort.				
Concept #3: There is no such thing as one scientific method.				
! Explain that the use of a scientific method can lead to an increased understanding of the natural world.				
! Explain that a general scientific method consists of three phases: - a creative phase - an investigative phase - a recording and reporting phase				
! Appreciate that a scientific method is any method which involves curiosity, imagination,				

logical thinking and investigation.			
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Concept #4: Technology is processes and products applied to solving human problems. Technology often uses scientific knowledge in solving these problems.				
! State that technology is processes and products applied to solving human problems.				
! Explain that technological problem solving consists of the following phases: - understanding the problem - developing a plan - carrying out the plan - evaluating				
! Explain that the integration of scientific concepts with technological problem-solving skills can provide solutions to technology related problems.				
Concept #5: Many Canadian scientists have made valuable contributions to science.				
! Appreciate the contribution of Canadian scientists to an area of science.				
Concept #6: Science- and Technology- related careers are both rewarding and accessible to both males and females.				

!	Identify career opportunities in the fields of science and technology.				
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!				
Describe the general requirements for some career opportunities in scientific and technical fields.				
Concept #7: A science project begins with a question.				
!				
Show an interest in some scientific issue which they wish to learn more about.				
Concept #8: Selecting a question is an important aspect of a science topic.				
!				
Generate a list of questions about the scientific issue.				
!				
Choose an appropriate question from the list to investigate.				
!				
Write the question in a researchable form.				
Concept #9: Background research is necessary to determine what is already known about the question.				
!				
Identify possible sources where information on the question can be gathered.				
!				
Collect information on the chosen question				

	from the different sources identified.			
!	Compile clear, concise notes about all of the information which is gathered.			
!	Acknowledge the sources of all the information which is gathered.			

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	Concept #10: Science projects are classified according to the type of project and the level of the project.				
!	Make a decision as to whether the answer to the question will require an experimental, study or innovative type project.				
!	Determine what level of difficulty, depth, complexity and completeness is necessary to investigate the chosen question.				
	Concept #11: Projects requiring experimental methods involve several recognizable steps.				
!	Design an experiment to investigate the question, making use of the following steps: - write the chosen question in the form of an hypothesis; - identify manipulated, responding and controlled variables; - determine a procedure which tests the hypothesis; - execute the procedure until every condition				

<p>that affects the hypothesis has been examined; - repeat the procedure a number of times to check the validity of the results; - record all the data generated from the investigation.</p>				
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Concept #12: Data can be efficiently recorded, presented and interpreted through the use of charts, tables, and graphs.				
! Organize the data collected from the investigation using a combination of charts, tables, and graphs.				
! Analyze the data, using the charts, tables and graphs, so as to decide upon a conclusion to the investigation.				
Concept #13: Results of investigations are recorded in scientific reports.				
! Prepare a science project consisting of the following components: - purpose - research summary - materials and procedures - results and observations - Conclusion(s)				

<ul style="list-style-type: none"> - Application(s) - Bibliography - A display unit (optional) - A materials exhibit (optional) 				
<p>Concept #14: Communications is an important aspect of science.</p>				
<p>! Communicate the methodology and results of the investigation.</p>				