

COMMONWEALTH OF THE BAHAMAS

MINISTRY OF EDUCATION



PRIMARY SCIENCE CURRICULUM GUIDELINES

GRADES 1-2

DEPARTMENT OF EDUCATION
JUNE 2010

GOVERNMENT OF THE COMMONWEALTH OF THE BAHAMAS

PRIMARY SCIENCE CURRICULUM GUIDELINES

A COMPONENT OF EDUCATION DEVELOPMENT PROGRAMME

PRODUCED BY THE SCIENCE & TECHNOLOGY SECTION

DEPARTMENT OF EDUCATION

JUNE 2010

**MINISTRY OF EDUCATION
PRIMARY SCIENCE CURRICULUM GUIDELINES
GRADES 1 – 2 (REVISED 2010)
TABLE OF CONTENTS**

SECTION A

Message from the Minister of Education	ii
Message from the Director of Education	iii
Acknowledgements	iv

SECTION B

Vision, Mission Statement – Ministry of Education	2
Rationale, Overreaching Goal, Sub-Goals, Objectives	3
Scope and Sequence	4
Unit /Topic Allocation	14
Standards and Bench-Marks	33
Learner Outcomes	51
Definition of Terms	60

SECTION C

The Curriculum/ Scope of Work	
Grade 1	62
Grade 2	91

SECTION D

Perspectives That Enrich Instruction	108
Inquiry-based Learning	109
Constructivism	110
Bloom’s Taxonomy	111
Science Process	112
Use of the Scientific Method	114
Cooperative Learning Technique	115
Student–Centred vs. Teacher-Centred Learning	116
Multiple Intelligences and Learning Styles	117
Assessment Strategies/ The Assessment Process	119
Information Technology Linkages/Literacy Skills	123
Laboratory Safety/ Science Safety	127
Rubrics	130

SECTION E

Appendices: Teaching and Learning Strategies	136
Sample Glossary: Grades 1 – 2	139

SECTION F

References	141
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SECTION A

MESSAGE FROM MINISTER OF EDUCATION

MESSAGE FROM ACTING ASSISTANT DIRECTOR OF EDUCATION (SCIENCE AND TECHNOLOGY SECTION)

What helps students to develop a scientific outlook, are the processes to which they are exposed in the classroom. Science, therefore, should not be merely a study of finite answers but rather an application of processes that aid in discovering and learning about the world in which we live.

If our education system is to keep pace with scientific advancement, our students must be exposed to an effective and comprehensive science education programme which presents opportunities for them to become actively involved in experiments, discovery and at the same time obtain the requisite knowledge, skills and attitudes necessary to compete both locally and globally in a scientific and technological society.

For this to be realized, the development and implementation of model science curricula, strengthening the capacity of teachers and providing adequate science instructional supplies and facilities are paramount.

Science teachers are therefore challenged to inspire, stimulate divergent thinking and provide the means for students to investigate based on what they know as well as what they wish to discover.

With each of us giving of and performing at our best, our students should be able to achieve our goal, which is, to develop competent citizens to provide an efficient and effective workforce needed to advance scientific careers and professions so as to improve the quality of life for all.

ACKNOWLEDGEMENTS

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SECTION B

VISION, MISSION STATEMENT, BROAD OBJECTIVES

VISION

To ensure that all persons in the Commonwealth of The Bahamas develop physically, mentally, socially and spiritually in order to function responsibly and productively in an increasingly dynamic, technological and complex society.

MISSION STATEMENT

To provide opportunities for all persons in The Bahamas to receive the education and training that will equip them with the necessary knowledge, skills, beliefs and attitudes required for work and life in a democratic society, guided by Christian values.

BROAD OBJECTIVES

The team responsible for effecting the necessary revisions to the *Primary Science Curriculum* holds the view that the curriculum should achieve two broad **objectives**:

- Provide courses of study that challenge participants to acquire interdisciplinary skills and academic standards consistent with emerging global workforce requisites while simultaneously promoting self-confidence, character strengthening, creativity and personal initiative.
- Improve the use of technology in the teaching/learning process.

RATIONALE, OVERREACHING GOAL, SUB-GOALS, OBJECTIVES

RATIONALE

To provide opportunities that expose and engage students in The Bahamas in acquiring scientific knowledge, attitudes and skills which will enhance critical thinking, problem-solving and organizational skills. In so doing, students will be able to participate in varied scientific and technological careers in the global environment, as well as realize the impact that they make on the natural world and appreciate the need for its sustainability.

OVERARCHING GOAL

To empower individuals to become critical thinkers, problem-solvers, visionaries, and scientifically and technologically literate citizens who appreciate, interpret and conserve the natural and physical environment.

SUB-GOALS

- To enable students to solve problems using the scientific method.
- To provide experiences which will help students develop analytical and evaluative skills thus enabling them to become critical thinkers.
- To assist students in the application of scientific knowledge and principles to stimulate their creative expressions.
- To expose individuals to scientific knowledge and technological advances so they will be able to function effectively in the world in which they live.
- To enable students to formulate, present and defend arguments based on facts.
- To promote an appreciation for the safe and sustainable use of resources.

OBJECTIVES

- Correctly and safely use materials and scientific equipment.
- Identify problems and apply the scientific method to solve them.
- Collect, interpret and process data to generate information.
- Communicate information.
- Recognize scientific relationships.
- Apply scientific principles and concepts to daily life in order to make responsible and wise decisions.
- Apply scientific and technological principles and concepts to daily life in order to make responsible and wise decisions.
- Pursue new scientific knowledge.
- Design, conduct and evaluate scientific investigations.
- Demonstrate critical thinking by responding to “what if” scenarios (situation analysis).
- Appreciate and utilize environmental conservation strategies.

SCOPE AND SEQUENCE

and

UNIT/ TOPIC ALLOCATION

**PRIMARY SCIENCE CURRICULUM
SCOPE AND SEQUENCE**

STRAND 1: LIFE SCIENCE

GRADES: 1-6

Fundamental concepts and principles of life science include the study of living organisms, their structure and function, their behaviors and their relationships with the environment.

	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6
	Characteristics of Organisms	Characteristics of Organisms	Characteristics of Organisms	Characteristics of Organisms	Characteristics of Organisms	Characteristics of Organisms
L I F E	1. A1 Observe human models and Identify body parts. (external only)	1. A1 Conduct research about animals in the environment.	1. A1 Observe a variety of organisms to determine which are vertebrates.	1. A1 Compare Vertebrates and Invertebrates.	1. A1 Communicate traits common to all invertebrates using technology/pictures/specimens.	1. A1 Observe and describe the structure of a cell in organisms (plant/animal).
	1. A2 Observe human models to identify sense organs.	1. A2 Observe/explain what a habitat is.	1. A2 Observe/investigate animals to classify them according to their characteristics.	1. A2 Investigate and record traits common to all invertebrates.		1. A2 Compare plant and animal cells.
	1. A3 Experiment to describe functions of sense organs.	1. A3 Explore selected habitats to observe and examine a variety of animals.	1. A3 Observe organisms to describe the traits common to vertebrates.	1. A3 Classify invertebrates based on body parts and covering.	1. A2 Observe a variety of invertebrates (models/ visuals) to identify their characteristics. (mollusks, crustaceans and stinging cell animals)	1. A3 Observe plant and animal cell parts and record their functions.
	1. A4 Observe models and compare growth development in humans.	1. A4 Compare body coverings of animals.	1. A4 Observe a variety of organisms to describe and identify vertebrate vectors.	1. A4 Observe the main traits of insects and spiders.		1. A4 Classify four types of fungi by their traits.
	1. A5 Experiment with manipulatives to demonstrate habits which support good health.	1. A5 Observe animal parts to predict how they function/move.	1. A5 Observe a variety of organisms to compare mammals to birds and reptiles to fish and amphibians.	1. A5 Compare insects and spiders using models.	1. A3 Observe organisms (visuals/models) to identify vertebrate and invertebrate vectors.	1. A5 Observe/investigate a variety of invertebrates and classify them as sponges, echinoderms and worms.
	1. A6 Infer results from poor health habits.	1. A6 Predict and infer what animals need for survival.	1. A6 Infer how body parts and body coverings of vertebrates help them survive.	1. A6 Compare the life cycles of mosquitoes and cockroaches.	1. A4 Analyze the impact of vectors on the society and infer ways to eliminate them.	1. A6 Compare the traits of sponges, echinoderms and worms.
	1. A7 Describe the basic needs of living things. (plants/animals)	1. A7 Compare animal habitats using visuals/field areas.	1. A7 Experiment with specimens of animal body coverings to determine their function.	1. A7 Analyze how insects use mimicry and camouflage for survival.	1. A5 Investigate the behaviour of animals and infer their adaptive method.	
	1. A8 Investigate/explain the uses of plants and animals.		1. A8 Experiment with materials which imitate mouth parts of animals to determine their diet.			

STRAND 1: LIFE SCIENCE**GRADES: 1-6**

	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6
	Structure and Functions in Living Systems	Structure and Functions in Living Systems	Structure and Functions in Living Systems	Structure and Functions in Living Systems	Structure and Functions in Living Systems	Structure and Functions in Living Systems
L I F E	1. B1 Classify living and nonliving things. 1. B2 Classify plants and animals according to their traits/ characteristics. 1. B3 Compare traits/ characteristics of plants and animals.	1. B1 Observe organisms to identify the basic parts of the human skeleton. 1. B2 Communicate the importance of the skeleton using models/visuals. 1. B3 Compare skeletons of various animals. 1. B4 Observe and record a variety of muscles in the body using visuals/models. 1. B5 Infer and communicate the importance of muscles in the body. 1. B6 Infer how poor health habits affect personal and family health. 1. B7 Predict the basic needs of plants for survival. 1. B8 Observe a live plant to record its parts.	1. B1 Use visuals to observe the parts of the digestive system. 1. B2 Communicate the function of the digestive system. 1. B3 Experiment to explain how food is broken down as it passes through the digestive system. 1. B4 Infer how proper nutrition is related to good health. 1. B5 Observe/Predict appropriate exercises and food choice to develop a healthy lifestyle. 1. B6 Observe the six main food groups, and explain the nutrients found in each group. 1. B7 Identify health resources, and communicate their function. 1. B8 Observe plants to identify their parts.	1. B1 Observe the parts and explain the function of the respiratory system. 1. B2 Observe the main parts of the nervous system and communicate its importance. 1. B3 Identify the main parts and the importance of the nervous system. 1. B4 Infer risk factors to health and communicate how these risks may be reduced. 1. B5 Analyze safety procedures for natural disasters. 1. B6 Compare seed and non-seed plants. 1. B7 Classify plants with flowers and plants with cones according to their traits. 1. B8 Compare monocots and dicots. 1. B9 Experiment and describe seed germination.	1. B1 Observe models to identify parts of the skeletal system. 1. B2 Research to explain functions of the skeletal system. 1. B3 Predict and communicate the importance of the muscular system. 1. B4 Compare skeletal and muscular systems. 1. B5 Infer how poor eating habits affect health. 1. B6 Experiment to explain the process of photosynthesis. 1. B7 Classify and record indigenous plants of The Bahamas and their uses. 1. B8 Hypothesize/Investigate the medicinal value of plants. 1. B9 Predict ways to conserve plants.	1. B1 Observe parts of the circulatory system and communicate its function. 1. B2 Observe and identify the four chambers of the heart and its function. 1. B3 Observe the Immune system and communicate its function/importance. 1. B4 Predict risk factors to health and communicate how these risks may be reduced. 1. B5 Infer how negative habits affect the immune system. 1. B6 Use specimen of flowers to observe and label the parts and explain their function. 1. B7 Research to communicate the life cycle of a flower. 1. B8 Compare the growth patterns of plants.

STRAND 1: LIFE SCIENCE
GRADES: 1-6

	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6
	Structure and Functions in Living Systems	Structure and Functions in Living Systems	Structure and Functions in Living Systems	Structure and Functions in Living Systems	Structure and Functions in Living Systems	Structure and Functions in Living Systems
		1. B9 Classify and compare a variety of fruit seeds.	1. B9 Experiment with plant parts and describe their functions. 1. B10 Experiment with seeds to communicate various growth patterns.	1. B10 Observe and describe indigenous flowering plants in The Bahamas.		1. B9 Observe a variety of plants to conclude their adaptive methods for survival. 1. B10 Experiment to discover the needs of plants for growth.
	Organisms and the Environment	Organisms and the Environment	Organisms and the Environment	Organisms and the Environment	Organisms and the Environment	Organisms and the Environment
LIFE	1. C1 Observe and infer where plants/animals live. 1. C2 Compare homes of animals. 1. C3 Research and predict ways in which plants and animals help each other. 1. C4 Observe environment to infer what are vectors, where they live, and their effect on humans.	1. C1 Observe pictures/models to identify plant and animal habitats. Infer how these habitats help the animals and plants. 1. C2 Predict how habitats can be harmed and protected. 1. C3 Research to observe what are vectors. 1. C4 Predict where specific vectors live. 1. C5 Infer how vectors can be eliminated.	1. C1 Observe living and nonliving things in a garden (ecosystem). 1. C2 Observe a variety of model gardens (pictures/real) to communicate and compare types of gardens. (e.g. vegetable/ flower) 1. C3 Experiment with seeds to create several containerized gardens. 1. C4 Use ruler/tape to measure growth of seedlings/ record growth development.	1. C1 Observe/Investigate food chains and food webs in ecosystems and communicate their function. 1. C2 Compare the relationship among producers, consumers and decomposers. 1. C3 Observe/Research plants and animals that live in the pine forests, coral reefs and mangroves. 1. C4 Hypothesize the effect on organisms when a pine forest is damaged. 1. C5 Observe/Investigate organisms in coral reefs and communicate their importance.	1. C1 Infer why plants, decomposers and animals (organisms) are found in ecosystem. 1. C2 Compare food chains and food webs. 1. C3 Communicate the relationship of predator, prey and scavenger. 1. C4 Predict/Research what are resources. 1. C5 Analyze why water, energy and electricity are resources. 1. C6 Infer ways to use resources wisely.	1. C1 Research to define "biomes". 1. C2 Infer/Investigate why plants/animals live in certain biomes. 1. C3 Compare weather factors and organisms in several biomes. 1. C4 Predict the results of natural disasters on the environment. 1. C5 Analyze the effects of human activities on the environment.

STRAND 1: LIFE SCIENCE						GRADES: 1-6
L I F E	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6
	Organisms and the Environment	Organisms and the Environment	Organisms and the Environment	Organisms and the Environment	Organisms and the Environment	Organisms and the Environment
			1. C5 Observe rocky and sandy shores to identify living and nonliving parts. 1. C6 Observe a variety of ecosystems to identify home of conch, grouper, lobster and hutia. 1. C7 Infer what threats affect endangered animals (e.g. grouper). 1. C8 Communicate the laws that protect endangered animals (e.g. grouper).	1. C6 Observe and investigate the four types of mangroves. 1. C7 Communicate the importance of mangroves to our Islands.	1. C7 Predict the importance of preserving National parks.	1. C6 Classify organisms (plants and animals) as endangered or extinct. 1. C7 Infer ways to avoid plants/animals from becoming endangered.

**PRIMARY SCIENCE CURRICULUM
SCOPE AND SEQUENCE**

STRAND 2: EARTH AND SPACE SCIENCE

GRADES: 1-6

**Fundamental concepts and principles of Earth and space science are related to the origin,
Structure and physical phenomena of the Earth and the Universe.**

EARTH AND SPACE	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6
	Properties and Structure of Earth's Systems	Properties and Structure of Earth's Systems	Properties and Structure of Earth's Systems	Properties and Structure of Earth's Systems	Properties and Structure of Earth's Systems	Properties and Structure of Earth's Systems
	2. A1 Infer what the earth is made up of (e.g. land water and air). 2. A2 Observe/Explain land forms found on earth. (e.g. hills, mountains, valleys) 2. A3 Research and observe several bodies of water on Earth (e.g. ponds, lakes, oceans). 2. A4 Investigate appropriate ways to care for the earth. 2. A5 Experiment to explain how hills are formed.	2. A1 Observe rocks and minerals to identify their traits. 2. A2 Compare a variety of rocks. 2. A3 Compare rocks and minerals. 2. A4 Experiment to communicate some uses of rocks and minerals.	2. A1 Investigate to identify Earth's resources 2. A2 Observe Earth's natural resources and their uses. 2. A3 Infer the importance of natural resources to the survival of people. 2. A4 Experiment to show the various types of pollution. 2. A5 Analyze the sources of air, water, and land pollution. 2. A6 Infer ways to prevent pollution. 2. A7 Investigate the role of students as environmental stewards. 2. A8 Predict ways to care for Earth's resources.	2. A1 Identify and describe the three layers of the earth. 2. A2 Experiment to describe the effects of weathering and erosion on earth. 2. A3 Investigate to identify Ocean resources. 2. A4 Investigate the movement of the ocean water and how it is affected by the moon. 2. A5 Infer what is ocean pollution/examine its effect on organisms in the ocean.	2. A1 Predict resources found in the ocean. 2. A2 Predict which pollutants affect the ocean and how pollution affects marine life. 2. A3 Infer the importance of conserving the ocean. 2. A4 Infer what are fossils and compare types of fossils. 2. A5 Analyze the process of fossil formation. 2. A6 Hypothesize how scientists know which fossils are the oldest.	2. A1 Identify and compare the layers of the Earth. 2. A2 Infer what natural resources are and where they are located. 2. A3 Observe the environment to compare weathering and erosion. 2. A4 Observe the environment to distinguish between air, land and water pollution. 2. A5 Predict ways to prevent pollution. 2. A6 Classify resources as renewable or nonrenewable.

STRAND 2: EARTH AND SPACE SCIENCE GRADES: 1-6						
EARTH AND SPACE	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6
	Changes in the Earth and Sky	Changes in the Earth and Sky	Changes in the Earth and Sky	Changes in the Earth and Sky	Changes in the Earth and Sky	Changes in the Earth and Sky
	2. B1 Explain how seasons affect weather.	2. B1 Predict weather conditions by observing the sky.	2. B1 Experiment to explain the water cycle and its relationship to weather and climate.	2. B1 Predict “What is meteorology?”	2. B1 Research to define “atmosphere”.	2. B1 Observe tools that measure factors of weather.
	2. B2 Predict and record weather conditions using basic weather instruments.	2. B2 Observe the immediate environment and communicate the kinds of weather experienced in The Bahamas.	2. B2 Interpret diagrams to explain the changes that occur at each phase of the water cycle.	2. B2 Observe layers in the earth’s atmosphere.	2. B2 Analyze layers of the atmosphere.	2. B2 Observe and describe factors that make up weather.
	2. B3 Investigate career and service opportunities related to weather.	2. B3 Observe weather instruments and their uses.	2. B3 Experiment to describe how clouds are formed.	2. B3 Experiment to show the properties of air.	2. B3 Analyze conditions that change weather.	2. B3 Compare traits/ characteristics of storms/hurricanes.
		2. B4 Hypothesize the different ways in which weather affects people.	2. B4 Research and classify clouds according to their traits.	2. B4 Predict and communicate the elements which contribute to weather.	2. B4 Infer how weather changes affect people.	2. B4 Measure weather conditions using a barometer, a hydrometer and an anemometer.
			2. B5 Analyze weather conditions associated with different types of clouds.	2. B5 Compare weather and climate.	2. B5 Experiment with weather instruments to describe their function. (rain gauge, wind sock)	2. B5 Interpret and record weather data.
				2. B6 Experiment with weather instruments to determine their use. (thermometer wind vane)		2. B6 Compare weather and climate.
				2. B7 Analyze the sun’s effect on Earth.		

STRAND 2: EARTH AND SPACE SCIENCE**GRADES: 1-6**

	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6
[E]	Universe and the Solar System	Universe and the Solar System	Universe and the Solar System	Universe and the Solar System	Universe and the Solar System	Universe and the Solar System

	2. C1 Observe objects in the solar system. 2. C2 Distinguish between day and night.	2. C1 Describe the differences between the moon and Earth. 2. C2 Identify the source of moonlight. 2. C3 Analyze changes in the moon. 2. C4 Infer what a constellation is. 2. C5 Identify and compare common constellations.	2. C1 Experiment to explain the sun's position in relation to the Earth. 2. C2 Experiment to describe the motion of the Earth around the sun. 2. C3 Experiment to explain the terms orbit, revolve and rotate. 2. C4 Predict what causes seasons. 2. C5 Investigate to explain seasonal changes.	2. C1 Research to communicate the order of the eight planets. 2. C2 Research to classify the planets as inner and outer planets. 2. C3 Compare the inner planets and the outer planets. 2. C4 Create a scale model of the distances between planets.	2. C1 Observe and communicate the make-up of the Solar System. 2. C2 Investigate to compare planets. 2. C3 Compare rotation and revolution. 2. C4 Communicate how the sun benefits the earth and other planets. 2. C5 Compare and analyze objects in space. – asteroids, comets, meteors and meteoroids.	2. C1 Compare the atmosphere of the planets. 2. C2 Hypothesize which planets are susceptible to life. 2. C3 Observe equipment used to study objects in space. 2. C4 Analyze distances between planets. 2. C5 Analyze safety precautions for astronauts in space.
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**PRIMARY SCIENCE CURRICULUM
SCOPE AND SEQUENCE**

STRAND 3: PHYSICAL SCIENCE

GRADES: 1-6

**Fundamental concepts and principles of physical science include the study and analysis
of the nature and properties of living and non-living matter and energy.**

	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6
	Properties and Changes in Matter	Properties and Changes in Matter	Properties and Changes in Matter	Properties and Changes in Matter	Properties and Changes in Matter	Properties and Changes in Matter
P H Y S I C A L	3. A1 Classify objects according to their physical properties such as size, color and shape.	3. A1 Analyze forms and properties of matter.	3. A1 Experiment with materials to identify matter as solids, liquids and gases.	3. A1 Investigate, using a variety of materials to identify properties of matter.	3. A1 Classify matter as a substance or a mixture.	3. A1 Analyze physical properties in matter.
	3. A2 Experiment to identify how matter changes: state, size, color and shape.	3. A2 Observe tools used to measure matter.	3. A2 Compare characteristics of solids, liquids and gases to classify them.	3. A2 Investigate physical changes in matter.	3. A2 Compare substances and mixtures.	3. A2 Experiment to explain physical changes in materials.
	3. A3 Compare physical changes in matter.	3. A3 Experiment to determine what is volume.	3. A3 Investigate how matter changes from one form to another.	3. A3 Compare physical properties and physical changes in matter.	3. A3 Experiment to explain how mixtures can be separated.	3. A3 Experiment and record chemical changes in substances.
		3. A4 Observe a variety of solids to communicate which is lighter or heavier.	3. A4 Examine objects to communicate the physical properties of matter.	3. A4 Use a balance to measure and record the mass of objects.	3. A4 Experiment to explain what is a solution.	3. A4 Measure and graph physical properties of matter.
		3. A5 Compare the weights of solids using a balance/scale.	3. A5 Compare forms and properties of matter using measuring utensils.	3. A5 Experiment with measuring instruments (graduates or measuring cups) to measure the volume of matter (varied materials).	3. A5 Compare solutes and solvent.	3. A5 Observe chemicals that will cause changes in matter.
			3. A6 Experiment to discover the length, volume and mass of objects using metric units.		3. A6 Experiment to separate solutes.	3. A6 Compare physical and chemical changes in matter.
					3. A7 Compare mixtures and solutions.	

STRAND 3: PHYSICAL SCIENCE GRADES: 1-6						
P H Y S I C A L	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6
	Forces and Energy	Forces and Energy	Forces and Energy	Forces and Energy	Forces and Energy	Forces and Energy
	3. B1 Compare pushes and pulls.	3. B1 Infer why the sun is the greatest source of energy on Earth.	3. B1 Experiment to discover the sources of energy.	3. B1 Experiment with materials to conclude what is force, work and motion.	3. B1 Investigate Energy and compare various forms of Energy.	3. B1 Experiment with magnets to abate the poles and the magnetic field.
	3. B2 Experiment to identify poles of a magnet.	3. B2 Identify other sources of light besides the sun.	3. B2 Experiment to define fuels.	3. B2 Measure and record pulls using a spring scale.	3. B2 Experiment to explain what is work.	3. B2 Experiment to record the relationships between motion, speed and direction.
	3. B3 Experiment to find out which objects (materials) a magnet will attract/repel.	3. B3 Investigate traits of the sun and communicate its importance.	3. B3 Experiment to communicate how fossil fuels are formed.	3. B3 Use charts to interpret data recorded on pushes and pulls.	3. B3 Compare potential and kinetic energy.	3. B3 Experiment to show how a simple circuit works.
		3. B4 Infer why water is a source of energy/ explain its use.	3. B4 Analyze the uses of energy from fossil fuels.	3. B4 Analyze work and infer how it is related to force.	3. B4 Infer how heat affects temperature.	3. B4 Observe objects and materials to discover the effects of friction on them.
		3. B5 Experiment to explain the wind as a source of energy.	3. B5 Predict which materials will transfer electricity.	3. B5 Experiment to explain what a simple machine is.	3. B5 Investigate how energy changes.	3. B5 Experiment to identify pulleys, wheels and axels.
		3. B6 Predict what would happen if there were no water on Earth.	3. B6 Experiment with magnets to observe the properties of varied materials.	3. B6 Observe objects as wedges or inclined planes.	3. B6 Analyze the impact of technology on forms of energy.	3. B6 Analyze how forces affect everyday living.
		3. B7 Hypothesize ways in which we can conserve water.	3. B7 Investigate the term conservation and explain its importance.	3. B7 Communicate what is energy conservation.	3. B7 Investigate compound/ complex machines that use the lever and screw to help us do work.	3. B7 Experiment to conclude how pulleys, wheels and axels make work easier.
		3. B8 Experiment with magnets and explain what they do.	3. B8 Analyze and share ways to conserve energy.	<u>Technology</u> 1. Describe ways technology is used to explore the ocean.	3. B8 Communicate the importance of conserving energy.	
		3. B9 Classify materials according to their magnetic force.				

UNIT/ TOPIC ALLOCATION
GRADE: 1

SECTION	STRAND	TOPICS	DURATION (Hours)
LIFE SCIENCE	Characteristics of Organisms	1. <u>HUMAN BODY – SENSE ORGANS</u> a. Body Parts b. Function of Body Parts c. Sense Organs d. Function of Sense Organs e. Stages of Human Development f. Physical Changes in Human Development g. Keeping Healthy h. Keeping Clean	✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins.
	Living and Nonliving things	2. <u>WHAT ARE LIVING THINGS?</u> a. Needs of Living Things b. Uses of Plants and Animals c. Animals as Pets and Animals That Help People Work	✓30 mins. __45 mins. __60 mins. 2x30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins.
		3. <u>LIVING AND NONLIVING THINGS</u> a. Living and nonliving things b. Similarities of Living and Nonliving Things c. Plants and Animals d. Homes of Plants and Animals e. Plants Parts f. Animal Parts g. Plants and Animals Help Each Other h. Harmful Animals-Vectors	✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins.

UNIT/ TOPIC ALLOCATION
GRADE: 1

SECTION	STRAND	TOPICS	DURATION (Hours)
EARTH SCIENCE	Properties and structure of Earth's Systems	4. <u>THE EARTH</u> a. Our Earth b. Landform – Hills and Valleys c. Landforms – Plains and Mountains d. Natural Resources e. Saving Natural Resources f. Uses of Water	✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins.
		5. <u>WEATHER AND SEASONS</u> a. Different Types of Weather b. Weather Changes c. Weather Instruments d. Types of Clouds e. Seasons	✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins.
	Universe and the Solar System	6. <u>CHANGES IN THE SKY</u> a. The Sun b. Looking at the Sky c. Day and Night	✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins.
PHYSICAL SCIENCE		7. <u>PROPERTIES AND CHANGES IN MATTER</u> a. Matter b. Physical Properties of matter c. Physical Changes in Matter	✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins.
		8. <u>FORCES AND ENERGY</u> a. Push and Pull b. Using Magnets c. Attract and Repel	✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins.

UNIT/ TOPIC ALLOCATION
GRADE: 2

SECTION	STRAND	TOPICS	DURATION (Hours)
LIFE SCIENCE	Characteristics of Organisms	1. <u>ANIMALS</u> a. Animals in the Environment b. Body Coverings and Parts c. How Animals Move d. What Animals need to Survive e. How Animals Get Food f. Animal Habitats	✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins.
	Structure and Function of Living Systems	2. <u>THE HUMAN BODY</u> a. The Skeleton b. The Muscles c. Keeping Your Bones and Muscles Healthy	2x30 mins. __45 mins. __60 mins. 2x30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins.
		3. <u>PLANTS</u> a. What plants Need to Grow b. Parts of the Plant c. Seeds	✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins.
	Organisms and the Environment	4. <u>HABITATS</u> a. Land Habitats – Schoolyard, Backyard b. Water Habitats – Pond, Lake, Seashore, Ocean c. Caring for Habitats d. Eliminating the Habitats of Vectors	✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins.

UNIT/ TOPIC ALLOCATION
GRADE: 2

SECTION	STRAND	TOPICS	DURATION (Hours)
EARTH SCIENCE	Properties and Structure of Earth	5. <u>EARTH'S RESOURCES</u> a. Rocks and Minerals b. Uses of Rocks and Minerals	✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins.
	Changes in the Earth and Sky	6. <u>WEATHER CHANGES</u> a. Weather in The Bahamas b. Weather Instruments c. How Weather Affects People	✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. 2x30 mins. __45 mins. __60 mins.
	Universe and the Solar System	7. <u>CHANGES IN THE SKY</u> 1. The Moon and its Changes 2. Constellations	2x30 mins. __45 mins. __60 mins. 2x30 mins. __45 mins. __60 mins.
PHYSICAL SCIENCE	Properties and Changes in Matter	8. <u>MEASURING MATTER</u> 5. What is Matter? 6. Measuring Length and Mass 7. How Much Can Things Hold?	✓30 mins. __45 mins. __60 mins. 2x30 mins. __45 mins. __60 mins. 2x30 mins. __45 mins. __60 mins.
	Forces and Energy	9. <u>SOURCES OF ENERGY</u> a. The Sun's Energy b. Wind Energy c. Energy from the Water d. Magnets	✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. ✓30 mins. __45 mins. __60 mins. 2x30 mins. __45 mins. __60 mins.

UNIT/ TOPIC ALLOCATION
GRADE: 3

SECTION	STRAND	TOPICS	DURATION (Hours)
LIFE SCIENCE	Characteristics of Organisms	1. <u>VERTEBRATES</u> a. Definition/Characteristics/Traits b. Vectors c. Mammals and Birds d. Reptiles, Fish, Amphibians e. Body Parts/Function of Fish f. Body Parts-Survival	__30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins.
		2. <u>DIGESTIVE SYSTEM</u> a. Parts of the Digestive System b. Process of Digestion/Function c. Proper Nutrition/Exercise d. Food Groups e. Health Resources	__30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins.
	Structure and Function	3. <u>PLANT PARTS AND FUNCTION</u> d. Plant Parts/Function e. Function of Seeds f. Seed Growth Patterns	__30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins.
	Organisms and the Environment	4. <u>ECOSYSTEMS</u> i. Living/non-living organisms in a garden j. Types of Gardens k. Experiment with seeds – Containerized with Seeds l. Rocky and Sandy Shores m. The Grouper – Coral Reefs (Home) n. The Grouper – Protection/Laws	__30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins.

UNIT/ TOPIC ALLOCATION
GRADE: 3

SECTION	STRAND	TOPICS	DURATION (Hours)
EARTH SCIENCE	Properties and structure of Earth Systems	5. <u>Earth Materials</u> a. Earth's Natural Resources – Uses b. Sources of air, water and land pollution c. Pollution prevention d. Environmental stewards – Care of Earth's Resources	__30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins.
	Changes in Earth and Sky	6. <u>EARTH'S AIR AND WATER</u> a. The Water Cycle b. How Clouds Form – Classify/Traits c. Weather Conditions – Types of Clouds	__30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins.
	Universe and the Solar System	7. <u>THE EARTH</u> a. The Earth – Relation to Sun b. Motion of Earth	__30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins.
		8. <u>SEASONS</u> a. Types of Seasons b. Causes of Seasons	__30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins.

UNIT/ TOPIC ALLOCATION
GRADE: 3

SECTION	STRAND	TOPICS	DURATION (Hours)
PHYSICAL SCIENCE	Properties and changes in matter	9. <u>MATTER</u> a. States of Matter (solid, liquid, gas) b. Properties of Matter c. Changes in Matter d. Measuring Matter	__30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins.
	Forces and Energy	10. <u>MATTER</u> cont'd. a. Sources and Forms of Energy/Uses b. Define fuels c. How Fossil Fuels Form d. Transfer of Electricity e. Magnets – Objects Repel/Attract f. Magnets – Uses g. Conservation h. Ways to Conserve	__30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins.

UNIT/ TOPIC ALLOCATION
GRADE: 4

SECTION	STRAND	TOPICS	DURATION (Hours)
LIFE SCIENCE	Characteristics of Organisms	1. <u>INVERTEBRATES</u> a. Vertebrates and Invertebrates b. Traits of Invertebrates c. Invertebrate Groups d. Traits of Insects and Spiders e. Life Cycle of Insects (mosquito and cockroach) f. Animal Adaptations (mimicry and camouflage)	__30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins.
	Structure and Function in Living Systems	2. <u>THE HUMAN BODY AND HYGIENE</u> a. The Respiratory System b. The Nervous System c. Risk Factors to Health d. Safety Procedures for Natural Disasters	__30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins.
		3. <u>PLANTS</u> a. Seed and Non-seed Plants b. Seed Plants c. Monocots and Dicots d. Seed Germination e. Indigenous Plants	__30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins.
	Organisms and The Environment	4. <u>CONSERVING ECOSYSTEMS</u> a. Food Chain and Web b. Relationships in Ecosystems (producers, consumers and decomposers) c. Pine Forests, Coral Reefs, Mangroves d. Four Types of Mangroves e. Importance of Mangroves	__30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins.

UNIT/ TOPIC ALLOCATION
GRADE: 4

SECTION	STRAND	TOPICS	DURATION (Hours)
EARTH SCIENCE	Properties and Structure of Earth	5. <u>CHANGES ON EARTH</u> a. The earth's Layers b. Weathering and Erosion c. Causes of Weathering d. Ocean Resources e. Movement of Ocean Water f. Ocean Pollution	__30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins.
	Changes in Earth and Sky	6. <u>WEATHER</u> a. Meteorology b. The Earth's Atmosphere c. Properties of Air d. Elements of Weather e. Weather and Climate f. Measuring Weather Conditions (temperature and wind direction) g. The Sun's effect on Earth	__30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins.
	Universe and The Solar System	7. <u>EXPLORING THE PLANTS</u> a. The Planets b. The Inner and Outer Planets c. Scale Model of Planets	__30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins.

UNIT/ TOPIC ALLOCATION
GRADE: 4

SECTION	STRAND	TOPICS	DURATION (Hours)
PHYSICAL SCIENCE	Properties and Changes in Matter	8. <u>MATTER CHANGES</u> a. Properties of Matter b. Physical Changes in Matter c. Physical Properties and Physical Changes in Matter d. Measuring Matter (mass and volume)	__30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins.
	Forces and Energy	9. <u>MAKING WORK EASIER</u> a. Force, Work and Motion b. Measuring Force (pushes and pulls) c. Simple Machines d. Wedges and Inclined Planes e. Energy Conservation	__30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins. __30 mins. ☒ 45 mins. __60 mins.
		10. <u>TECHNOLOGY</u> a. Technology in the Ocean	__30 mins. ☒ 45 mins. __60 mins.

UNIT/ TOPIC ALLOCATION
GRADE: 5

SECTION	STRAND	TOPICS	DURATION (Hours)
LIFE SCIENCE	Characteristics of Organisms	1. <u>INVERTEBRATES</u> <u>Crustaceans</u> a. Common traits of invertebrates b. Characteristics and identification of crustaceans c. Impact on the Bahamian economy and laws that preserve the spiny lobster	__30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins.
		2. <u>Mollusks</u> a. Characteristics, identification and classification of mollusks and the queen conch in our economy b. Stinging Cell Animals	__30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins.
		3. <u>Vectors (Insect)</u> a. Definition, identification and characteristics b. Diseases, treatment and elimination of vectors	__30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins.
		4. <u>How Animals meet their needs</u> a. Instincts and Learned behavior b. Animals that migrate and hibernate	__30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins.

UNIT/ TOPIC ALLOCATION
GRADE: 5

SECTION	STRAND	TOPICS	DURATION (Hours)
LIFE SCIENCE	Structure and Function in Living Systems.	5. <u>HEALTH</u> a. Skeletal System b. Muscular System c. Personality, relationships and self concepts d. Investigating eating habits, disorders and their affect on growth and development	__30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins.
	Structure and Function of Living Systems.	6. <u>PLANTS</u> a. Photosynthesis b. Indigenous and Medicinal Plants c. Plant Conservation	__30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins.
	Organisms and the Environment	7. <u>ECOLOGY</u> a. Ecosystems and the interdependence of living and nonliving elements b. Predator, prey and scavengers as it relates to food chains and webs c. Water, fisheries and electricity as resources d. Preserving national parks of The Bahamas	__30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins.

UNIT/ TOPIC ALLOCATION
GRADE: 5

SECTION	STRAND	TOPICS	DURATION (Hours)
EARTH SCIENCE	Properties and Structure of Earth's Systems	8. <u>EARTH</u> a. Resources of the earth and oceans b. Pollutants, their affect on marine life, prevention and conservation of the oceans	__30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins.
		9. <u>FOSSILS</u> a. Description, formation and types of fossils	__30 mins. __45 mins. <u>✓</u> 60 mins.
		10. <u>THE ATMOSPHERE</u> a. Layers of the atmosphere b. Conditions that change weather and its effect on people c. Measuring weather using a rain gauge and windsock	__30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins.
	Universe and the Solar System	6. <u>SOLAR SYSTEM</u> a. What is the solar system? b. Rotation and revolution c. The sun and other stars d. Benefits of the sun on the earth and other planets e. Other objects in space	__30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins.

UNIT/ TOPIC ALLOCATION
GRADE: 5

SECTION	STRAND	TOPICS	DURATION (Hours)
PHYSICAL SCIENCE	Properties and Changes in Matter	7. <u>INVESTIGATING MATTER</u> a. Classification of matter b. Substances and mixtures c. Solutes and solvents	__30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins.
	Forces and Energy	8. <u>ENERGY</u> a. Potential and Kinetic Energy b. Effects of forces on the motion of objects c. Heat and temperature as forms of energy d. Technology and forms of energy e. Simple machines, the lever and screw f. Conservation of energy	__30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins.

UNIT/ TOPIC ALLOCATION
GRADE: 6

SECTION	STRAND	TOPICS	DURATION (Hours)
LIFE SCIENCE	Characteristics of Organisms	1. <u>THE CELL</u> a. Parts and Functions b. Compare plant and animal cell	__30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins.
		2. <u>FUNGI</u> a. Classify four types Harmful and helpful fungi b. Harmful and helpful fungi c. Growth of fungi	__30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins.
		3. <u>INVERTEBRATES</u> a. Traits of sponges b. Traits of echinoderms c. Kinds of worms	__30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins.
	Structure and Functions in Living Systems	4. <u>CIRCULATORY SYSTEM</u> a. Parts of the Circulatory System and labels of the heart b. Function of the heart and blood vessels. c. Risk factors that affect the Circulatory System	__30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins.
		5. <u>IMMUNE SYSTEM</u> a. Functions and parts of the immune system b. Negative affects on the immune system	__30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins.

UNIT/ TOPIC ALLOCATION
GRADE: 6

SECTION	STRAND	TOPICS	DURATION (Hours)
LIFE SCIENCE	Structure and Functions in Living Systems	6. <u>FROM FLOWER TO FRUIT</u> a. Parts and Functions of a flower b. Life cycle of a flower c. Plant growth and responses d. Plant adaptation	__30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins.
	Organisms and the environment	7. <u>BIOMES</u> a. Define biomes and infer why organisms live in certain biomes b. Compare and contrast different biomes	__30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins.
		8. <u>ENVIRONMENTAL CHANGES CAUSING ENDANGERMENT OR EXTINCTION</u> a. Compare natural resources on the environment. b. The effects of human activities on the environment c. Endangered animals	__30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins.
EARTH SCIENCE	Properties and Structure of Earth	9. <u>WEATHERING AND EROSION</u> a. Forces of weathering and erosion b. Wind, rain, heat, wave action, ice, snow, gravity. c. Earthquakes, Volcanoes d. Natural resources on Earth e. Renewable and non renewable resources	__30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins.

UNIT/ TOPIC ALLOCATION
GRADE: 6

SECTION	STRAND	TOPICS	DURATION (Hours)
EARTH SCIENCE	Properties and Structure of Earth	10. <u>POLLUTION</u> a. Air Pollution b. Land Pollution c. Water Pollution	__30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins.
		11. <u>OIL, COAL AND NATURAL GAS</u> a. Compare coal, oil and natural gas b. Advantages and Disadvantages of fossil fuels c. Petroleum and Natural Gas	__30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins.
	Changes in Earth and Sky	12. <u>PREDICTING WEATHER</u> a. Factors of weather b. Weather Instruments c. Weather/Climate	__30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins.
		13. <u>STORMS</u> a. Compare traits of storms b. Safety precautions during storms	__30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins.
	Universe and the Solar System	14. a. Surface and atmosphere of planets b. planets susceptible to life c. space equipment d. vehicles to explore space	__30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins.

UNIT/ TOPIC ALLOCATION
GRADE: 6

SECTION	STRAND	TOPICS	DURATION (Hours)
PHYSICAL SCIENCE	Properties and Changes in Matter	15. <u>PHYSICAL PROPERTIES AND CHANGES</u> a. What are physical changes in matter b. Use equipment to measure physical properties	__30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins.
		16. <u>CHEMICAL PROPERTIES</u> a. Record chemical changes in matter b. Define/State chemicals that cause changes in matter c. Compare physical and chemical changes in matter	__30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins. __30 mins. __45 mins. <u>✓</u> 60 mins.
		17. <u>MAGNETISM</u> a. Locate poles and magnetic field	__30 mins. __45 mins. <u>✓</u> 60 mins.
	Forces and Energy	18. <u>MOTION AND FORCES</u> a. Define motion/The relationship between motion, speed and direction	__30 mins. __45 mins. <u>✓</u> 60 mins.
		19. <u>A SIMPLE CIRCUIT</u> a. How a simple circuit works	__30 mins. __45 mins. <u>✓</u> 60 mins.

UNIT/ TOPIC ALLOCATION
GRADE: 6

SECTION	STRAND	TOPICS	DURATION (Hours)
PHYSICAL SCIENCE	Forces and Energy	20. <u>FRICTION</u> a. The effects of friction on certain materials	__30 mins. __45 mins. <u>✓</u> 60 mins.
		21. <u>PULLEYS AND WHEEL AND AXEL</u> a. How simple machines make work easier	__30 mins. __45 mins. <u>✓</u> 60 mins.
		22. <u>DEFINE ENERGY CONSERVATION</u> a. Write ways that energy can be conserved	__30 mins. __45 mins. <u>✓</u> 60 mins.

STANDARDS AND BENCHMARKS

Standards & Benchmarks—Science & Technology (Grade 1 - Grade 6)

Summary of Science & Technology Standards

1. **Understands basic features of the Earth
2. **Understands basic Earth processes
3. **Understands essential ideas about the composition and structure of the universe and the Earth's place in it
4. **Knows about the diversity and unity that characterize life
5. **Knows the general structure, organization and functions of cells in organisms
6. **Understands how species depend on one another and on the environment for survival
7. **Understands basic concepts about the structure and properties of matter
8. **Understands energy types, sources and conversions, and their relationship to heat and temperature
9. **Understands motion and the principles that explain it
10. **Understands the nature of scientific knowledge and inquiry

STANDARD **UNDERSTANDS BASIC FEATURES OF THE EARTH

Benchmarks

Grade 1

- ***knows that Earth has several land forms (e.g. identifies hills, mountains, valleys and flatlands)
- *** knows that Earth has several bodies of water (e.g. identifies lakes, rivers and oceans, describes the characteristics of water)
- ***knows that soil is comprised of various materials (e.g. classifies soil according to its physical characteristics, identifies the living and non-living materials found in soil)
- ***knows that there are different types of rocks (**e.g. classifies rocks by their colour, shape and size)
- ***knows the characteristics of air
- *describes local natural habitats (e.g. ocean, lakes, trees)

^a The single asterisk (*) indicates that the following item has been adopted/adapted from the Ontario Model accessed at

<http://www.edu.gov.on.ca/eng/document/curricul/kinder/kinder.html>

^b The two asterisks (**) indicate that the following item has been adopted/adapted from the McRel Model: Kendall, J. S. & Marzano, R. J. (1997) Content knowledge: A compendium of standards and benchmarks for K-12 education. Aurora, Co: Mid-continent Regional Educational Laboratory, Inc.

^c The three asterisks (***) indicate that the following item has been adopted/adapted from the Commonwealth of The Bahamas, Ministry of Education, 1997 Primary Science Curriculum Guidelines.

Grade 2

- **knows that Earth materials consist of solid rocks, soils, liquid water, and the gases of the atmosphere (**e.g. identifies features of the Earth, names landforms, identifies bodies of water)
- ***explains how rocks are alike and different (e.g. classifies rocks as sedimentary, igneous, and metamorphic)
- ***identifies bodies of water on the Earth
- ***understands that soil is comprised of various materials (e.g. concludes that different kinds of plants, animals, and rocks, make up different kinds of soil; describes different kinds of soil their composition and formation)
- ***describes changes in the sky as related to the sun, moon and stars

Grade 3

- ***understands the sun's importance to living things on the Earth
- ***understands how the movements of the Earth cause day, night and the seasons (**e.g. describes the way in which the sun seems to move across the sky each day, examines the relationship between how often the earth rotates and the length of day, describes the position of the sun in the sky at sunrise, noon and sunset)
- ***knows the composition of air (e.g. identifies the gas in the air that living organisms need, explains how one can tell that air is soil and water)
- ***understands that there are various types and forms of water on the Earth (e.g. identifies places where fresh water, salt water, icebergs and glaciers are found)

Grade 4

- ***understands that natural forces can change the land (e.g. describes the effects of water and wind on rocks and soil; describes the forces of erosion, a volcano, an earthquake; demonstrates an understanding of the factors— minerals, temperatures, forces— involved in the composition and formation of rocks)
- **knows that water can be a liquid or a solid and can be made to change from one form to the other, but the amount of water stays the same
- **knows that short-term weather conditions (e.g. temperature, rain, snow) can change daily, and weather patterns change over the seasons

Grade 5

- **knows that water is an importance resource (e.g. ***lists two resources that come from the oceans, ***explains why lakes and ponds are important, categorizes the various uses of water, uses the physical properties of water to describe or illustrate the water cycle, compares and contrasts fresh water and salt water environments, describes human impacts on the Earth's water resources)
- **knows the major differences between fresh and ocean waters
- **knows that air is a substance that surrounds us, takes up space, and moves around us as wind

Grade 6

- **knows that clouds and fog are made of tiny droplets of water
- **knows that water can change from one state to another (solid, liquid, gas) through various processes (e.g. freezing, condensation, precipitation, evaporation)
- **knows that night and day are caused by the Earth's rotation on its axis
- **knows that the Sun provides the light and heat necessary to maintain the temperature of the Earth

STANDARD

**UNDERSTANDS BASIC EARTH PROCESSES

Benchmarks

Grade 1

- *identifies patterns and cycles in the natural world (e.g. pattern of petals on a flower; life cycle of a butterfly)
- *describes some natural occurrences, using his/her own observations (e.g. sprouting of seeds; opening of buds; ***weather conditions as sunny, cloudy, rainy, snowy, windy, hot, warm, cold)
- *demonstrates an understanding of changes that occur in daily and seasonal cycles and of how these changes affect the characteristics, behaviour, and location of living things
- *investigates changes that occur in a daily cycle and in a seasonal cycle (e.g. ***identifies spring, summer, autumn and winter as the four seasons)
- *describes how living things, including humans, adapt to and prepare for daily and seasonal changes

Grade 2

- *demonstrates an awareness of the forms in which water and air are present in the environment, and describes ways in which living things are affected by water and air (**e.g. describes weather changes and how they affect people, identifies seasons and how they affect what people wear)
- *investigates the visible effects of air and water in the environment
- *describes ways in which clean air and water are vital for meeting the needs of humans and other living things
- **knows that rocks come in many different shapes and sizes (e.g. boulders, pebbles, sand)

Grade 3

- *demonstrates an understanding of the similarities and differences between various soils and the effects of moving water on soils
- *investigates the components of various soils, and describes the effects of moving water on these soils
- *recognizes the dependence of humans and other living things on soil and recognizes its importance as a source of materials for making useful objects
- understands the concept of weather (**e.g. defines the term weather, defines the temperature and wind direction, describes weather conditions, classifies clouds according to how they look and the weather conditions with which they are associated)

Grade 4

- **knows that smaller rocks come from the breakage and weathering of bedrock and larger rocks
- **knows that rock is composed of different combinations of minerals
- *demonstrates an understanding of the physical properties of rocks and minerals and the effects of erosion on the landscape
- *investigates, tests and compares the physical properties of rocks and minerals and investigates the factors that cause erosion of the landscape
- *describes the effects of human activity (e.g. land development, building of dams, mine development, erosion-preventing measures) on physical features of the landscape, and examines the use of rocks and minerals in making consumer products

Grade 5

- **knows the composition and properties of soils (e.g. components of soil such as weathered rock, living organisms, products of plants and animals; properties of soil such as colour, texture, capacity to retain water, ability to support plant growth)
- *demonstrates an understanding of the major climatic factors and patterns associated with weather (e.g. describes the key features of a variety of weather conditions, identifies factors responsible for weather systems locally and globally)
- *investigates the major climatic factors associated with weather, and designs, constructs and tests a variety of instruments for recording various features of the weather (e.g. identifies and measures the factors that influence local weather, uses instruments to measure local weather conditions)
- *examines how weather forecasts influence decisions concerning human activity and how humans have adapted to a variety of weather conditions (e.g. describes the consequences of extreme weather conditions)

Grade 6

- *demonstrates an understanding of the patterns of change observable on Earth as a result of the movement of the different bodies in the solar system (e.g. solar and lunar eclipses, tides, phases of the moon, position of the constellations) and of the physical characteristics of the different components of the solar system;
- *investigates, using models and simulations, the relationship between the Sun, Earth, and Moon, the patterns of change observable on earth that result from the movement of these bodies, and the physical characteristics of the different components of the solar system (e.g. the Sun and planets, inner planets and outer planets)
- *describes technological and scientific advances that enable humans to study space, and explain how these advances have affected the quality of life on earth (e.g. lists the contributions that space exploration has made to everyday life)
- **knows how features on the Earth's surface are constantly changed by a combination of slow and rapid processes (e.g. weathering, erosion, and deposition of sediment caused by waves, wind, water, and ice; sudden changes in the landscape caused by landslides, volcanic eruptions, and earthquakes)
- **knows that fossils provide evidence about the plants and animals that lived long ago and the nature of the environment at that time

STANDARD **UNDERSTANDS ESSENTIAL IDEAS ABOUT THE COMPOSITION AND STRUCTURE OF THE UNIVERSE AND THE EARTH'S PLACE IN IT

Benchmarks

Grade 1

- ***knows the basic composition and structure of the universe (e.g. identifies the basic characteristics of the sun, observes that the earth gets light and warmth from the sun, identifies the moon and stars as objects in the night time sky, explains what causes day and night)

Grade 2

- **knows basic patterns of the Sun and Moon (e.g. the Sun appears every day, and the Moon appears sometimes at night and sometimes during the day; the Sun and Moon appear to move from east to west across the sky; the Moon appears to change shape over the course of a month)

Grade 3

- **knows that the stars are innumerable, unevenly dispersed, and of unequal brightness

Grade 4

- **knows that telescopes magnify distant objects in the sky (e.g. the Moon, planets) and dramatically increase the number of stars we can see (***e.g. understands the usefulness of telescopes in studying space)

Grade 5

- **knows that the Earth is one of several planets that orbit the Sun, and the Moon orbits around the Earth (***e.g. identifies the position of earth relative to the sun, the moon and other planets, describes the movements of earth, discusses the relationship between a planet's orbit and the length of its year)

Grade 6

- **knows that the patterns of stars in the sky stay the same, although they appear to slowly move from east to west across the sky nightly, and different stars can be seen in different seasons (***e.g. lists the inner and outer planets of the solar system, describes and compares planets of the solar system, names the three types of bodies in the solar system)
- **knows that planets look like stars, but over time they appear to wander among the constellations (***e.g. relates the motions of a planet to a concept of night and day, describes and compares the major characteristics of the planets of the solar system)
- **knows that astronomical objects in space are massive in size and are separated from one another by vast distances (e.g., many stars are more massive than our Sun but so distant they look like points of light, ***identifies the distance of the Sun from Earth, ***explains why the Sun appears much brighter from earth than do other stars, ***analyses how a day on a planet can be longer than a year on another planet)

STANDARD **KNOWS ABOUT THE DIVERSITY AND UNITY THAT CHARACTERIZE LIFE

Benchmarks

Grade 1

- *knows the basic needs of animals and plants (e.g., the need for food, air, and water, ***identifies conditions that animals and plants need to grow)
- *investigates the characteristics and needs of animals and plants (***e.g. describes ways in which plants are alike and different, classifies things as living or non-living: growth, reproduction, and movement, measures and records plant growth--metric)
- *demonstrates awareness that animals and plants depend on their environment to meet their basic needs (***e.g. identifies foods that come from plants, identifies foods from plants that must be processed before they are eaten, identifies animals that are used as a source of food, identifies animals that are used for clothing)
- *describes the requirements for good health for humans (***e.g. determines the requirements of healthy plants and healthy animals, describes habits that maintain good health, lists common illness caused by pests and vectors)

Grade 2

- *demonstrates an understanding of the similarities and differences among various types of animals and the ways in which animals adapt to different environmental conditions (***e.g., explains how animal body parts and other adaptations help them to live in their habitats)
- *investigates physical and behavioural characteristics and the process of growth of different types of animals
- *identifies ways in which humans can affect other animals

Grade 3

- **knows that plants and animals need certain resources for energy and growth (e.g. food, water, light, air)
- *demonstrates an understanding of the similarities and differences in the physical characteristics of different plant species and the changes that take place in different plants as they grow (e.g. describes structures that enable different plants to survive in different environments, compares and contrasts different types of plant life cycles)
- *investigates the requirements of plants and the effects of changes in environmental conditions on plants (e.g. describes how plants take in water, nutrients and light and the effect of these factors on them)
- *describes ways in which plants are important to other living things, and the effects of human activities on plants (e.g. suggests reasons for the endangerment or extinction of plant species, explain how animals interact with one another)
- **knows that some kinds of organisms that once lived on Earth have completely disappeared (e.g. dinosaurs, trilobites, mammoths, giant tree ferns, horsetail trees)
- **knows that plants and animals have features that help them live in different environments (e.g. compares and contrasts different types of animal life cycles, compares and contrasts plant and animal life cycles, describes structures that enable animals to survive in different environments)

Grade 4

- ***distinguishes between living and non-living things (e.g. states characteristics)
- ***classifies different types of animals (e.g. distinguishes between vertebrates and invertebrates)
- ***classifies different types of plants (e.g. identifies seed plants, flowering plants, traits of conifers, non-seed plants)
- ***identifies living organisms that are neither plants or animals

Grade 5

- **knows different ways in which living things can be grouped (e.g. plants/animals; pets/non-pets; edible plants/non-edible plants) and purposes of different groupings
- **knows that fossils of past life can be compared to one another and to living organisms to observe their similarities and differences

Grade 6

- **knows that plants and animals progress through life cycles of birth, growth and development, reproduction and death; the details of these life cycles are different for different organisms
- **knows that the transfer of energy (e.g. through the consumption of food) is essential to all living organisms
- **knows the organization of simple food chains and food webs (e.g. green plants make their own food with sunlight, water, and air; some animals eat the plants; some animals eat the animals that eat the plants)
- *demonstrates an understanding of ways in which classification systems are used to understand the diversity of living things and the interrelationships among living things
- *investigates classification systems and some of the processes of life common to all animals (e.g. growth, reproduction, movement, response, and adaptation)
- *describes ways in which classification systems can be used in everyday life

STANDARD **KNOWS THE GENERAL STRUCTURE, ORGANISATION AND FUNCTIONS OF CELLS IN ORGANISMS

Benchmarks

Grade 1

- ***knows the importance and functions of the eyes, ears, tongue, skin, nose as sense organs
- ***knows the four main internal organs (e.g. identifies the heart, lungs, brain, and stomach)
- understands the connection between health and welfare (**describes habits that maintain good health)
- identifies the stages in the life cycle of a plant and of a pet or other animal
- demonstrates how plants and other organic material can be recycled back into the environment

Grade 2

- *describes changes in the appearance and activity of an animal as it goes through a complete life cycle (e.g., mealworm)
- *compares the life cycles of some animals that have similar life cycles (e.g. bee and butterfly) and some that have different life cycles (e.g., gerbil and butterfly)
- **knows that plants and animals closely resemble their parents
- *identifies constant traits (e.g. number of legs) and changing traits (e.g., weight) in animals as they grow, and compares the appearance of young and mature animals of the same species
- *investigates physical and behavioural characteristics and the process of growth of different types of animals
- ***evaluates the importance of the five senses (e.g. describes their basic structure and function of the organs involved in hearing and speech, relates the nature of sound to hearing, describes ways to protect his/her hearing and speech organs from damage)

Grade 3

- **knows that differences exist among individuals of the same kind of plant or animal
- **knows that animals require air, water, food, and shelter; plants require air, water, nutrients, and light
- *demonstrates an understanding of the similarities and differences in the physical characteristics of different plant species and the changes that take place in different plants as they grow
- *identifies the major parts of plants (e.g. seeds, stem, pistil) and describes their basic functions
- *describes, using his/her observations, the changes that plants undergo in a complete life cycle (e.g. from the germination of a seed to the production of flowers or fruit)
- *compares the life cycles of different kinds of plants (e.g. plants that grow from bulbs or from seeds)
- *identifies traits that remain constant in some plants as they grow (e.g. leaf shape, leaf size, flower colour)

Grade 4

- understands that all living things are composed of cells
- identifies the characteristics of various single-celled organisms
- knows that dietary habits and behaviour are related to an organism's health
- knows that the life processes of an organism are related to its use of nutrients, water, and oxygen
- describes the changing requirements of organisms as they grow

Grade 5

- *demonstrates an understanding of the structure and function of the respiratory, circulatory, digestive, excretory, and nervous systems, and the interactions of organs within each system
- *investigates the structure and function of the major organs of the respiratory, circulatory, digestive, excretory, and nervous systems
- *demonstrates an understanding of factors that contribute to good health

Grade 6

- **knows that many characteristics of an organism are inherited from the parents of the organism (e.g., eye colour in human beings, fruit or flower colour in plants), and other characteristics result from an individual's interactions with the environment (e.g. people's table manners, ability to ride a bicycle)
- **knows that each plant or animal has different structures which serve different functions in growth, survival, and reproduction (e.g., humans have distinct structures of the body for walking, holding, seeing, and talking)
- identifies the similarities and differences in plant and animal cells
- analyses the effects of micro-organisms on other organisms
- describes the human body's various defences against harmful micro-organisms

STANDARD **UNDERSTANDS HOW SPECIES DEPEND ON ONE ANOTHER AND ON THE ENVIRONMENT FOR SURVIVAL

Benchmarks

Grade 1

- *demonstrates awareness of the need for recycling (e.g. ***describes ways in which people can protect the places where plants and animals live (reuse, recycle))
- *demonstrates an understanding of and care for the natural world
- ***describes ways in which people can harm the places where plants and animals live (pollution, encroachment)
- ***describes ways in which plant and animal habitats depend on each other

Grade 2

- **knows that living things are found almost everywhere in the world and that distinct environments support the life of different types of plants and animals
- *knows the concepts of a habitat and community

Grade 3

- *knows the factors that could affect habitats and communities of plants and animals (e.g. ***identifies sources of air and water pollution and how it can be eliminated, explains how recycling is related to conservation)
- *investigates the dependency of plants and animals on their habitat and the interrelationships of the plants and animals living in a specific habitat
- *describes ways in which humans can change habitats and the effects of these changes on the plants and animals within the habitats

Grade 4

- ***defines natural resources and gives examples
- ***identifies ways to avoid pollution
- *understands the concepts of habitat and community, and identifies the factors that could affect habitats and communities of plants and animals (e.g., ***describes ways in

which groups of animals live in a neighbourhood)

- *investigates the dependency of plants and animals on their habitat and the interrelationships of the plants and animals living in a specific habitat
- *describes ways in which humans can change habitats and the effects of these changes on the plants and animals within the habitats.

Grade 5

- **knows that the behaviour of individual organisms is influenced by internal cues (e.g. hunger) and external cues (e.g., changes in the environment), and that humans and other organisms have senses that help them to detect these cues
- **knows that an organism's patterns of behaviour are related to the nature of that organism's environment (e.g., kinds and numbers of other organisms present, availability of food and resources, physical characteristics of the environment)
- ***understands the concept of an ecosystem (e.g. explains the interdependence of living and non-living parts of an ecosystem, identifies the three different groups in an ecosystem, lists the importance of producers, consumers and decomposers to the ecosystem, explains how living things in an ecosystem form a community)

Grade 6

- **knows that changes in the environment can have different effects on different organisms (e.g. some organisms move in, others move out; some organisms survive and reproduce, others die)
- **knows that all organisms (including humans) cause changes in their environments, and these changes can be beneficial or detrimental (**e.g., defines the term pollution, defines the term conservation, lists ways to conserve our national resources)

STANDARD

****UNDERSTANDS BASIC CONCEPTS ABOUT THE STRUCTURE AND PROPERTIES OF MATTER**

Benchmarks

Grade 1

- *distinguishes between objects and materials (e.g. scissors are objects and they can be made of metal and/or plastic), and identifies and describes the properties of some materials (e.g. flexibility of plastic, hardness of wood)
- *investigates the properties of materials and makes appropriate use of materials when designing and making objects (**e.g., identifies materials that are used to make mixtures, describes how things change when you mix them)
- *describes the function of specific materials in manufactured objects that he/she and others use in daily life

Grade 2

- *demonstrates an understanding of the properties of familiar liquids (e.g. vinegar, detergent, water, oil) and solids (e.g., sugar, salt, sand), and of interactions between liquids and between liquids and solids

- *investigates the properties of and interactions between liquids and between liquids and solids, and identifies the types of objects or materials that can be used to contain liquids and solids (e.g. a plastic bowl will hold a liquid or a solid but a paper towel will only hold a dry solid)
- *identifies and describes ways in which we use our knowledge of liquids and solids in making useful objects and in living in our environment (**e.g., evaluates the importance of the five senses, estimates the length mass and volume of objects, compares relative sizes of objects, measures the length, mass and volume of different objects)
- **knows that different objects are made up of many different types of materials (e.g., cloth, paper, wood, metal) and have many different observable properties (e.g. colour, size, shape, weight; ***describes and classifies objects by size shape colour, weight, texture, and weight, ***compares objects using size, shape, colour, weight, texture)

Grade 3

- **knows that things can be done to materials to change some of their properties (e.g., heating, freezing, mixing, cutting, dissolving, bending), but not all materials respond the same way to what is done to them (***e.g., compares some characteristics of solids, liquids and gases, classifies solids, liquids and gases that are used daily)
- *demonstrates an understanding of the properties of materials that can be magnetised or charged and of how materials are affected by magnets or static electric charges
- *identifies and describes, using his/her observations, ways in which static electric charges are made in everyday materials, as well as different types of interactions that take place both between charged materials and between magnetised materials
- *identifies familiar uses of magnets and gives examples of static electric charges that are created in the home or at school

Grade 4

- *demonstrates understanding that certain materials can transmit, reflect, or absorb light or sound
- *investigates materials that transmit, reflect, or absorb light or sound and uses the findings in designing objects and choosing materials from which to construct them
- *explains why materials that transmit, reflect, or absorb light and/or sound are used in a variety of consumer products

Grade 5

- *demonstrates an understanding of the three states of matter and of changes in state (***e.g., identifies the three states of matter, explains the physical properties of matter, explains the physical changes in matter)
- *investigates common changes of state (e.g., melting, freezing, condensing, evaporating) and makes informed choices about materials when finding solutions to problems in designing and constructing objects
- *identifies the properties that make different materials useful in everyday products and discusses the environmental impact of their use

Grade 6

- **knows that objects can be classified according to their properties (e.g., magnetism, conductivity, density, solubility)
- **knows that materials may be composed of parts that are too small to be seen without magnification
- **knows that properties such as length, weight, temperature, and volume can be measured using appropriate tools (e.g., rulers, balances, thermometers, graduated cylinders)
- **knows that materials have different states (solid, liquid, gas), and some common materials such as water can be changed from one state to another by heating or cooling
- **knows that the mass of a material remains constant whether it is together, in parts, or in a different state
- *demonstrates an understanding of the properties of air (e.g., air and other gases have mass) and explains how these can be applied to the principles of flight
- *investigates the principles of flight and determines the effect of the properties of air on materials when designing and constructing flying devices
- *identifies design features (of products or structures) that make use of the properties of air, and gives examples of technological innovations that have helped inventors to create or improve flying devices

STANDARD **UNDERSTANDS ENERGY TYPES, SOURCES, AND CONVERSIONS, AND THEIR RELATIONSHIP TO HEAT AND TEMPERATURE

Benchmarks

Grade 1

- *demonstrates an understanding of ways in which energy is used in daily life (**e.g., identifies sources of heat, identifies sources of light)
- *investigates some common devices and systems that use energy and ways in which these can be controlled manually
- describes different uses of energy at home, at school and in the community, and suggests ways in which energy can be conserved (**e.g., identifies ways that heat changes things: melting, cooking)

Grade 2

- *demonstrates an understanding of the movement of air and of water as sources of energy
- *designs and constructs devices that are propelled by moving air or moving water
- *identifies wind and moving water as renewable sources of energy and determines the advantages and disadvantages of using them
- **knows that the Sun supplies heat and light to Earth

Grade 3

- **knows that heat can be produced in many ways (e.g., burning, rubbing, mixing substances together; ***identifies the sources of heat energy; ***identifies materials through which heat moves quickly)
- **knows that electricity in circuits can produce light, heat, sound, and magnetic effects

- *demonstrates an understanding of how movement is caused by forces and by energy that is stored and then released (**e.g., describes the direction in which heat moves; compares the ways light behaves as it passes through materials; describes how sound energy moves)
- *investigates how different forces affect the operation of everyday devices, and designs and constructs devices that use a form of energy to create controlled movement (**e.g., identifies what causes sound energy)
- identifies objects, devices, and systems in everyday life that are affected by forces and movement and explains in what ways they are useful to us (**e.g., identifies forms of energy and describes one use of each form)

Grade 4

- *demonstrates an understanding of the characteristics and properties of light and sound (**e.g., gives the definition of sound and vibrate; explains the causes of sound; explains how sound travels; defines the term light; gives examples of sources of light; describes how light travels)
- *investigates different ways in which light and sound are produced and transmitted, and designs and makes devices that use these forms of energy
- *identifies technological innovations related to light and sound energy and how they are used and controlled at home and in the community, and determines how the quality of life has been affected by these innovations

Grade 5

- *demonstrates an understanding of the importance of conservation of energy in relation to the wise use of renewable and non-renewable energy sources
- *designs and constructs devices that use a form of energy to meet a specific need or want, and investigates how the energy is transferred to a specified output
- *evaluates the reasons for conserving natural resources and identifies possible ways of conserving energy

Grade 6

- **knows that heat is often produced as a by-product when one form of energy is converted to another form (e.g., heat is produced by mechanical and electrical machines)
- **knows that heat can move from one object to another by conduction and that some materials conduct heat better than others (**e.g., defines the term static electricity; describes how objects become negatively charged; describes what happens during an electric discharge)
- **knows the organisation of a simple electrical circuit (e.g., battery or generator, wire, a complete loop through which the electrical current can pass; **defines the term electric current, **compares conductors and insulators, **makes electrical circuits)
- *demonstrates understanding that electrical energy can be transformed into other forms of energy
- *designs and constructs a variety of electrical circuits and investigates ways in which electrical energy is transformed into other forms of energy
- *identifies uses of electricity in the home and community and evaluates the impact of these uses on both our quality of life and the environment

STANDARD **UNDERSTANDS MOTION AND THE PRINCIPLES THAT EXPLAIN IT

Benchmarks

Grade 1

- *demonstrates awareness that structures have distinctive characteristics
- *designs and makes structures that meet a specific need
- *demonstrates understanding of the characteristics of different structures and of ways in which they are made, and recognises and uses some systems in the home or at school

Grade 2

- *describes the position and movement of objects, and demonstrates an understanding of how simple mechanisms enable an object to move (**e.g., identifies and describes simple machines and explains their uses; describes forces used to move objects; identifies types of forces)
- *designs and makes simple mechanisms, and investigates their characteristics
- *recognises that different mechanisms and systems move in different ways, and that the different types of movement determine the design and the method of production of these mechanisms and systems
- **knows that the position and motion of an object can be changed by pushing or pulling

Grade 3

- **knows that vibrating objects produce sound
- **knows that light travels in a straight line until it strikes an object
- **knows that the position of an object can be described by locating it relative to another object or the background
- **knows that things move in many different ways (e.g., straight line, zigzag, vibration, circular motion)
- *demonstrates an understanding of the factors that affect the stability of objects
- *designs and makes structures that include mechanisms and that can support and move a load, and investigate the forces acting on them
- *describes, using their observations, systems involving mechanisms and structures, and explain how these systems meet specific needs and how they have been made
- **knows that magnets can be used to make some things move without being touched (e.g., classifies materials as magnetic or non-magnetic; demonstrates the properties of magnetic attraction and repulsion; describes various kinds of magnets and their force fields; creates a magnet)
- **knows that things near the Earth fall to the ground unless something holds them up

Grade 4

- *demonstrates an understanding of the characteristics of pulleys and gears
- *designs and makes pulley systems and gear systems, and investigates how motion is transferred from one system to another
- *identifies ways in which different systems function, and identifies appropriate criteria to be considered when designing and making such systems

Grade 5

- *demonstrates an understanding of the effect of forces acting on different structures and mechanisms (**e.g., defines the term force; describes the ways force can affect the motion of an object)
- *designs and makes load-bearing structures and different mechanisms, and investigates the forces acting on them (**e.g., explains how a machine makes doing a task easier)
- *evaluates the design of systems that include structures and mechanisms, and identifies modifications to improve their effectiveness
- **knows that electrically charged material pulls on all other materials and can attract or repel other charged materials (**e.g., describes the conditions under which electric charges produce a magnetic field; defines the term electromagnetism; makes electromagnets; describes how a magnet can produce an electric current; identifies the charges of protons and electrons in atoms)
- **knows that magnets attract and repel each other and attract certain kinds of other materials (e.g., iron, steel)

Grade 6

- **knows that the pitch of a sound depends on the frequency of the vibration producing it
- **knows that light can be reflected, refracted, or absorbed
- **knows that an object's motion can be described by tracing and measuring its position over time
- **knows that when a force is applied to an object, the object either speeds up, slows down, or goes in a different direction (**e.g., defines term buoyant force; defines the term inertia; explains that a force is needed to overcome inertia)
- **knows the relationship between the strength of a force and its effect on an object (e.g., the greater the force, the greater the change in motion; the more massive the object, the smaller the effect of a given force)
- *demonstrates an understanding of different kinds of motion-linear, rotational, reciprocating, oscillating (**e.g., defines the term motion, differentiates between three types of motion)
- *designs and makes mechanical devices, and investigates how mechanisms change one type of motion into another and transfer energy from one form to another
- *identifies modifications to improve the design and method of production of systems that have mechanisms that move in different ways
- **knows that the Earth's gravity pulls any object toward it without touching it (**e.g., defines the term gravity; defines the term weight in relation to gravity; compares and contrasts magnetic force and the force of gravity)

STANDARD **UNDERSTANDS THE NATURE OF SCIENTIFIC KNOWLEDGE AND INQUIRY

Benchmarks

Grade 1

- *identifies familiar technological items and describes their use in daily life (e.g., telephone, videocassette recorder)
- *uses familiar technology appropriately (e.g., overhead projectors, cassette recorders, computers)
- *makes things using a variety of tools and techniques (e.g., hammer, screwdriver, glue, stapler)

Grade 2

- **knows that learning can come from careful observations and simple experiments
- **knows that tools (e.g., thermometers, magnifiers, rulers, balances) can be used to gather information and extend the senses
- **knows ways that technology is used at home and school (e.g., paging systems, telephones, VCR's)
- **knows that most things are made of parts and they may not work if some parts are missing
- **knows that when parts are put together, they can do things that they couldn't do by themselves
- **understands how some elements or components of simple systems work together (e.g., parts of a bicycle)

Grade 3

- **knows that in science it is helpful to work with a team and share findings with others
- **knows that scientific investigations generally work the same way in different places and normally produce results that can be duplicated
- **knows that new tools and ways of doing things affect all aspects of life, and may have positive or negative effects on other people
- **knows that objects occur in nature; but people can also design and make objects (e.g., to solve a problem, to improve the quality of life)
- **knows that tools can be used to observe, measure, make things, and do things better or more easily
- **knows that people are always inventing new ways to solve problems and get work done (e.g., computer is a machine that helps people work and play)
- **creates and tests a simple linear system (e.g., a production line process for making sandwiches)

Grade 4

- **knows that technologies often have costs as well as benefits and can have an enormous effect on people and other living things
- **knows areas in which technology has improved human lives (e.g., transportation, communication, nutrition, sanitation, health care, entertainment)

Grade 5

- **knows that new inventions often lead to other new inventions and ways of doing things
- **categorises items into groups of natural objects and designed objects
- **identifies a simple problem that can be solved using technology
- **knows that people have invented and used tools throughout history to solve problems and improve ways of doing things
- **knows that when things are made up of many parts, the parts usually affect one another
- **knows that things that are made of parts may not work well if a part is missing, broken, worn out, mismatched, or misconnected
- **identifies the relationships between elements (i.e., components, such as people or parts) in systems

Grade 6

- **knows that scientific investigations involve asking and answering a question and comparing the answer to what scientists already know about the world
- **knows that scientists use different kinds of investigations (e.g., naturalistic observation of things or events, data collection, controlled experiments), depending on the questions they are trying to answer
- **plans and conducts simple investigations (e.g., makes systematic observations, conducts simple experiments to answer questions)
- **uses simple equipment and tools to gather scientific data and extend the senses (e.g., rulers, thermometers, magnifiers, microscopes, calculators)
- **knows that good scientific explanations are based on evidence (observations) and scientific knowledge
- **knows that scientists make the results of their investigations public; they describe the investigations in ways that enable others to repeat the investigations
- **knows that scientists review and ask questions about the results of other scientists' work
- **knows that different people may interpret the same set of observations differently
- **knows constraints that must be considered when designing a solution to a problem (e.g., cost, materials, time, space, safety, scientific laws, engineering principles, construction techniques, appearance, environmental impact, what will happen if the solution fails)
- **implements proposed solutions using appropriate tools, techniques, and quantitative measurements
- **evaluates a product or design (e.g., considers how well the product or design met the challenge to solve a problem; considers the ability of the product or design to meet constraints), and makes modifications based on results
- **assembles, disassembles, and tests systems (e.g., in logo programming, using paper and pencil designs)
- **knows that although the same scientific investigation may give slightly different results when it is carried out by different persons, or at different times or places, the general evidence collected from the investigation should be replicable by others
- **knows that people of all ages, backgrounds, and groups have made contributions to science and technology throughout history
- **knows that although people using scientific inquiry have learned much about the objects, events, and phenomena in nature, science is an ongoing process and will never be finished
- **knows that scientists and engineers often work in teams to accomplish a task

LEARNER OUTCOMES
GRADES: 1 – 6

LIFE SCIENCE	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6
	Identify body parts (external) of humans.	Identify a variety of animals in your environment.	Define the term vertebrates.	Distinguish between vertebrates and invertebrates.	Describe traits common to all invertebrates.	Identify and describe parts of the cell and their functions.
	Describe the functions of external body parts. (legs, arms, torso, head)	Group animals by body coverings and parts.	Classify vertebrates according to their characteristics.	Describe traits common to all invertebrates.	Describe the characteristics common to crustaceans.	Differentiate between plant and animal cell (microscope).
	Infer and identify the five sense organs in the human body.	Describe how animals move from place to place.	Describe the traits common to vertebrates.	Identify five invertebrate groups.	Identify invertebrates that are crustaceans.	Observe plant and animal cell parts and record their functions.
	Describe the functions of the five sense organs.	Identify things animals need for survival.	Identify and describe vectors that are vertebrates.	Identify the main traits of insects and spiders.	Explain the impact of crustaceans on the Bahamian economy.	Use specimen or pictures to classify four types of fungi by their traits.
	Explain how the senses work together to tell us about our surroundings/ environment/ world.	Describe ways that animals get food.	Compare mammals to birds.	Compare traits of insects and spiders.	Research the laws that govern the preservation and conservation of the spiny lobster.	Distinguish between harmful and helpful fungi.
	Identify the stages in human development.	Define the term habitat.	Compare reptiles, fish and amphibians.	Describe the life cycle of mosquitoes and cockroaches.	Explain the characteristics of mollusks.	Compare and contrast the growth of fungi to the growth of plants.
	Describe physical changes that occur at each stage of development.	Compare animal habitats.	Observe and describe body parts of fish and their functions.	Investigate how insects use mimicry and camouflage	Identify invertebrates that are mollusks.	Research and describe traits common to all sponges.
	Compare physical abilities of infants, children, and adults	Identify the parts of the skeleton.	Infer how body parts of vertebrates help them survive.	Identify the main parts of the respiratory system.	Classify mollusks as no shell, one shell and two shell types.	Describe the traits of echinoderms.
	Describe habits that help people stay healthy.	Explain the functions of the skeleton.	Observe visuals or models to identify the parts of the digestive system.	Demonstrate the importance of the respiratory system.	Explain the impact of the queen conch on the Bahamian economy	Research to distinguish between different kinds of worms.

L I F E S C I E N C E	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6
	Identify foods that help to keep the body healthy.	Describe the location of the skeleton in the body.	Experiment to communicate how food is broken down.	Identify the main parts and the importance of the Nervous System.	Analyze ways to preserve and conserve the queen conch.	Examine a variety of invertebrates and classify them as sponges, echinoderms and worms.
	Infer what happens if your body is not kept clean.	Identify muscles in the body.	Investigate to explain the functions of the digestive system.	Identify risk factors to health and how they may be reduced.	Explain the characteristics of stinging-cell animals.	Identify parts of the Circulatory System.
	Identify the things living things need to stay alive.	Explain the function of muscles.	Infer how proper nutrition is related to good health.	Identify safety procedures for natural disasters.	Identify invertebrates that are stinging-cell animals.	Discuss and label a simple diagram of a heart.
	Identify and describe ways people use plants and animals.	Demonstrate how muscles work.	Investigate appropriate exercises and food to develop a healthy lifestyle.	Investigate plants with seeds and without seeds.	Define the term vector.	Investigate and describe the function of the heart.
	Name animals that are sources of food, clothing and shoes.	Explain how healthy habits affect your bones and muscles.	Identify the seven main food groups, and explain the nutrients found in each group.	Classify plants with flowers and plants with cones.	Identify invertebrate vectors.	Research and identify the blood vessels in the circulatory system.
	Name plants that people eat.	Experiment to tell what plants need to grow.	Identify health resources.	Compare monocots and dicots.	Describe characteristics of invertebrate vectors. (insects)	Investigate and identify risk factors to health and how these may affect the circulatory system.
	Identify animals used as pets and animals that help people work.	Observe plants to identify plant parts.	Observe plants to identify parts using hand lens.	Predict which of two seeds will germinate first.	Explain how vectors affect the health and well-being of Bahamians.	Research and describe the functions of the Immune System.
	Classify living and nonliving things.	Identify seeds from various plants.	Experiment with plant parts and describe their functions.	Compare the growth rate of two plant specimens.	Describe diseases caused by invertebrate vectors and their treatments.	Explain how negative habits affect the Immune System.
	Compare living and nonliving things.	Classify seeds according to color, size and shape.	Investigate to describe the function of seed parts.	Identify and describe indigenous flowering plants in The Bahamas.	Discuss ways to eliminate vectors.	Identify risk factors to health and how these risks may be reduced.
	Identify the two main groups of living things.	Compare seeds from various plants.	Experiment with seeds to describe its growth patterns.	Define food chain and web.	Explain instincts that help animals meet their needs.	Observe specimens of flowers to identify the parts of a flower, and explain its function.

LIFE SCIENCE	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6
	Compare traits of plants and animals.	Identify plants and animals that live in the schoolyard.	Investigate to describe the function of seed parts.	Distinguish between producers, consumers and decomposers.	Explain two examples of learned behaviour.	Research and explain the life cycle of a flower. (plant)
	Identify places where plants and animals live.	Identify plants and animals that live in their backyard.	Experiment with seeds to describe its growth patterns.	Create a food chain and web. Identify plants and animals that live in the pine forests, coral reefs and mangroves.	Differentiate between instinct and learned behaviour.	Predict and experiment to discover the needs of plants for growth.
	Explain how plant parts help them to live in different places.	Identify plants and animals that live in ponds and lakes.	Investigate living and non-living things in a garden ecosystem.	Hypothesize the effect on organisms when a pine forest is damaged.	Identify animals that migrate and hibernate.	Investigate and compare the growth patterns of different plants.
	Explain how body parts and coverings help animals live where they do.	Identify plants and animals that live on the seashore and in the ocean.	Observe a variety of model gardens (visuals) or real to identify types of gardens. (Vegetable, flower).	Explain how a coral reef differs from other ecosystems.	Identify parts of the skeletal system.	Experiment to show how plants respond to their environment.
	Describe ways plants and animals help each other.	Describe ways that people can harm habitats.	Experiment with seeds to create a containerized vegetable garden.	Explain the importance of coral reefs.	Explain the function of the skeletal system.	Explore a variety of plants to conclude their adaptive method for survival.
	Infer what are vectors and where they live.	Describe ways that people can protect and preserve habitats.	Use ruler to measure the growth of seedlings.	Identify the four types of mangroves.	Explain why different parts of the bone are important.	Investigate to define a biome.
	Discuss ways to prevent breeding.	Identify vectors and discuss why they are harmful.	Investigate the rocky and sandy shores to identify living and non-living parts.	Communicate characteristics of each type of mangrove/ Identify organisms found in this ecosystem.	Infer how proper nutrition and exercise are related to good skeletal health.	Research and infer why organisms live in certain biomes.
		Identify places where specific vectors live/ Explain why they live in these places.	Observe and classify plants and animals of rocky and sandy shores' using hand lens.	Infer the importance of mangroves.	Explain the functions of the muscular system.	Compare and contrast the tropical rain forest to the deciduous forest.
		Describe ways to eliminate the habitats of vectors.	Compare a vegetable garden and garden/farm. Compare rocky and sandy shores.		Identify parts of the muscular system and explain its function.	Research and compare the results of natural disasters on the environment.

L I F E S C I E N C E	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6
			Observe a coral reef ecosystem to identify the home of the grouper.		Classify muscles as skeletal, smooth and cardiac.	Communicate and summarize the effects of human activities on the environment.
			Research information on the grouper to explain why they are endangered.		Explain why muscles must work in pairs.	Research and identify animals (organisms) in The Bahamas that are endangered.
			Investigate to infer what threats affect the grouper.		Demonstrate how skeletal and muscular systems work together.	
			Research and discuss laws that protect the grouper.		Infer how proper nutrition, rest and sleep are related to good muscular health.	
					Describe how personality, relationship and self-concept affect mental and emotional health.	
					Investigate eating habits, disorders and how they affect health.	
					Explain how good eating habits enhance healthy growth and development.	
					Describe the process photosynthesis.	
					Identify indigenous plants of The Bahamas. Identify medicinal plants and their uses.	

L I F E S C I E N C E	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6
					Describe ways to conserve plants.	
					Define ecosystem.	
					Explain the interdependence of living and nonliving elements of an ecosystem.	
					Identify three different groups (predator/prey and scavenger) in an ecosystem.	
					Explain components of food chains and food webs.	
					Define resources.	
					Identify water, fisheries and electricity as resources.	
					Describe ways to conserve resources.	
					Define preservation.	
					Explain the importance of preserving national parks.	

EARTH SCIENCE	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6
	Recognize that earth is made up of land, water and air.	Compare and contrast rocks and minerals.	Investigate to identify Earth's natural resources and their uses.	Identify the three layers of the Earth.	Define earth resources.	Identify and compare the layers of the earth.
	Differentiate among bodies of water on earth.	Classify rocks and minerals according to color, size and shape.	Communicate the importance of natural resources to the survival of people.	Describe the Earth's layers.	Identify ocean resources.	Infer what natural resources are and where they are located.
	Compare and contrast a variety of landforms.	Explain some uses of rocks.	Investigate the sources of air, water, and land pollution.	Describe weathering and erosion.	Identify pollutants and explain how they affect marine life.	Classify resources as renewable or nonrenewable.
	Investigate how hills are formed.	Explain some uses of minerals.	Investigate to discover ways to prevent pollution.	Identify the causes of weathering.	Suggest strategies that avoid polluting the ocean.	Investigate the environment to distinguish between air, land and water pollution,
	List examples of natural resources.	Describe weather in The Bahamas.	Communicate the role of students as environmental stewards.	Identify ocean resources.	Explain ways to conserve the ocean.	Research and compare coal, oil and natural gas.
	Explain how reducing, reusing and recycling can save natural resources.	Identify instruments used to measure weather conditions.	Research ways to explain to care for earth's resources.	Investigate the movement of the ocean water and how it is affected by the moon.	Define fossil.	Research to compare/explain advantages and disadvantages of fossil fuels.
	Identify ways water can be used.	Describe ways weather affects people.	Explain the water cycle and its relationship to weather and climate.	Infer what is ocean pollution/ examine its effect on organisms in the ocean.	Describe the process of fossil formation.	Research and identify factors of weather.
	Explain the different types of weather.	Explain precautions that can be taken before and during bad weather conditions for safety.	Interpret diagrams to explain changes that occur at each phase of the water cycle.	Define Meteorology.	Distinguish between types of fossils.	Manipulate/look at pictures of models of weather instruments to identify them and explain how they work.
	Observe and record weather changes using weather instruments.	Describe the differences between the moon and Earth.	Experiment to describe how clouds are formed.	Describe the Earth's atmosphere.	Define atmosphere.	Explain the difference between weather and climate.
	Observe clouds and their changes.	Analyze the source of moonlight.	Classify clouds according to their traits.	Investigate the properties of air.	Describe the layers of the atmosphere.	Observe the environment and visuals to differentiate between weathering and erosion.

EARTH SCIENCE	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6
	Name the different seasons.	Describe changes in the moon.	Investigate to describe weather conditions associated with different types of clouds.	Describe the elements of Weather.	Identify conditions that change weather.	Research and identify the forces that cause weathering and erosion.
	Identify weather conditions associated with each season.	Define the term constellation.	Experiment with models to demonstrate Earth's position in relation to the sun.	Distinguish between weather and climate.	Describe how weather changes affect people.	Research to compare the traits/characteristics of storms.
	Identify and describe the sun and other stars.	Examine common constellations.	Experiment to describe the motion of the earth around the sun.	Measure water at various temperatures.	Measure rainfall using a rain gauge.	Investigate and record safety precautions during a storm.
	Discuss the importance of the sun.		Experiment to explain the terms orbit, revolve and rotate.	Measure wind direction.	Measure the speed of the wind using a windsock.	Collect data to compare and contrast the surface and atmosphere of the planets.
	Name natural objects seen in the daytime and nighttime sky.		Interpret visuals to show various seasons.	Demonstrate the sun's effect on Earth.	Explain what the solar system is.	Hypothesize which planets are susceptible to life.
	Explain the difference between day and night.		Investigate to discover what causes seasons.	Record the order of the eight planets.	Identify bodies in the solar system.	Research to identify equipment used to study objects in space.
				Classify the planets as inner and outer planets.	Differentiate between rotation and revolution of planets.	Investigate and identify pictures of vehicles used to explore the universe safely.
				Distinguish between inner and outer planets.	Record the differences between the years on each planet.	
				Create a scale model of the distances between planets.	Explain how the sun benefits the earth and other planets.	
					Identify other stars.	
					Identify and describe other objects in space.	

PHYSICAL SCIENCE	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6
	Classify objects according to their physical properties such as size, colour, shape and texture.	Define the term matter.	Experiment with manipulatives to identify matter as solids, liquids and gases.	Observe and identify properties of matter.	Explain how matter is classified.	Manipulate objects to identify physical properties.
	Experiment to identify how matter changes state, size, colour, shape and texture.	Describe characteristics of solids, liquids and gases.	Investigate concrete models to compare some characteristics of solids, liquids and gasses.	Investigate physical changes in matter.	Differentiate between substances and mixtures.	Predict and experiment to explain physical changes in objects. Manipulate equipment used to measure physical properties of matter.
	Experiment to describe physical changes in matter.	Classify objects into groups of solids, liquids and gases.	Classify models into solids, liquids and gasses.	Compare physical properties and physical changes in matter.	Define solution.	Experiment and record chemical changes in objects and substances.
	Compare pushes and pulls.	Examine and identify the tools used to measure matter.	Experiment to show how matter changes from one form to another.	Measure the mass of objects.	Identify solutes and solvents in substances.	Investigate chemicals to identify some that will cause changes in matter.
	Observe and identify poles of a magnet.	Estimate the length and mass of objects.	Investigate objects to observe the physical properties of matter, forms and properties of Matter.	Measure the volume of different matter.	Define energy.	Research to distinguish between a physical change and a chemical change.
	Experiment to find out which objects (materials) a magnet will attract/repel.	Measure the length and mass of objects.	Experiment to discover the length, volume and mass of objects.	Define force, work and motion	Differentiate between potential and kinetic energy.	Experiment to compare and measure matter.
		Predict how much various size containers can hold.	Interpret the metric table to identify metric units used to measure length, volume and mass.	Compare the force of pushing and pulling.	Describe the effects of forces on the motion of an object.	Experiment with magnets to locate the poles and the magnetic field.
		Experiment to discover how much various size containers can hold.	Experiment with a graduate to measure the volume of liquids and solids.	Measure pulls using a spring scale.	Identify forms of energy.	Manipulate objects to infer the relationships between motion, speed and direction.

PHYSICAL SCIENCE	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6
		Identify the forms of energy provided by the sun.	Investigate to discover the sources of energy.	Interpret data recorded on pushes and pulls.	Explain the differences between heat and temperature.	Experiment to explain how a simple circuit works.
		Describe the uses of energy provided by the sun.	Research information to define fuels.	Investigate work and infer how (work) it is related to force.	Explain how energy can be changed into other forms.	Investigate objects and materials to discover the effects of friction on them.
		Describe the uses of energy provided by wind.	Investigate to discover how fossil fuels are formed.	Conclude what a simple machine is.	Discuss the impact of technology on forms of energy.	Research to identify pulleys and wheel and axle.
		Describe the uses of energy provided by water.	Interpret information on the uses of energy from fossil fuels.	Identify various objects as wedges or inclined planes.	Define simple machines.	Experiment to conclude how pulleys and wheel and axles make work easier.
		Predict which objects are attracted to magnets.	Investigate the different forms of energy.	Communicate how wedges are related to inclined planes.	Identify compound machines that use the lever and screw to help us do work.	Investigate and describe ways in which energy can be conserved.
				Discuss energy conservation.	Explain the importance of conserving energy.	
		Experiment to discover which objects are attracted to magnets.	Communicate the various forms of energy and their uses.	Describe ways technology is used to explore the ocean.		
		Classify objects according to whether or not they are attracted to magnets.	Experiment to discover basic characteristics of light, heat, sound and electricity.			
		Experiment with magnets to discover which objects attract or repel.	Research information to identify objects that transfer electricity.			
			Research information on magnets and their uses.			
			Investigate and interpret pictures to identify conservation.			
			Analyze and share ways to conserve energy.			

Definition of Terms

Overarching Goal	This indicates the ultimate outcome of the Primary Science Curriculum document.
Sub-Goals	These six sub-goals are based on the three strands which form the framework for the curriculum.
Scope and Sequence	This is a table outlining objectives for each grade level showing the progression and overview of the work to be accomplished.
Scope of Work	It develops curriculum objectives with suggested content, activities, assessment and resources to facilitate and enhance the teaching/learning process.
Strand	The sections within a particular content area that may be clustered by topic or process. E.g. Life Science – Fundamental concepts and principles of life science include the study of living organisms, their structure and function, their behaviors and their relationships with the environment.
Objectives	They are derived from goals. They specify in measurable and observable terms the content, skill and attitudes to be learned by each student. Objectives are written in terms of what the student is expected to achieve.
Assessment	Ongoing processes which measure student understanding of specific learning targets or objectives. Instruments used to collect data and evaluate student performance.
Rubric	A prescribed set of instructions, criteria or rules that indicate the critical elements of a learning task.
Concept	A general idea derived or inferred from specific instances or occurrences.
Skills	Targeted proficiencies; technical actions and strategies.

SECTION C

The Curriculum / Scope of Work

Fundamental concepts and principles of life science include the study of living organisms, their structure and function, their behaviors and their relationships, with the environment.

CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: HUMAN BODY		STRAND 1: CHARACTERISTICS OF ORGANISMS			
LIFE SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	1. Identify body parts (external) of humans.	Our bodies are made up of many different parts. Each part has a special job to do. On the outside, our bodies are separated into the following obvious parts, - head, torso, arms, legs, feet, hands, nose, ears, eyes, lips, toes, and fingers.	1. Use large classroom mirrors and hand mirrors to observe external parts of the body – say the parts orally as they are identified. Attach word cards (external body parts) on the correct parts of the human model (three dimension or flat). Glue external body parts in the correct positions on an outline of a student (boy or girl). Use the worksheet to have students write the body part next to the part in the corresponding diagram. Sing/Demonstrate the Song “Head and Shoulders, Knees and Toes.”	Caribbean Primary Science Bk. 1 Harcourt Science Bk. 2 First Steps in Science Illustrative Human Body Chart Human Body Model http://www.kidskonnnect.com/content/view www.kidszone.com Harcourt Health and Fitness Bk. 1	I. Using a human model – Number the body parts – Direct students to name the numbered body parts/ Attach correct word to numbered parts.

Fundamental concepts and principles of life science include the study of living organisms, their structure and function, their behaviors and their relationships, with the environment.

CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: HUMAN BODY

STRAND 1: CHARACTERISTICS OF ORGANISMS

LIFE SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	2. Describe the functions of external body parts. (legs, arms, torso, head)	Each major part of the body has a specific function. The legs are used for locomotion, like walking, running, jumping and swimming. The arms are used for holding things, lifting, pushing and pressing. The torso or body trunk (the area between the head and legs) is used to bend and twist our bodies around. The head contains the brain which is the “control center” of the body. It tells us what we see, hear, smell, taste and touch.	2. Assign two body parts to each student to research their function. Have students READ researched information. Discuss and demonstrate why body parts are important. Play “Body Match Game” – Students match the external body parts with correct functions. “Body Collage” (Students will trace their body outline) and use collage materials to enhance some body parts. Create short sentences and poems about body parts and functions. Students will have their body outline traced and used.	❖ http://www.teachervision.fen.com/anatomy/lesson-plan Harcourt Health and Fitness Bk. 1	II. Present the body collages constructed, and explain functions of selected body parts. e.g. The TORSO/BODY TRUNK is used to bend and twist our bodies around. Human Body Puzzle Present parts of human body (cut out pieces). Give students specific time to put puzzle together correctly.

Fundamental concepts and principles of life science include the study of living organisms, their structure and function, their behaviors and their relationships, with the environment.

CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: HUMAN BODY - SENSE ORGANS

STRAND 1: CHARACTERISTICS OF ORGANISMS

LIFE SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	1. Infer and identify the five sense organs in the human body.	Human beings and other living things (organisms) are able to tell what is going on in their surroundings/environment by using their sense organs . Human beings have five sense organs. They are: 1. nose 2. eyes 3. ears 4. tongue 5. skin	1. Observe human models and infer which parts of the human body are organs. Blind fold students and allow them to taste sample foods which are a. Sweet b. Salty c. Sour – Have students identify which body part detected the taste. Draw or make a chart with a picture of an eye, ear, nose, tongue and hand. Write words or hold up pictures that match each of the sense organs that are represented by the eye – (sight, vision), ear – (hearing, auditory), nose – (smell, scent), tongue – (taste) and hand/skin – (touch, feeling). For example: under the: I. Eye: (light bulb, sun, flashlight) II. Ear: (piano, music) III. Nose: (garbage, perfume, air freshner, skunk) IV. Tongue: (ice cream, hotdog, apple) V. Hand/skin: (glove, pencil, book)	Science Horizon Kindergarten Edition. School House Press Level A Harcourt Science Teacher’s Edition Bk. 1 Science Horizon Big Shared Book- Kindergarten www.scientificpsychic.com/workbook www.visualdictionaryonline.com www.neuroscienceforkids.com Harcourt Health and Fitness Bk. 1	I. On a flat Human Model, students attach the correct card on the sense organ.

Fundamental concepts and principles of life science include the study of living organisms, their structure and function, their behaviors and their relationships, with the environment.

CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: HUMAN BODY - SENSE ORGANS

STRAND 1: CHARACTERISTICS OF ORGANISMS

LIFE SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	2. Describe the functions of the five sense organs.	We use our sense organs to observe, explore and learn about things around us. The nose is used for smelling. The eyes are used for sight or seeing. The ears are used for hearing. The tongue is used for tasting and the skin is used for touch or feeling.	2. SENSORY STATIONS – Set up tables with hands-on materials for students to touch, smell, taste, hear and see. – Some possible station items: ❖ HEARING: bells, whistles, drums, spoons to tap. ❖ TOUCH: sandpaper, play dough, finger paint, ice. ❖ VISION/SIGHT: magnifying lens, prism, colored water. ❖ SMELL: vanilla, perfume, spices, chocolate. ❖ TASTE: jelly beans, fruit slices, crackers, dill pickles, salty chips.	Science Horizon Kindergarten Edition School House Press Level A Harcourt Science Teacher’s Edition Bk. 1 www.scientificpsychic.com/workbook www.visualdictionaryonline.com www.neuroscienceforkids.com Harcourt Health and Fitness Bk. 1	Ila. The students will be given organ parts (cut out pieces) and organ function sentences. Match the correct organ part with the correct (function) – sentence strip. Glue them on the paper provided. Create a model on one of the sense organs. Write about it and present it to class

Fundamental concepts and principles of life science include the study of living organisms, their structure and function, their behaviors and their relationships, with the environment.

CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: HUMAN BODY - SENSE ORGANS		STRAND 1: CHARACTERISTICS OF ORGANISMS			
LIFE SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	3. Explain how the senses work together to tell us about our surroundings/environment/world.	Our sight, hearing, smell, taste and touch are senses. These senses help to keep us safe by making us aware of changes around us or of danger that may occur. Our senses work together to tell us about the outside world.	3. In small groups play “Sensory Concentration Game” and “Sensory, Sensory Pile On Game”.	Science Horizon Kindergarten Edition School House Press Level A Harcourt Science Teacher’s Edition Bk. 1 www.scientificpsychic.com/workbook www.visualdictionaryonline.com www.neuroscienceforkids.com Harcourt Health and Fitness Bk. 1	III. Create a Sense Organ/Function Booklet. (Research pictures, words, which will match with Sense Organs. Write a sentence about each Sense Organ.
	4. Identify the stages in human development.	Humans begin life as babies. A young baby is called an infant . The infant continues to grow into a young child, a teenager, and then an adult. An adult is a fully grown person. As we grow the size and shape of our bodies change.	4a. Students make a pictorial representation of themselves from infant to five years. Label the pictures. 4b. Give the students four picture cards showing the different stages of human development. Paste the picture card on a sheet in the correct order to show the stages in human development. Discuss each stage.	Science Horizons Bk. 1 Harcourt Science Bk. 2 Harcourt Health and Fitness Bk. 1	IV. Give each student four different shapes. Write a different stage on each shape. Put the shapes in the correct order by attaching string to pre-punched holes on each shape. Infant Young Child Teenager Adult

Fundamental concepts and principles of life science include the study of living organisms, their structure and function, their behaviors and their relationships, with the environment.

CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: HUMAN BODY			STRAND 1: CHARACTERISTICS OF ORGANISMS			
LIFE SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES		RESOURCES	METHOD OF ASSESSMENT
	5. Describe physical changes that occur at each stage of development.	Infants are small, have no teeth and sleep a lot. They cannot care for themselves. Young children can talk, walk and run. They begin to care for themselves. Teenagers grow very fast and can do most things for themselves. Teenagers become adults. Adults are able to care for themselves. They do not get taller but change as they grow older.	5a. Give each student a paper with the headings: How I Look Now and How I May Look When I Grow Up		Harcourt Science Bk. 2 Your Health Harcourt Brace Bk. 1 Focus on Science Level B Harcourt Health and Fitness Bk. 1	V & VI. Complete a worksheet. Ways You Grow. Read the title of each box. Then write or draw how humans grow and change. 1. How babies Look and Act 2. Things Young Children Do 3. How Teenagers Look and Act 4. How Adults Change
			How I Look Now	How I May Look When I Grow Up		
	6. Compare physical abilities of infants, children, and adults.		Draw a picture of yourself now. Draw what you may look like when you grow up. 5b. Make a growth chart. Measure the height of students on the growth chart. Distribute magazines to students. Have them cut and paste pictures of infants, children, and adults participating in different activities.			

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CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: HUMAN BODY

STRAND 1: CHARACTERISTICS OF ORGANISMS

LIFE SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	7. Describe habits that help people stay healthy.	Healthy means being well. For our bodies to grow strong and healthy we can eat healthy foods, get enough rest and exercise. Meat, fish, and milk, fruits, vegetables, and breads are good foods. Exercise means moving your body. You should exercise each day. Rest means to stop moving. You rest when you sit or sleep.	7a. Students work in cooperative groups to dramatize ways that will help them grow strong and healthy. 7b. Distribute magazines. Have students cut out pictures of people exercising and discuss why exercise is important for good health.	Science Horizons BK. 1 Focus On Science Level B Your Health Activity Book Harcourt Brace Harcourt Health and Fitness Bk. 1	VII. Make a web with <u>Staying Healthy</u> in the middle. Draw and write four things you do to stay healthy.
	8. Identify foods that help to keep the body healthy.		8. Work in cooperative groups to choose foods that will keep them healthy from a box of assorted foods. Make a list of the foods. Share with the class.		VIII. Complete a worksheet “Snack Choices”. Anna tries to eat healthful snacks when she comes home from school. Which snacks should Anna choose? Color and circle the healthful foods.
	9. Infer what happens if your body is not kept clean.	If we do not keep our bodies clean we can become sick. Sick means not healthy. Germs can sometimes make us sick. Germs are tiny living things. Keeping clean helps to get rid of germs.	9a. Demonstrate several actions to the class. Discuss how the actions are unhealthy. 9b. Draw a picture to show how staying clean keeps you healthy. Write a sentence to tell about it.		IX. Create a poster to show how the body can be kept clean. E.g. bathing, washing hands, brushing teeth.

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CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: WHAT ARE LIVING THINGS?

STRAND 1: CHARACTERISTICS OF ORGANISMS

LIFE SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT	
	1. Identify the things living things need to stay alive.	Plants need light, water, air, warmth and nutrients from the soil to grow. Animals need air, food, water and a place to live.	1a. Plant seeds and investigate what plants need to grow. Share what you see. 1b. Make an animal home using different materials. Place small animals in the home. Observe how your home gives animals food, water and shelter. 1c. Draw pictures of a favorite animal and tell what the animal needs in order to grow and live.	Harcourt Science Bk. 1 Science Horizons Bk. 1 www.pbskids.org/seekoworld/parentteachers/lessons_k_2.html	X. Make a drawing of plants and animals in a garden on poster board. Make a list to tell what things the plants need and what things animals need to survive.	
	2. Identify and describe ways people use plants and animals.	Some animals use plants for food, to hide or to make a home for their young. People use plants (beets, cauliflower, cabbage, lettuce, corn) and animals for food (fish, chicken, cow) clothing and shelter. Plants are also used to beautify our surroundings and as medicine.	2. & 3. Students will work in pairs to investigate things people use from plants and animals using picture cards. i. Classify the cards. Sort them into groups. ii. Share your groups with the class.	Harcourt Science Bk. 1 Science Horizons Bk. 1 www.pbskids.org/seekoworld/parentteachers/lessons_k_2.html	Plant Needs	Animal Needs
	3. Name animals that are sources of food, clothing and shoes.					
	4. Name plants that people eat.	People eat the meat of some animals and use their skin and other body parts to make clothing and shoes. Some animals such as dogs and cats are used as pets. Other animals can be used to help people do work.	4. Students will work in cooperative groups to make pictures or models of different fruits and vegetable that they eat. Make a fruit and vegetable stall and have the groups label and place their picture or drawing in it.		XI, XII & XIII. Create a class book of plants and animals that are used as food, medicine, clothing, furniture shoes, shelter, etc.	

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CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: WHAT ARE LIVING THINGS?		STRAND 1: CHARACTERISTICS OF ORGANISMS			
LIFE SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	5. Identify animals used as pets and animals that help people work.	Animals are an important part of our lives. Pets become members of our families and bring companionship and a sense of security to our homes. Some animals that help people work are: - herding dogs, sled dogs, horses, mules, cows (pulling carts), explosive, bomb or drug sniffing dogs, scent tracking dogs, for security; search and rescue dogs, elephants (transportation and moving objects), etc...	5. Have the students observe pictures of animals at work and animals used as pets. a. Name the animals in each picture. b. Discuss how the animals are being used.	www.kidszone.com Harcourt Science Bk. 1 Science Horizons Bk. 1 www.pbskids.org/eeeworld/parentsteachers/lessonsk_2html	XIII. Draw a picture of an animal helping someone. Write about how the animal you drew is helping the person. Have students bring in photos of their pets and use them to describe their relationship with their pets.

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CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: LIVING AND NONLIVING THINGS

STRAND 1: CHARACTERISTICS OF ORGANISMS

LIFE SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	1. Classify living and nonliving things.	Plants and animals are living things . They need food, air, and water. They can move, grow and produce other living things. Nonliving things do not need food, air, or water. They do not grow. Some nonliving things behave like living things but they need help. For example, wind moves clouds across the sky. Only living things can carry out actions without being helped.	1a. Distribute boxes of materials with pictures of living things and pictures and items of non-living things. Have the students sort the pictures and items into two groups: Living and Nonliving. Use the pictures and items to make a collage. 1b. Give each student an object. Answer the following questions. a. Do I need food? b. Do I need air? c. Do I need water? d. Do I produce young? e. Am I Living?	Harcourt Science Bk. 1 Science Horizons Bk. 1 www.schoolscience.rice.edu/science/curricula/printpreviewlearningexperienceonly.cfm	I & II a. Draw a picture of a living thing and a nonliving thing. b. Write about two traits about what you drew. Have students collect examples of living things and non-living things in the schoolyard, bring to class and categorize them as living or nonliving.
	2. Compare living and nonliving things.		2. Have the students observe a picture of a baby and a picture of a doll. Discuss how they are the same and how they are different.		
	3. Identify the two main groups of living things.		3. Distribute magazines. Have the students cut out pictures of plants and animals. Make a class chart of plants and animals.		III & IV. Complete a Venn diagram. Label one side as plants and the other side as animals. Write two ways plants and animals are alike and two ways they are different.

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CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: LIVING AND NONLIVING THINGS		STRAND 1: CHARACTERISTICS OF ORGANISMS			
LIFE SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	4. Compare traits of plants and animals.	Plants and animals need food. Most plants make their own food. Animals must find their food. Animals move from place to place. Plants do not. They can only move some of their parts.	4a. Have the students choose a plant and an animal to observe for a length of time. On a weekly basis, have them draw any changes they observe in the living things. 4b. Take a nature walk with your class. Look for plants and animals. Record what you see on your nature walk.	www.hden.k12wi.us/k8/firfor.htm Harcourt Science Bk. 1 Science Horizons Bk. 1	IV. Have students play “What’s My Trait” Game. Distribute pictures and trait strips of plants and animals. Have students work in groups to align the trait to the plant or animal and explain why they made their choices.

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CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: LIVING AND NONLIVING THINGS

STRAND 1: CHARACTERISTICS OF ORGANISMS

LIFE SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	1. Identify places where plants and animals live.	Plants can be found living almost everywhere. Some plants live in wet and shady places such as a forest. Some live in very dry places such as the desert. Some plants live where there is ice and snow, and others may live in the ocean. Animals can also be found living in different places. Some animals live in caves, holes in the ground, in the ocean, under stones, in trees and on the bodies of other animals.	1a. Rain Forest in a jar <u>Procedure:</u> i. Put pebbles, soil, and plants in a jar. ii. Water the plants. Put the lid on the jar. iii. Put the jar to get some light. iv. Wait one day. Observe. How is this like a Rain Forest? 1b. Make a Bird Feeder <u>Procedure:</u> i. Cut the top off a plastic jug. Punch holes on both sides. ii. Tie string through the holes. iii. Pour some birdseed inside. Hang outdoors. iv. Observe birds that eat the seeds. 1c. An Animal Home <u>Procedure:</u> i. Put soil, twigs, rocks, water and a small animal in a box. ii. Observe how the animal uses its home. iii. Draw what you see. Close the lid.	Harcourt Science Bk. 1 Science Horizons Bk. 1 Focus On Science Level B	I. Divide a poster paper in half. Draw the plants and animals that you would find living in two different places. Label the plants and animals in your drawings.

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CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: LIVING AND NONLIVING THINGS

STRAND 1: CHARACTERISTICS OF ORGANISMS

LIFE SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	2. Explain how plant parts help them to live in different places.	The parts of a plant help it to live where it does. Some plants have different types of leaves , stems , and roots that help them survive in different environments. Animals have body parts and coverings that help them live where they make their homes.	2a. Plant Parts i. Observe a plant with flowers. Look at the parts of the plant. Draw what you see. ii. Look at the parts of another plant. Draw what you see. iii. Compare the plants. Tell about their parts. 2b. Desert Leaves <u>Materials:</u> 2 paper clips, water, wax paper, 2 paper towel leaf shapes. <u>Procedure:</u> i. Make both leaf shapes damp. Put one shape on wax paper. Fold the paper over. Clip it. ii. Put both leaves in the sunlight. Check them after an hour. iii. Which leaf holds water longer? Draw a conclusion. 2c. Collect different leaves and make leaf rubbings. 2d. How are birds' beaks different? <u>Materials:</u> 2 sticks, 2 clothespins, glue, straw pieces	Science Horizons Bk. 1 www.hden.k12wi.us/ks/firfor.htm Harcourt Science Bk. 1 A World of Science Bk. 1	II. Complete a Worksheet. A. Match each word with a plant part: (observe a picture of a plant) cone flower leaf stem root seed B. Write briefly about these places where plants live: Desert, forest, pond

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CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: LIVING AND NONLIVING THINGS			STRAND 1: CHARACTERISTICS OF ORGANISMS		
LIFE SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
			<u>Procedure:</u> a. Glue two sticks to a clothespin. Pretend it is a long beak. b. Get another clothespin. Pretend it is a short beak. c. Pick up a straw with the long beak and then the short beak. Which beak would be better for crushing seeds?		
	3. Explain how body parts and coverings help animals live where they do.			Science Horizons Bk. 1 www.hden.k12wi.us/ks/firfor.htm Harcourt Science Bk. 1 A World of Science Bk. 1 Focus on Science Level B	III. Draw a picture of an insect in a garden. Write or illustrate two ideas about how the insect uses its legs.
	4. Describe ways plants and animals help each other.	Plants and animals live together and help each other. Plants need animals to carry seeds and to make the soil better. Animals need plants for food, shelter and protection.	4a. How Seeds Stick to Animals <u>Materials:</u> Styrofoam ball, glue, velcro, cotton, sandpaper <u>Procedure:</u> a. Observe pictures of seeds or seeds on plants. How might these seeds stick to animals? b. Plan a model of a seed that sticks. Choose materials to glue to the ball.	Harcourt Science Bk. 2 Harcourt Science Bk. 1 www.kidszone.com www.pbskids.org/seekoworld/parentsteachers/lessons_k2.html	IV. Give each student a pattern of a plant and a pattern of an animal. On the plant pattern write two ways plants help animals. On the animal pattern write two ways animals help plants.

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CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: LIVING AND NONLIVING THINGS			STRAND 1: CHARACTERISTICS OF ORGANISMS		
LIFE SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
			c. Investigate your materials. Which ones stick to the cotton? The cotton is like animals' fur. 4b. Go outside with your class. Observe the animals and plants in one area. Record the different ways small animals use the plants. e.g. food, shelter, etc.		
	5. Infer what are vectors and where they live. 6. Discuss ways to prevent breeding.	Animals that spread diseases are called vectors. Rats, cockroaches, mosquitoes and houseflies are vectors. Vectors live in places where they are able to find food, shelter and the right conditions for laying their eggs. These places are usually dirty and filled with garbage.	5 & 6a. Students will work in cooperative groups to make models of vectors and where they live. i. Tell why you think vectors would like living in these places. ii. Tell what they can do to help prevent vectors from breeding. 5 & 6b. Take a tour of the schoolyard. Observe and record anything that may contribute to the development of vectors. Discuss what they can do to help prevent vectors.	Vectors handouts – Ministry of Health and the Environment/Vector Control Section School Health and Family Life Education Curriculum Module – Reducing Pests and Insect Vectors.	V & VI. Construct a model of a vector. On a sheet of paper: a. tell where your vector lives. b. tell what you could do to stop this vector from breeding/laying eggs.

Fundamental concepts and principles of earth and space science are related to the origin, structure and physical phenomena of the Earth and the Universe.

CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: THE EARTH

STRAND 2: PROPERTIES AND STRUCTURE OF EARTH'S SYSTEMS

EARTH SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	1. Recognize that earth is made up of land, water and air.	The earth is the planet we live on. Earth is ball (sphere). Earth's surface is covered with water and land . Most of the earth is covered with water. A blanket of air called the atmosphere surrounds the earth. (Air is a mixture of gasses.)	1a. Create a 3-D clay model of Earth's exterior. 1b. Play vocabulary charade.	A Globe/World Map www.scign.jpl.nasa.gov/learn/plate/htm www.enotes.com>science Fact Finder Harcourt Science Bk. 1 Science Horizons Bk. 1	I. Create a pamphlet providing facts about the earth's structure.
	2. Differentiate among bodies of water on earth.	Most of the Earth is covered with water, much of which is saltwater . Water that is not salty is called freshwater . An ocean is a large body of saltwater. Saltwater is also found in many ponds in The Bahamas like the ponds in Cat Island, Exuma and Long Island. Streams, rivers, and lakes are bodies of freshwater. A stream is a small body of moving water. A river is a large body of moving water. A lake is a still body of water with land all around it.	2a. Field Trip: Visit an area where a pond/lake can be observed. Discuss similarities and differences. 2b. Give each student a sheet of construction paper. Draw a shape of an island on the paper. On a separate sheet of paper draw, colour and cut out four different bodies of water. Paste and label bodies of water on your island.	Harcourt Science Bk. 1 Science Horizons Bk. 1 www.harcourtschools.com/activity/types_of_land_z/ www.hcbe.net/ito?powerpoints/socialstudies/files	II. Study body of water pictures. Cut and paste the correct name of each body of water under each picture. Complete a vocabulary wheel.

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CURRICULUM GUIDELINES

GRADE 1

SCOPE OF WORK

TOPIC: THE EARTH

STRAND 2: PROPERTIES AND STRUCTURE OF EARTH'S SYSTEMS

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT						
3. Compare and contrast a variety of landforms.	The surface of the Earth has many special folds or wrinkles called landforms . Landforms include hills, valleys, mountains and flatlands. A hill is a raised area or mound of land. A valley is a low place between mountains or hills. A plain is a flatland. A mountain is the highest kind of land.	3. Distribute modeling clay. Allow students to make models of two different landforms. Record on a chart how they are alike and how they are different.	www.kidsgeo.com/...forkids/0031-whatarelandforms.php www.kidsgeo.com/...kids/0032-understandinglandforms	III. Look through magazines. Cut out pictures of different landforms. Make a collage with the pictures. Write two sentences to tell how the landforms are alike and how they are different. Use a triangle Venn to compare four landforms.						
4. Investigate how hills are formed.		4a. Students work in groups to investigate how to make a model of a hill using sand, soil and water in a pan. 4b. Visit a hill. Discuss how it may have formed.	www.edu.pe.ca/southernkings/hillsmc.htm	IV. Draw a picture of a hill. Then draw a picture of yourself on the hill. Write sentences to tell about your picture.						
5. List examples of natural resources.	Everyday we use materials that come from the Earth. A natural resource is anything that people can use. Water, air, rocks, soil, plants and animals are natural resources. We can take care of natural resources by planting new trees, keeping the air and water clean.	5a. Distribute materials to make a chart. <table border="1"><tr><th colspan="2">Things I Saw Outside</th></tr><tr><td>animals</td><td>plants</td></tr><tr><td>water</td><td>land</td></tr></table> Go outside and observe everything around you. Draw and label the things that belong in the chart. Share your chart with the class. 5b. Use the “Jig Saw” Strategy.	Things I Saw Outside		animals	plants	water	land	Harcourt Science Bk. 1 www.answers.com/.../what_are_so_me_of_the_Bahamas_natural_resources	V. Divide a paper into three sections. Draw and label a picture of a natural resource on each section. Then write a sentence under each picture.
Things I Saw Outside										
animals	plants									
water	land									

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CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: THE EARTH

STRAND 2: PROPERTIES AND STRUCTURE OF EARTH'S SYSTEMS

EARTH SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	6. Explain how reducing, reusing and recycling can save natural resources.	People can reduce the use of resources by using only the amount that is needed. Resources can also be reused. To reuse is to use something over and over again. Also, recycling materials will help them last longer. Things such as newspaper, glass, plastic and cans can be recycled. Recycling resources is to take something that was used for one thing to make something new.	6a. Tree Planting. Have the students assist with identifying an area in the school to plant a tree. Discuss the importance of trees. b. Working in groups, give each group a box of items and three bags labeled can, plastic and paper. Students will sort the items in the box and place them into the correct bag to be recycled. Continue the activity throughout the day. c. Recycling: Display on a bulletin board titled "Recycling". Provide word cards. Label: newspaper, glass, plastic and cans. Have students cut out and post newspaper articles or pictures of recyclable materials under the labels. d. Make a personal compost bin.	www.nrdc.org/thisgreenlife/0802.asp The Story of Stuff www.kids.niehs.nih.gov/recycle.htm www.epa.gov/osw/conserv/rrr/recycle.htm	VI. You want to take care of resources in your school. Create a plan. (Tell each thing you would do. Tell why each thing would help.) Tell at least four things you would do and describe how each one would help take care of the resources in your school.

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CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: THE EARTH		STRAND 2: PROPERTIES AND STRUCTURE OF EARTH’S SYSTEMS			
EARTH SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
			6a. What covers most of the Earth? Materials: world map, blue circles, brown circles Procedure: 1. Look at the map. 2. Cover water with blue circles 3. Cover land with brown circles. 4. Count the blue circles. 5. On a sheet of paper record which colour you used more of and what covers most of the Earth. 6b. Moving Water. Cut a cardboard tube in half the long way. Put the halves on a tray. Put something under one end of one half. Pour water into each half. Observe. Infer how the land’s shape makes rivers or streams flow quickly or slowly. 6c. Students will make a flap book to tell how the ocean is different from another body of water.	Harcourt Science Bk. 1 www.utm.edu/departments/cece/old-site/esamk2.shtml	VI & VII. Students divide a sheet of construction paper into three sections, labeling each section with the name of a body of water. Draw a picture of each showing its unique characteristics. Write a sentence about each picture. Use data collected from What covers most of the earth? To create a pictograph.

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CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: THE EARTH		STRAND 2: PROPERTIES AND STRUCTURE OF EARTH’S SYSTEMS			
EARTH SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
			<u>Procedure:</u> a. Have students fold a sheet of drawing paper in halves, first horizontally and then vertically. b. On the right side of the inner sheet, have them cut a flap that can be folded back to reveal the inner part of the back cover. c. Write facts about the ocean and another body of water. Tell how they are different.		
	7. Identify ways water can be used.	People use water for drinking, cleaning, cooking, washing, and for other purposes.	8. Can Water Cool You? <u>Materials:</u> thermometers, small towels, timer <u>Procedure:</u> Wrap one thermometer in a damp towel. Wrap another in a dry towel. Check them after 10 minutes. Which is cooler? How can you use water to keep your body cool?		VIII. Cut and paste pictures of people using water. Explain each picture. Provide pictures depicting situations where water is needed. Write these situations on cards. Have students explain what is happening and tell how water can be used to correct the problem.

CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: WEATHER AND SEASONS

STRAND 2: PROPERTIES AND STRUCTURE OF EARTH'S SYSTEMS

EARTH SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT															
	1. Explain the different types of weather.	Weather is what the air outside is like. The weather may be warm, cool, snowy, windy, rainy, cloudy or sunny. Weather can change. One way to measure weather is to find the temperature. Temperature measures how hot or cold something is. A thermometer is a tool for measuring temperature. We can also measure the wind. A wind vane can tell us the direction of the wind.	1 & 2a. Daily Weather. Observe the changes in weather each day for a week. Make a chart. Record what you see using basic weather symbols. <table><tr><td colspan="5">Daily Weather</td></tr><tr><td>Mon.</td><td>Tues.</td><td>Wed.</td><td>Thurs.</td><td>Fri.</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table> Draw or write what you observed and record it on the chart. 1 & 2b. Observing Weather. Look out the window. Observe the sky. Observe what people are wearing. What can you tell about the weather? Repeat each day for a week. Make a chart to show weather data.	Daily Weather					Mon.	Tues.	Wed.	Thurs.	Fri.						Harcourt Science Bk. 1 Science Horizons Bk. 1 www.totaltrainingsols.com/grade1/grade1.htm	I & II. Create a flip chart to show four different weather conditions. Use basic weather instruments to further explain which weather conditions will be measure. (Example: A thermometer will measure the temperature.)
	Daily Weather																			
	Mon.	Tues.	Wed.	Thurs.	Fri.															
2. Observe and record weather changes using weather instruments.																				
3. Observe clouds and their changes.	Clouds help us to decide what type of weather to expect. Light, fluffy clouds often mean nice, sunny weather. Thick, gray clouds often bring rain or snow.	3a. How Clouds Form Materials: jar with lid, very warm water, ice cubes Procedure: i. The teacher put the warm water in the jar. ii. Turn the jar lid upside down on the jar. Observe. iii. Place ice on the lid. Observe. Infer how clouds form.	www.n.att.com/wired/fil/pages/listcloudssu1.html	III. Fold a construction paper in half. Cut out a cloud shape. Open the paper.  On one half of the paper draw clouds you would see on a sunny day. On the other half draw clouds you would see on a rainy day.																

Fundamental concepts and principles of earth and space science are related to the origin, structure and physical phenomena of the Earth and the Universe.

CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: WEATHER AND SEASONS

STRAND 2: PROPERTIES AND STRUCTURE OF EARTH'S SYSTEMS

EARTH SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
			3b. Cloud Journal. Keep a journal of clouds and the weather. Each morning, draw the clouds you see. Predict what the weather will be like.		
	4. Name the different seasons.	A season is a time of year. The seasons are spring, summer, fall and winter. Weather changes when a new season comes. In spring , the weather gets warm, the rain falls and plants begin to grow. In summer the weather can be hot, plants grow leaves and flowers. In fall the weather gets cool. Some trees lose their leaves. In winter the weather can be cold and snow falls. Many plants have no leaves. In The Bahamas, the weather is usually warm and sunny most of the year.	4a. Make a "Four Seasons" poster. Fold a big sheet of paper into four parts. Label each part for a different season. Add pictures of things you like to do in each season. Talk about how the weather changes. 4b. Seasonal Fashion Show. Hold a seasonal fashion show with the students. Students can bring in outfits that they wear during the different seasons and model them. Discuss why their outfits are appropriate for each season.	Harcourt Science Bk. 1 www.brain.popjr.com/science//weather/seasons/grownups.weml	IV & V. Give each student a circle wheel divided into four sections. Write the name of a season on each section. Then draw how a tree would look during each season of the year.
	5. Identify weather conditions associated with each season.		5a. Dress up a Tree for a Season. Divide students in cooperative groups. Give each group a tree template and a set of materials to place on the tree.	www.first-school.ws/activities/crafts/colors/dreestree.htm	

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CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: WEATHER AND SEASONS		STRAND 2: PROPERTIES AND STRUCTURE OF EARTH’S SYSTEMS			
EARTH SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
			E.g. Summer Tree – decorate with fruit cut outs or sticker. Winter Tree – glue cotton balls on the tree and glue some under it for a winter effect. 5b. Swim! Ask the students: Why do you swim in summer and not in winter? Put a cup of water under a lamp. (Caution teacher the lamp may be hot) Put another cup of water in a shady place. Which cup of water warms up faster? Discuss. Remind students not to touch the lamp.		

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CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: CHANGES IN THE SKY

STRAND 2: UNIVERSE AND THE SOLAR SYSTEM

EARTH SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	1. Identify and describe the sun and other stars.	A star is an object in the sky that gives off light.	1 & 2. Make a model of the sun and some other stars. Write one way the sun helps living things. Use the other stars to make a pattern.	Harcourt Science Bk. 1	I, II & III. Make a sun and stars flip book. Draw a picture of the sun and clouds on Earth during the day. Write one sentence about it. On another page draw a picture of the stars and moon at night. Write a sentence about it.
	2. Discuss the importance of the sun.	The sun is a star. It is the closest star to Earth. The sun lights the sky each day. It is made up of very hot gases and heats the earth. Some stars seem to make patterns in the sky. In the daytime sky, you may see clouds and the sun. In the night time sky, you may see stars, planets, and the moon.	3. The Sky. Make a chart to record what you see in the sky during the day and what you see at night.	Science Horizons Bk. 1 www.hspscience.com	III. Complete a Worksheet. Finish the chart. Look at the day sky and the night sky. Write what you see under each heading. Things in the Day Sky. Things in the Night Sky.
	3. Name natural objects seen in the daytime and nighttime sky.	The moon is a huge ball of rock. Sunlight only reaches one part of the earth at a time. The part that sunlight reaches has day. The part that sunlight does not reach has night. The earth is turning all the time. It takes the earth 24 hours to make one complete turn. As the earth turns, it causes some places to move into the light and other places to move away from the light into the dark.	4. Day and Night. Make a model of the sun and Earth. The flashlight is the sun. The globe is Earth. Tape on the labels		
	4. Explain the difference between day and night.		Sun Earth Ask a partner to hold Earth. Shine the flashlight on Earth. The side facing the sun is having day. The other side is having night.		

Fundamental concepts and principles of physical science include the study and analysis of the nature and properties of living and non-living matter and energy.

CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: PROPERTIES AND CHANGES IN MATTER

STRAND 3:

PHYSICAL SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	1. Classify objects according to their physical properties such as size, colour, shape and texture.	Through our senses, we become aware of the world around us. Your senses help you learn about things. Everything in our environment is called matter . Matter occurs in different sizes, shapes, colours, textures and weight. Some forms of matter, such as air, cannot be seen.	1. Take students on a nature walk around the school. a. One group can identify things in nature that have specific colours. E.g. leaves, flowers, rocks, animals etc. b. The other group can find things with certain shapes.	Harcourt Science Bk. 1 www.ckcolorado.org/units/1st_grad_e/1_matter_statesproperties.pdf www.kids.aol.com/homework-help/junior/science/matter	I. Students close their eyes. Then, put a hand into a bag to guess what the object is by its shape and texture. Other things can be used for students to infer what they are by using the senses.
	2. Experiment to identify how matter changes state, size, colour, shape and texture.	Matter can be changed by cutting, freezing, melting, burning and mixing. We can use our senses to discover how the various forms of matter are alike or how they are different.	2. Students manipulate tools for measuring weight and length.		II. Students take items out of a bag to sort by size, shape and colour. Teacher provides ice. Let the ice melt. Students draw a picture to show before and after melting. Write one sentence to state the change in matter. Students, with parents' assistance, make a fruit salad. Each student will explain how the salad was made. They will also state the changes that occurred to the fruits. Students make a "Matter Kit" using a show box. In the box they will put two items that are solid, 2 liquid and 2 gas. Demonstrate in front of the class by telling which item is solid, liquid and gas.

Fundamental concepts and principles of physical science include the study and analysis of the nature and properties of living and non-living matter and energy.

CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: PROPERTIES AND CHANGES IN MATTER

STRAND 3:

PHYSICAL SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	3. Experiment to describe physical changes in matter.		3. Divide students into groups. Each group will have three objects. They will make predictions about the weight of each one. Then put them on the scale (weight) to test predictions.	Harcourt Science Bk. 2	I. Students explore physical changes in matter by conducting an experiment involving cubes of ice, butter, and clay and record changes. (Group assessment)
			4. Teacher allows students to perform certain activities, then explain the changes that take place. E.g. cutting paper, pouring liquids into containers with different shapes and sizes.		

Fundamental concepts and principles of physical science include the study and analysis of the nature and properties of living and non-living matter and energy.

CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: FORCES AND ENERGY

STRAND 3:

PHYSICAL SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	1. Compare pushes and pulls.	A force is a push or a pull. Pushes and pulls make things move or stop moving. A push or a pull can make something change direction. A hard push moves things quickly, but a gentle push moves things slowly. When objects are pushed, they move away from us, but when objects are pulled, they move towards us. Heavy objects need more force to be moved than light objects. Forces such as wind and flowing water can be used to make things move also. A magnet is a piece of iron that can attract or pull things. The things it pulls are usually made of metal. Some	1. The whole class stands and as the teacher says “push” or “pull”, the students would demonstrate each activity. 2. The class will be divided into groups. Each group will be given an activity to perform by pushing or pulling, the other students will guess what the group is doing. 3. Students demonstrate how they would move a big boulder. Then, they would demonstrate how they would move a box of cotton. Class discussion would follow to compare the activities. 4. Students make a model of a windmill.	Harcourt Science Bk. 1 Harcourt Science Bk. 2 www.regent-edu/acad/schedu/pdf/mcms/force_motion_energy-gr.1pdf www.eduplace.com/kids/hmxs/gl/magnets/cricket/sec14cc.html	I. The students will draw two pictures to show a fish being caught. Write two sentences to explain how they got the fish out of the water. Use the words push or pull to explain. Picture showing Mom grocery shopping with a trolley. Write three sentences to ..3 ..3explain how the trolley was moved. Use the words push and pull.
	2. Observe and identify poles of a magnet.	magnets are found in nature (lodestone). A magnet has two poles. These are the places where its pulling force is strongest. Every magnet has a north pole and a south pole. They are often called the N pole and the S pole. Two poles that are different attract each other. Two poles that are the same, repel or push each other away.		Harcourt Science Bk. 1	II. Students complete teacher prepared worksheet which has pictures of activities. The students will study the pictures, then write “Push” or “Pull” under each picture. Examples: child pushing a car on the floor, child pushing a dog that refuses to move, Mom mopping (pushing and pulling), etc.

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CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: FORCES AND ENERGY

STRAND 3:

PHYSICAL SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	3. Experiment to find out which objects (materials) a magnet will attract/repel.	Magnets attract most objects made of metal such as iron and steel.	1. Divide students into groups. Give each group 3 objects to predict whether a magnet will attract it or repel it. Then they will experiment to test their predictions. All of the objects will be classified under the headings: Attract and Repel . 2. Children play the game “Go Fish”. The children can be divided into groups or remain as a whole class. Draw a pond on the floor. Put little fish shapes into the pond. Some fish will have tape on them; others will have paper clips attached. Students will cast a fishing line with a magnet tied to it to catch the fish. Students can take turns competing to catch the most fish. 3. Making magnets: The students will be divided into groups. Metal objects such as paper clips, nail, and scissors will be placed in each group. Each object will be tested to see if it would attract paper clips. Then the objects will be stroked twenty times in the same direction.	Harcourt Science Bk. 1 Harcourt Science Bk. 1 Houghton Mifflin Science Discovery Works. Bk. 1 Workbook Text Book	Students use magnets to pick up paper clips, pins or thumb tacks to demonstrate the objects that will be attracted. They will draw the picture after making the observation. Under the picture, explain where the poles are on the magnet and state how they know that.
					Students experiment with magnets to feel the push and pull of the magnets. Put no less than three magnets together.
					Three bar magnets.
					The students will write N or S to show how the poles are lined up for the magnets to attract. They will write about three sentences to explain why the magnets attract.
					(1) (2) (3) N S N S N S Magnets attract (pull)

Fundamental concepts and principles of physical science include the study and analysis of the nature and properties of living and non-living matter and energy.

CURRICULUM GUIDELINES
GRADE 1
SCOPE OF WORK

TOPIC: FORCES AND ENERGY

STRAND 3:

PHYSICAL SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
			Then, it will be tested again to see if the paper clips would be attracted. Discussion will follow.		Group assessment. Each group will be given objects to use as a magnet: nail, pen, file, comb, etc. They will stroke the objects to magnetize them. Then, they will attempt to attract objects such as tissue, yarn, thread, paper, etc. This activity will be demonstrated in front of the class. The assessment will be based on the success of the experiment.

Fundamental concepts and principles of life science include the study of living organisms, their structure and function, their behaviors and their relationships, with the environment.

CURRICULUM GUIDELINES
GRADE 2
SCOPE OF WORK

TOPIC: ANIMALS

STRAND 1: CHARACTERISTICS OF ORGANISMS

LIFE SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	3. Identify a variety of animals in your environment.	There are many animals in the world. Animals that are similar are placed in the same group. Scientists use grouping to study the habits of animals. Some of the things that scientists look for when deciding which group to put an animal in, are the animals' body parts, what materials cover the animals' body, where the animal lives and how it moves, breathes and feeds.	1. Go on a nature walk around the schoolyard. Use hand lens to observe various animals. Make a list of all of the animals you see. Or "Sea for Yourself" (fieldtrip to look at what lives on the beach).	Science Horizons Bk. 1 Science Horizons Bk. 2 Harcourt Science Bk. 1 Harcourt Science Bk. 2	I, II & II. Put together puzzles where animals must be matched with their correct body parts or coverings. Then, write the name of the animal under the completed puzzle and record the way the animal moves.
	4. Group animals by body coverings and parts.		2. Cut out various pictures of animals. Glue them onto colored paper into groups based on body coverings and parts. Discuss why each animal belongs in a certain group. Predict how they move, based on the body parts observed.	Scott Foresman Science Bk. 2 http://www.enchantedlearning.com/coloring/ http://animals.nationalgeographic.com/animals	
	5. Describe how animals move from place to place.	Animals have different body coverings. Some animals have fur. Others have feathers or scales. Some animals use special body parts to fly, swim, hop or walk .	3. Play the game "Animal Charades". Students will choose a word card from a box with the name of an animal on it. They will act out the way the animal moves. The class will guess the name of the animal based on the movements. (e.g. If the word frog is chosen, the student may hop around the classroom.)	http://animals.com	
	6. Identify things animals need for survival.	Animals need food, air and water to live. Animals also need a safe place to live.	4. Make mobiles (using hangers) to show that animals need food, air, water and shelter to live.	Science Horizons Bk. 1 Discovery Works Bk. 2	IV & V. Create a brochure all about animals. In it, write: What Animals Need to Survive and Describe how various Animals get their Food.
	7. Describe ways that animals get food.	A shelter is a safe place to live. Animals use different body parts to get food. (E.g. A giraffe uses its long neck to reach leaves at the top of a tree.)	4 & 5. Draw a picture of a favorite animal and research what the animal needs in order to grow and live. Create a model to demonstrate what body parts the animal uses to obtain its food.	The Learning Site: www.harcourtschool.com/activity/animalneeds	

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CURRICULUM GUIDELINES
GRADE 2
SCOPE OF WORK

TOPIC: ANIMALS

STRAND 1: CHARACTERISTICS OF ORGANISMS

LIFE SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT											
			4. Observe a classroom pet or an animal in the schoolyard and discuss their needs.													
	6. Define the term habitat.	A place where an animal lives is called its habitat .	6. Discuss what a habitat is. Make a model of an animal habitat. E.g. bird’s nest or wasp’s nest.	Scott Foresman Science Bk. 2 Harcourt Science Bk. 2 Discovery Works Bk. 2 http://www.goerie.com/animals/animal_habitats.html	VII. Give students a sheet of paper with two scenes of different habitats. Have them draw pictures of various animals that live in each habitat or cut out pictures from a sheet provided and glue them on the appropriate habitat.											
	15. Compare animal habitats.	Animals find habitats where they can meet their needs. Animals get food, water and shelter from their habitats. Animals can live on land, in water, or in the air. They can even live in trees or under the ground.	7. Play a matching game called ‘Find My Home’. Match pictures of various animals to their correct habitats. Compare the different ways animals use their homes. 6 & 7. Go on a nature walk around the schoolyard. Observe various habitats (e.g. bird’s nest, wasp nest, under a stone or log). Discuss what a habitat is and the traits the animal has that allow it to live there. 7. Observe two pictures of different animal habitats. Discuss and record how they are alike and different. Infer what would happen if you moved an animal from one habitat and placed it in the other.		VI & VII. Write down four sentences describing what a habitat is and how the two habitats are alike and different. VIII. Complete the table. <table><tr><td>Animal</td><td>Habitat</td></tr><tr><td>10. fish</td><td></td></tr><tr><td>11. bird</td><td></td></tr><tr><td>12. wasp</td><td></td></tr><tr><td>13. ant</td><td></td></tr><tr><td>14. frog</td><td></td></tr></table>	Animal	Habitat	10. fish		11. bird		12. wasp		13. ant		14. frog
Animal	Habitat															
10. fish																
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CURRICULUM GUIDELINES
GRADE 2
SCOPE OF WORK

TOPIC: THE HUMAN BODY

STRAND 1: STRUCTURE AND FUNCTION OF LIVING SYSTEMS

LIFE SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT												
	❖ Identify the parts of the skeleton.	Your bones fit together to make your skeleton . Your skeleton holds up your body and gives it shape.	1 & 2. Make models of the skeleton using various art materials (e.g. clay, pipe cleaners, etc.) Label the parts and discuss the functions of the skeleton.	Harcourt science Bk. 2 Science Horizons Bk. 2	I & III. On a piece of paper, glue various bones together to complete a skeleton. Then, label its parts.												
	❖ Explain the functions of the skeleton.	Some bones protect parts inside your body. Your ribs protect your heart and lungs. Your skull protects your brain. Some bones help you move (arm bones, leg bones and hip bones).	1 & 3. Make skeleton puzzles by gluing a diagram of a skeleton onto cardboard. Cut it apart into different pieces. Have students assemble the puzzle pieces. Then, label the parts of the skeleton.	http://www.42explore.com/skeleton.htm http://kidshealth.org/kid/htbw/bones.html	II. Write a few sentences to explain the functions of the skeleton.												
	❖ Describe the location of the skeleton in the body.	Your backbone (spine) allows you to stand up straight and bend at the waist.	1, 2 & 3. Make up a song about the skeleton and its functions to the tune of “Row, Row, Row Your Boat”. Point to various body parts identifying the location of various bones as you sing.	http://yucky.discovery.com/noflash/body/pg000124.html Harcourt Health and Fitness Bk. 2	III. Complete the table. <table><tr><td></td><td>Name of Bone</td><td>Body Part Protected</td></tr><tr><td>a</td><td>_____</td><td>Brain</td></tr><tr><td>b</td><td>_____</td><td>Lungs</td></tr><tr><td>c</td><td>_____</td><td>Heart</td></tr></table>		Name of Bone	Body Part Protected	a	_____	Brain	b	_____	Lungs	c	_____	Heart
		Name of Bone	Body Part Protected														
	a	_____	Brain														
b	_____	Lungs															
c	_____	Heart															
c. Identify muscles in the body.	The muscles in our bodies help us move. Muscles are attached to bones. Your bones and muscles work together. They help you sit, stand, walk and run.	4. Make up riddles about various muscles in the body and have the class guess the correct answers. Then, label the muscles on a diagram.	Harcourt Science Bk. 2 Science Horizons Bk. 2 http://kidshealth.org/kid/htbw/muscles.html	IV & V. Complete a worksheet explaining the function of muscles in the body and label muscles on a diagram.													
d. Explain the function of muscles.	Muscles change shape as you use them. They can get shorter or longer. When one muscle gets shorter, it pulls on the bone it is joined to.	4, 5 & 6. Play the game “Simon Says”. Students will be given various exercises to perform. Then, discuss the various muscles being used to carry out the exercise and how they were able to move them.	http://yucky.discovery.com/noflash/body/pg000123.html Harcourt Health and Fitness Bk. 2														

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CURRICULUM GUIDELINES
GRADE 2
SCOPE OF WORK

TOPIC: THE HUMAN BODY		STRAND 1: STRUCTURE AND FUNCTION OF LIVING SYSTEMS			
LIFE SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	e. Demonstrate how muscles work.	That makes the bone move one way. Another muscle pulls the bone the other way. There are many different kinds of muscles in our bodies (arm muscles, shoulder muscles, stomach muscles and leg muscles).	6. Use rubber bands to demonstrate how muscles contract (become thicker and shorter) and expand (become longer and thinner).	Harcourt Science Bk. 2 Harcourt Health and Fitness Bk. 2	VI. Have students observe a picture of someone lifting weights. Have them write down a few sentences stating how the muscles are able to do this.
	f. Explain how healthy habits affect your bones and muscles.	You can keep your bones and muscles strong and healthy. Exercising everyday helps your bones and muscles stay strong. It helps your body stay healthy. You can get exercise by walking, running, swimming, playing and doing many other activities. Food gives you energy to work and play. It also helps you grow. To stay healthy you need to eat certain kinds of foods everyday (e.g. fruits and vegetables).	7a. Cut out and observe pictures of persons exercising and discuss why exercise is important for good health. 7b. Put on a skit for the class to show some habits that can keep your bones and muscles healthy and strong. 7c. Predict how many jumping jacks you can do in one minute. Do jumping jacks for one minute. Be sure to count each one. Have a partner time you. Compare your prediction with your results. Discuss how exercise helps your bones and muscles. 7d. Cut out magazines pictures of foods that make you healthy. Place pictures under the headings – Fruits; Vegetables.	Harcourt Science Bk. 2 Science Horizons Bk. 2 Scott Foresman Science Bk. 2 http://www.tc.pbskids.org/arthur/parentsteachers/lesson/health/pdf/Eat_Well_Stay_Fit.pdf Harcourt Health and Fitness Bk. 2	VII. Create a flyer encouraging persons to practice habits that will keep their bones and muscles healthy and strong.

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CURRICULUM GUIDELINES
GRADE 2
SCOPE OF WORK

TOPIC: PLANTS		STRAND 1: STRUCTURE AND FUNCTION OF LIVING SYSTEMS			
LIFE SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	d. Experiment to tell what plants need to grow.	Plants need light , air and water to grow. It also needs nutrients or minerals from the soil. Each part of a plant helps the plant to get what it needs. Most plants get light from the sun. Plants get water and minerals from the soil. When a plant gets what it needs, it can grow and change.	1a. Experiment with plants. Get two potted plants and water them. Cover one plant with a brown grocery bag and put the other one in the light. Predict how the plants will look in one week. Observe both plants after a week. Discuss what happens to plants that do not get light. 1b. Watch a plant grow. Put some potting soil in a cup. Plant 2-3 seeds in the soil and water the seeds. Put the cup in a sunny spot. Observe and draw what you see every 2 or 3 days. Measure your plants once a week. Record your results. 1c. Experiment to see how plants get water. Put a celery stalk in colored water. Have children observe how water travels through a plant.	Harcourt Science Bk. 1 Harcourt Science Bk. 2 Discovery Works Bk. 2 http://yorkcountyschools.org/mes/plant%20webquest/plantneeds.htm http://www.theeducationcenter.com/Images/dlr_images/pdf/sample/tec61165_sample.pdf http://www.naturegrid.org.uk/plant/index.html	I. Imagine that you are a tiny seed. Write a letter to someone telling them exactly what you need to grow into a healthy plant.

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CURRICULUM GUIDELINES
GRADE 2
SCOPE OF WORK

TOPIC: PLANTS		STRAND 1: STRUCTURE AND FUNCTION OF LIVING SYSTEMS			
LIFE SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	e. Observe plants to identify plant parts.	Plants have different parts. Most plants have roots , a stem , and leaves . Many plants also have flowers . Each plant part has a special job to do in order for the plant to live and grow.	2a. Observe a plant using a hand lens. Identify each of its parts. 2b. Draw a plant and label its parts. 2c. Play a matching game. Match pictures of plant parts to the correct labels.	Harcourt Science Bk. 1 Discovery Works Bk. 2 Scott Foresman Science Bk. 2 www.greeningofdetroit.com/uploads/plants.pdf	II. Make a model of a plant using various art materials provided and label its parts. Create a game to teach someone else about plant parts. Play the Vocabulary Wheel game
	f. Identify seeds from various plants.	Different plants grow from different seeds. The new plants look like the plants the seeds came from. When old plants die, their seeds can be planted to grow new plants. Seeds can be classified or grouped according to their shape, size and color.	3 & 5. Collect a variety of seeds from fruits. Use hand lenses to observe the seeds. Discuss how the seeds are alike and different. 3. Play a guessing game called ‘Where did I come from?’ Show students the seed from a fruit and have them guess what fruit it came from.	Harcourt Science Bk. 1 Science Horizons Bk. 2 Scott Foresman Science Bk. 2 http://www.teachingbug.com/lesson_05.htm	III. Give students a worksheet with pictures of various fruits on it. Students will cut out pictures of various seeds and glue it onto the correct fruit.
	g. Classify seeds according to color, size and shape.		4. Use sorting bins or paper plates marked off in sections to classify a variety of seeds according to color, size and shape.		IV & V. Give students a variety of seeds. Have them classify them into groups according to color, shape and size. Then, glue seeds onto a piece of paper (in their groups) and give each group a name (e.g. Black seeds, Hairy seeds, etc). Next, have students write a few sentences telling how the seeds are alike and different.
	h. Compare seeds from various plants.				

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CURRICULUM GUIDELINES
GRADE 2
SCOPE OF WORK

TOPIC: HABITATS		STRAND 1: ORGANISMS AND THE ENVIRONMENT			
LIFE SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	– Identify plants and animals that live in the schoolyard. – Identify plants and animals that live in their backyard.	The places where animals and plants choose to make their homes are called habitats. Some animals can only survive on land. They make their homes almost anywhere including caves, dens, trees, under stones and under leaves. Some land animals can also live in water for long periods of time.	1 & 2. Play a matching game called “Animal Homes”. Use animal picture cards and habitat picture cards to match each animal with its habitat. Use plastic animals or pictures of animals and classify them into groups according to whether they live on land or not. Write and illustrate short stories or poems about animals that live in the school yard or in their backyard.	Harcourt Science Bk. 2 Discovery Works Bk. 2 Scott Foresman Science Bk. 2	I & II. Make a model of a schoolyard or backyard habitat using the materials provided.
	– Identify plants and animals that live in ponds and lakes.	Things that live in water must have special body parts to help take in air underwater. Some water habitats include ponds, lakes, seashores and oceans.	3. Make a model of a pond or lake habitat. 3 & 4. Examine a pond/ocean habitat. Make a list of all of the plants and animals that you see.	Harcourt Science Bk. 1 Harcourt Science Bk. 2 A Field Guide to the Sandy and Rocky Seashore (Bahamas National Trust)	III & IV. Students will cut out pictures of plants and animals from a sheet provided and glue them onto a sheet of paper with a water habitat scene on it. The picture formed should be a realistic water habitat.
	– Identify plants and animals that live on the seashore and in the ocean.	Some plants and animals can only live in freshwater (ponds). E.g. turtles and fish. Some can only live in saltwater (oceans). E.g. algae, whales, lobsters and crabs.	4. Make a model of a seashore or ocean habitat. 4. Choose a plant or animal that lives in the ocean. Read books to learn more about it. Write a poem or short story about the plant or animal.	www.hitchams.suffolk.sch.uk/habitats/sea.htm	

Fundamental concepts and principles of life science include the study of living organisms, their structure and function, their behaviors and their relationships, with the environment.

CURRICULUM GUIDELINES
GRADE 2
SCOPE OF WORK

TOPIC: HABITATS		STRAND 1: ORGANISMS AND THE ENVIRONMENT			
LIFE SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	– Describe ways that people can harm habitats.	The actions of humans can affect the places where plants and animals live.	5 & 6. Draw and color pictures of a clean environment and a dirty environment. Discuss which one you would prefer to live in.	Department of Environmental Health	V & VI. Create a flyer encouraging people to preserve and protect habitats, giving them reasons why they should do so. Give them tips on things that they should not do.
	– Describe ways that people can protect and preserve habitats.	Sometimes our actions can destroy some habitats. For example, throwing litter on the ground.	6a. Organize a schoolyard/beach clean-up.	Harcourt Science Bk. 2	
		Sometimes our actions help to improve some habitats. For example, keeping our environment clean.	6b. Recycle garbage by using discarded containers to make craft items.	www.endangeredpecie.com/ways_to_help.htm . www.crd.bc.ca/watersheds/protection/.../protectanimals.htm www.onvironment.fi_protectingand_monitoringnaturalhanitats ...<natureconservation">www.ymparisto.fi>...<natureconservation	
	– Identify vectors and discuss why they are harmful.	A vector is an organism that spreads germs and diseases. Some vectors are rats, mosquitoes, flies and cockroaches.	7, 8 & 9. Observe pictures of vectors and where they live. Discuss what vectors are and how their habitats can be eliminated.	Department of Environmental Health	VII, VIII & IX. Complete a worksheet where vectors must be identified and write a short paragraph about where they are found and how their habitats can be eliminated.
	– Identify places where specific vectors live/ Explain why they live in these places.			www.sbcounty.gov/dehs/vectorcontrol/PDF/540022whatisavector.pdf	
	– Describe ways to eliminate the habitats of vectors.	Waste provides excellent breeding grounds for vectors. Decreasing the amount of waste that is produced and disposing of waste properly can eliminate the habitats of vectors. Reusing and recycling help to decrease waste also.	9. Examine an area near the school's garbage disposal. Discuss proper garbage disposal practices at school and at home. Recycle garbage by using discarded containers to make craft items.		VII, VIII & IX. Design an environment which will discourage vector development.

Fundamental concepts and principles of earth and space science are related to the origin, structure and physical phenomena of the Earth and the Universe.

CURRICULUM GUIDELINES
GRADE 2
SCOPE OF WORK

TOPIC: EARTH'S RESOURCES

STRAND 2: PROPERTIES AND STRUCTURE OF EARTH

EARTH SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	❖ Compare and contrast rocks and minerals.	A rock is a hard, nonliving thing that comes from the Earth. Rocks come in many sizes, shapes and colors. Some rocks are: marble, pumice and sandstone. A mineral is one kind of nonliving thing that is found in nature. People find minerals in rocks. Copper, iron and diamonds are minerals.	III. Use hand lenses to observe various rocks and minerals. Say how they are alike and different.	Harcourt Science Bk. 2 http://www.rocksforkids.com/ Scott Foresman Science Bk. 2	I. Complete a venn diagram to compare and contrast rocks and minerals.
	IV. Classify rocks and minerals according to color, size and shape.		– Sort rocks and minerals according to shape, size and color. Make a chart. Classify the rocks and minerals on the chart.		II. Have students cut out pictures of various rocks and minerals and classify them according to shape, size and color. Give each group a name and glue the pictures (in their groups) on a sheet of paper.
	– Explain some uses of rocks.	People use rocks and minerals in different ways. Rocks are used to build things, such as houses, roads and walls. They also use rocks to make sculptures.	3 & 4. Observe pictures of items made from rocks and minerals. Discuss how we use the items.	Harcourt Science Bk. 2	III & IV. Create a flyer letting people know some uses of rocks and minerals.
	– Explain some uses of minerals.	People use minerals to make coins, furniture and jewelry.	3 & 4. Make up riddles about items made from rocks and minerals. Read them to the class and have them guess what the item is.	Harcourt Science Bk. 1	III & IV. Write a paragraph which describes some ways in which we use rocks and minerals.

Fundamental concepts and principles of earth and space science are related to the origin, structure and physical phenomena of the Earth and the Universe.

CURRICULUM GUIDELINES GRADE 2 SCOPE OF WORK

TOPIC: WEATHER CHANGES

STRAND 2: CHANGES IN THE EARTH AND SKY

EARTH SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	6. Describe weather in The Bahamas.	Weather is what the air outside is like. The air may be warm or cool. It may also be rainy, sunny, windy, or cloudy. Weather can change quickly.	1. Write simple poems or riddles about weather in The Bahamas.	Harcourt Science Bk. 2	I & II. Create a book about weather. In it, describe weather conditions in The Bahamas and the instruments used to measure weather conditions.
	7. Identify instruments used to measure weather conditions.	In The Bahamas, the weather remains the same for long periods of time. For most of the year, the weather in The Bahamas is warm and sunny. People who study the weather use several different instruments to assist them with their work. A thermometer is used for measuring temperature. A rain gauge is used for measuring rainfall. A wind vane is used for measuring direction of the wind.	2a. Make a simple rain gauge using a measuring cup. Put a measuring cup outside where it will collect rainwater. Each week record the amount of rain in the measuring cup in a weather log. Compare rainfall from week to week. 2b. Play a matching game called “Weather Watch”. Match pictures of weather instruments to their correct names. 2c. Weather Symbols Colour and label pictures of weather symbols. Eg.  cloudy  rainy  sunny	Science Horizons Bk. 2 http://weatherwizkids.com/index.htm http://www.metoffice.gov.uk/education/primary /students/index.html “The Bahamas Department of Meteorology” www.bahamasweather.org.bs/ www.bahamas-travel.info/weather.htm	

Fundamental concepts and principles of earth and space science are related to the origin, structure and physical phenomena of the Earth and the Universe.

CURRICULUM GUIDELINES
GRADE 2
SCOPE OF WORK

TOPIC: WEATHER CHANGES

STRAND 2: CHANGES IN THE EARTH AND SKY

EARTH SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	8. Describe ways weather affects people.	Many workers who work outdoors need to know what type of weather to expect in advance. People who predict what the weather will be like in the future are called Weather Forecasters. Some workers who depend on weather forecasters are pilots, sea captains, truck drivers and farmers.	3a. Listen to weather reports on the radio. Make a weather chart for each day. Record what you observe. Discuss how the weather conditions for each day will affect various workers. 3b. Make a scrapbook showing ways weather affects people. Use pictures and drawings.	Science Horizons Bk. 2 Harcourt Science Bk. 2	III. Create a poster describing the ways in which weather affects people.
	9. Explain precautions that can be taken before and during bad weather conditions for safety.	People also need to know what type of weather to expect so that they can wear the proper clothing. During the hurricane months, Bahamians (and other people who live in areas that are affected by hurricanes) like to know in advance when a storm is coming so that they can prepare their homes and secure their properties.	4. Have a class discussion about hurricanes. Discuss important items to have during a hurricane and other safety precautions.		IV. Create a flyer informing Bahamians about some precautions they should take before and during a hurricane. Give them a list of supplies they should have available during the hurricane season.

Fundamental concepts and principles of earth and space science are related to the origin, structure and physical phenomena of the Earth and the Universe.

CURRICULUM GUIDELINES
GRADE 2
SCOPE OF WORK

TOPIC: CHANGES IN THE SKY

STRAND 2: UNIVERSE AND THE SOLAR SYSTEM

EARTH SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	I. Describe the differences between the moon and Earth.	The moon is not like Earth. The moon has rocks and soil, but it does not have air or living things. Ice has been found on the moon.	1. Observe pictures of the Earth and the moon. Read short descriptions of each one. Discuss the difference and similarities between the two.	Harcourt Science Bk. 2 Science Horizons Bk. 1	I. Complete a Venn diagram to compare and contrast the Earth and moon.
	II. Analyze the source of moonlight.	The moon is the largest object you can see in the night sky. It seems to shine, but the moon does not really give off its own light. The light from the moon comes from the sun.	2 & 3. Cover a styrofoam ball with foil. Push a pencil into it for a handle. Compare how the ball looks when light from the flashlight is shining on it. Discuss how the flashlight represents the sun and provides the moonlight.	Discovery Works Bk. 2 Scott Foreman Science Bk. 2 http://www.kids-and-space.com/sites/moon.htm	II & III. Create a poster to describe the changes in the moon. Be sure to include the source of moonlight and illustrations.
	III. Describe changes in the moon.	The moon moves around the Earth. As it does this, its shape appears to change. This is why the moon has different shapes at different times of the month. The part of the moon facing the sun is the lighted part which we see.			
	IV. Define the term constellation.	You can see stars in the night sky. A star is a body in space. Stars give off light as the sun does. Some stars seem to form pictures in the sky. A group of stars that form a star picture is called a constellation .	4 & 5. Create a Constellation Book. Draw common constellations on each page and label them. Discuss what a constellation is.	Harcourt Science Bk. 2 Science Horizons Bk. 1 http://www.proteacher.com/110020.shtml	IV & V. Create Constellation Fact Cards with the names and pictures of various constellations. Include a fact card to include the definition for the term constellation.
	Examine common constellations.	Some common constellations include the Big Dipper , Little Dipper and Orion the Hunter .	5a. Use star cut-outs to form various constellations on black paper. Discuss the pictures that they form. 5b. Tape black paper on the wall. Use a sharp pencil to push holes in the bottom of a paper cup. Point the bottom of the cup toward the paper. Shine a flashlight through the cup. Record and discuss what you see. (Remember to turn off the lights for this activity).		

Fundamental concepts and principles of physical science include the study and analysis of the nature and properties of living and non-living matter and energy.

CURRICULUM GUIDELINES
GRADE 2
SCOPE OF WORK

TOPIC: MEASURING MATTER

STRAND 3: PROPERTIES AND CHANGES IN MATTER

PHYSICAL SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	– Define the term matter.	Matter is what all things are made of. Trees, milk, and air are all made of matter. Matter has three forms. It can be a solid, liquid or gas.	1 & 3. Gather some classroom objects. Observe them. Describe them to a friend. Sort the objects into groups of solids, liquids and gases and discuss what matter is.	Scott Foresman Science Bk. 2 Harcourt Science Bk. 2 http://www.2.medaniel.edu/Graduate/TI/pages/Lewis?matterweb.htm	I, II & III. Create a book about matter. Include the definition of matter, characteristics of each state of matter and examples.
	– Describe characteristics of solids, liquids and gases.	A solid has a size and shape of its own.	2. Collect pictures of different forms of matter and create a matter mural. Discuss characteristics of solids, liquids, and gases.		
	– Classify objects into groups of solids, liquids and gases.	A liquid takes the shape of container. A gas can change shape and size. Matter can also be described by color, shape, size and texture. We use our senses to learn about matter.	3. Classify picture cards into groups of solids, liquids and gases.		
	– Examine and identify the tools used to measure matter.	We can measure the mass (or weight) of matter. We can also measure the length of matter. We use tools to measure matter. A scale or balance is used to measure mass . A ruler, measuring tape or yard stick can be used to measure length .	4, 5 & 6. Observe various solids and predict which is lighter or heavier. Then, measure the actual mass and see if the prediction was correct. Record the predictions and actual mass on a chart. Identify the tool used to find the actual mass.	Harcourt Science Bk. 2 Science Horizons Bk. 1 http://www.2.medaniel.edu/Graduate/TI/pages/Lewis?matterweb.htm	IV & V. Glue pictures of various solids in the order of lightest to heaviest and shortest to longest. Then, identify the tools that could be used to get an accurate weight and length.

Fundamental concepts and principles of physical science include the study and analysis of the nature and properties of living and non-living matter and energy.

CURRICULUM GUIDELINES
GRADE 2
SCOPE OF WORK

TOPIC: MEASURING MATTER

STRAND 3: PROPERTIES AND CHANGES IN MATTER

PHYSICAL SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	– Estimate the length and mass of objects.	Length is the measurement of the distance from a given point A to a given point B. Length is usually measured using a ruler. Mass is the amount of matter that makes up the object being measure.	5 & 6. Use standardized and non-standardized units to measure different objects. (E.g. paper clips, pencils, rulers etc.) First, predict how many units it would take to measure them.	Harcourt Science Bk. 2 Science Horizons Bk. 1 http://www.2.medaniel.edu/Graduate/TI/pages/Lewis?matterweb.htm	IV & VI. Given a set of objects, measure and record their lengths and masses using the correct tools.
	– Measure the length and mass of objects.	Mass is measured using a balance or scale.	6. Mold clay into different sizes and shapes. Then, weigh them using a balance scale and compare their masses. Use a 12 inch ruler to measure desk length/width, length/width of exercise book, pencils and other classroom items.		
	– Predict how much various size containers can hold.	Containers can be used to measure quantities. Each container is able to hold a specific amount of a substance. The amount that a container can hold is called its capacity .	7 & 8. Predict, then experiment to find out how many cups of water or kool-aid will fill a pitcher.	Harcourt Science Bk. 2 Science Horizons Bk. 1	VII & VIII. Design a container that could hold water, then test it. Predict, then experiment to find out how many times the filled container would be needed to fill a small bucket.
	– Experiment to discover how much various sized containers can hold.		7 & 8. Using various sized containers, predict then experiment to see which one will hold the most beans. 7 & 8. Observe three glasses/cups of different shapes. Predict which one will hold the most juice. Experiment to see if your prediction was correct.		

Fundamental concepts and principles of physical science include the study and analysis of the nature and properties of living and non-living matter and energy.

CURRICULUM GUIDELINES
GRADE 2
SCOPE OF WORK

TOPIC: SOURCES OF ENERGY

STRAND 3: FORCES AND ENERGY

P H Y S I C A L S C I E N C E	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	5. Identify the forms of energy provided by the sun.	Sunlight is a source of heat and light. A source is a place from which something comes. Heat and light are forms of energy. Energy is needed to change things and to make them move.	1. Draw a picture of the sun on the board. Write the word “Energy” in it and ask the class to discuss what kinds of energy we get from the sun. Write their responses on the board.	Science Horizons Bk. 2 Scott Foresman Science Bk. 2 http://www.nrel.gov/docs/gen/fy01/30928.pdf	I & II. Design a poster informing people of the types of energy we get from the sun and the ways we use this energy. Include illustrations.
	6. Describe the uses of energy provided by the sun.	Light comes from many sources. The main source of light is the sun. Light is a form of energy that you can see. People use light in many ways. At home you use a lamp to read. Almost all of the heat energy that we receive on earth comes from the sun. Heat energy can be used for doing a number of things including cooking, ironing, baking and changing water into steam.	2. Give each student a picture of a sun with sunbeams. Have them write different uses of energy provided by the sun on the sunbeams. Then, color and decorate the sun pictures and share them with the class.		
	7. Describe the uses of energy provided by wind.	People use air in many ways. Moving air is wind. Wind energy can be changed into electricity. A windmill does this.	3 & 4. Collect pictures and make drawings of items that show different forms of wind and water energy being used.	Science Horizons Bk. 2 Harcourt Science Bk. 2 http://www.nrel.gov/docs/gen/fy01/30928.pdf	III & IV. Design a chart showing the ways that wind and water energy are used. Include illustrations.

Fundamental concepts and principles of physical science include the study and analysis of the nature and properties of living and non-living matter and energy.

CURRICULUM GUIDELINES
GRADE 2
SCOPE OF WORK

TOPIC: SOURCES OF ENERGY

STRAND 3: FORCES AND ENERGY

PHYSICAL SCIENCE	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
		People use air to make things fly. (E.g. a kite, airplane and hot air balloon).	3 & 4. Imagine what the world would be like without air and water. Draw a picture to illustrate what would happen. Discuss the importance of having wind and water energy.	http://www.awea.org/pubs/documents/TeachersGuide.pdf www.sccao.org/tdsb/ResourcePackUnits/2IEnergyFinalProofed.PDF	Create different sized paper windmills and test them with a fan to see if they can lift pieces of paper. Record and explain results.
	8. Describe the uses of energy provided by water.	People use water in many ways. (E.g. to drink, clean and production). People also use the energy of moving water. They use moving water to make electricity at power plants.	3 & 4. Have a discussion with the class about things such as windmills, waterwheels and sailboats which use moving air and water as sources of energy. Describe how these objects work.		
	9. Predict which objects are attracted to magnets.	Magnets can push or pull certain metal objects. A pole is the place on a magnet that has the strongest pull. Magnets have a north and south pole. Opposite poles attract each other. Attract means to pull toward. Like poles repel each other. Repel means to push away.	5 & 6. Go fishing with a magnet. Make a fishing pole by tying one end of a piece of string to a magnet and the other end to a pencil. Place a group of common classroom objects on a desk. Predict which objects the magnet will attract. Dip the magnet into the group of objects and observe which objects it picks up.	Scott Foresman Science Bk. 2 http://olc.spsd.sk.ca/de/resources/magnets/index.htm http://web2.airmail.net/kboyle/Magyesno.htm	V, VI & VII. Fold a piece of paper in half and put the title 'Attracted to Magnets' on one side and 'Not Attracted to Magnets' on the other side. Students will observe various objects and predict whether they are magnetic or not. These predictions will be recorded. Then, students will experiment with magnets to check their predictions.
	10. Experiment to discover which objects are attracted to magnets.	Some objects that magnets will attract are: paper clips, metal keys and screws.	5, 6 & 7. Show students a variety of objects one at a time. They will hold up a yes/no card to predict whether the object is magnetic or not. Students will keep a two column list of the objects that are magnetic and not magnetic. Then, experiment with a magnet to see if their predictions were correct.		
	11. Classify objects according to whether or not they are attracted to magnets.				

SECTION D

Perspectives that Enrich Instruction

Scientific Literacy is an essential support for sustainable development in the global economy. It therefore stands to reason that one of the main goals of the Science Instructional Programme would be the promotion of Scientific Literacy.

The benefits that accrue from the promotion of Scientific Literacy in the curriculum are numerous. For, as Scientific Literacy increases, so does the students' appreciation of the **application of scientific principles to problem solving**. In addition, students are encouraged to focus their creative energies, spawned by alert inquiring minds, to produce positive end results that can be of economic, social and emotional value to themselves and society.

As educators zealously attempt to prepare students for coping with the challenges of life in a technology driven world, care should be taken to incorporate current and innovative practices in the Science Instructional Programme. These and other instructional strategies will:

- ❖ Motivate students to increase their understanding of the subject through practical immersion and discovery encounter experiences
- ❖ Increase the effectiveness of Science instruction
- ❖ Build students' confidence and competence
- ❖ Heighten students' expectations
- ❖ Promote higher overall achievement

This section is intended to provide teachers at the primary level with a wide range of perspectives and innovative practices for implementing an effective Science Instructional Programme. These strategies comprise:

- ❖ Inquiry-based Learning
- ❖ Constructivism
- ❖ Bloom's Taxonomy
- ❖ Process Skills Development
- ❖ Use of the Scientific Method
- ❖ Cooperative Learning Technique
- ❖ Student-centred vs Teacher-centred Learning
- ❖ Multiple Intelligences and Learning Styles
- ❖ Assessment Strategies
- ❖ Information Technology Linkages
- ❖ Science Safety

Inquiry-based Learning

Inquiry-based Learning, places emphasis on experiential learning; where practical “hands-on” activities are used to motivate students to focus their innate curiosities and inquiring minds on problem solving through the application of scientific principles.

Proponents of the traditional “lecture method” of instruction (i.e. imparting information directly from text books with limited or no opportunity for students to engage exploration, questioning and discovery skills) are rapidly being convinced that this strategy (with respect to the teaching of Science) is very ineffective, and when compared with other modern approaches is now obsolete.

Research has shown that frequent use of the lecture method especially with regards to the teaching of Science results in diminished student expectation and achievement. Research “shows that people don’t learn science by absorbing stuff that has been poured unto them (via lectures) but rather by constructing meaning out of experiences that the teacher provides.” *Wendy Saul, Science Education Analyst; University of Maryland, Baltimore County, U.S.A.*

In **Inquiry-based Learning**, opportunities are provided that create an environment that enable students to gain experience as a result of Science exploration. Practical experiences are provided and open-ended questions asked to encourage experimentation that does not necessarily have a known outcome and that will lead to testable questions. During this experimentation, students are encouraged to take risks and are therefore, not afraid to make mistakes. Some of the greatest scientific discoveries come after many failures and disappointments.

Inquiry-based learning goes beyond providing students with opportunities for practical, “hands-on” experiences to illustrate established scientific principles e.g. giving them batteries, bulbs, and wires to show the concept of current electricity. This strategy takes the learning process to a different level. E.g., it may challenge students to use the batteries, bulb, wire and additional materials to develop something useful for a deaf person or something that can assist with a specific chore, homework assignment, etc.

The inquiry-based approach to the teaching of Science is key to effective and meaningful instruction as it encourages students to:

- ♦ Critically evaluate situations
- ♦ Frame their own questions
- ♦ Develop diverse strategies for coping with problems in their environment
- ♦ Cultivate organizational and creative skills
- ♦ Assume leadership roles and be self motivated
- ♦ Be accountable for their learning
- ♦ Collaborate and communicate with each other
- ♦ Develop team interaction skills

Constructivism

Constructivism is closely related to **Inquiry-based Learning** therefore, effective application of **Inquiry-based Learning** is enhanced by **Constructivism**. **Constructivism** means generating meaning by connecting what is to be learned with personal knowledge that has been constructed from past experiences. “A Constructivist is one who believes that the learner is responsible for constructing knowledge and, therefore, the responsibility for learning must be returned to the child.” *Ebenezer & Conner 1998, Learning to Teach Science, A Model for the 21ST Century.*

Students’ understanding of the world is moulded by their experiences. As they think about these experiences, their views and beliefs, they construct personal meaning and acquire knowledge. Constructivists advocate that students should not be expected to just accept knowledge and skills developed over the years and imparted by the teacher. Instead they become “active seekers” of knowledge as inquiry is encouraged and they discover and decipher things for themselves.

In using Constructivism, teachers become facilitators that create stimulating environments with a variety of “hands-on” experiences that empower students to explore. The teacher’s main role is to provide experiences that help students make connections between what is learned and what they already know or believe. More learning takes place when students become active participants in the learning process and are “allowed to make their own sense out of the world.”

Providing students with “hands-on” experiences that reinforce ideas or perceptions that they already have results in them assimilating or absorbing new concepts easily. The knowledge that the students construct from the information that they receive as a result of these “hands - on” activities makes sense and is easier for them to relate to and apply to their everyday life and their environment.

Constructivists probe students’ knowledge base, examine and classify their concepts then provide them with opportunities to share and debate common knowledge. They then convert and expand students’ knowledge by asking open-ended questions and presenting problems which cause them to gain new understanding of the concepts being taught. By doing this they challenge and promote conceptual change.

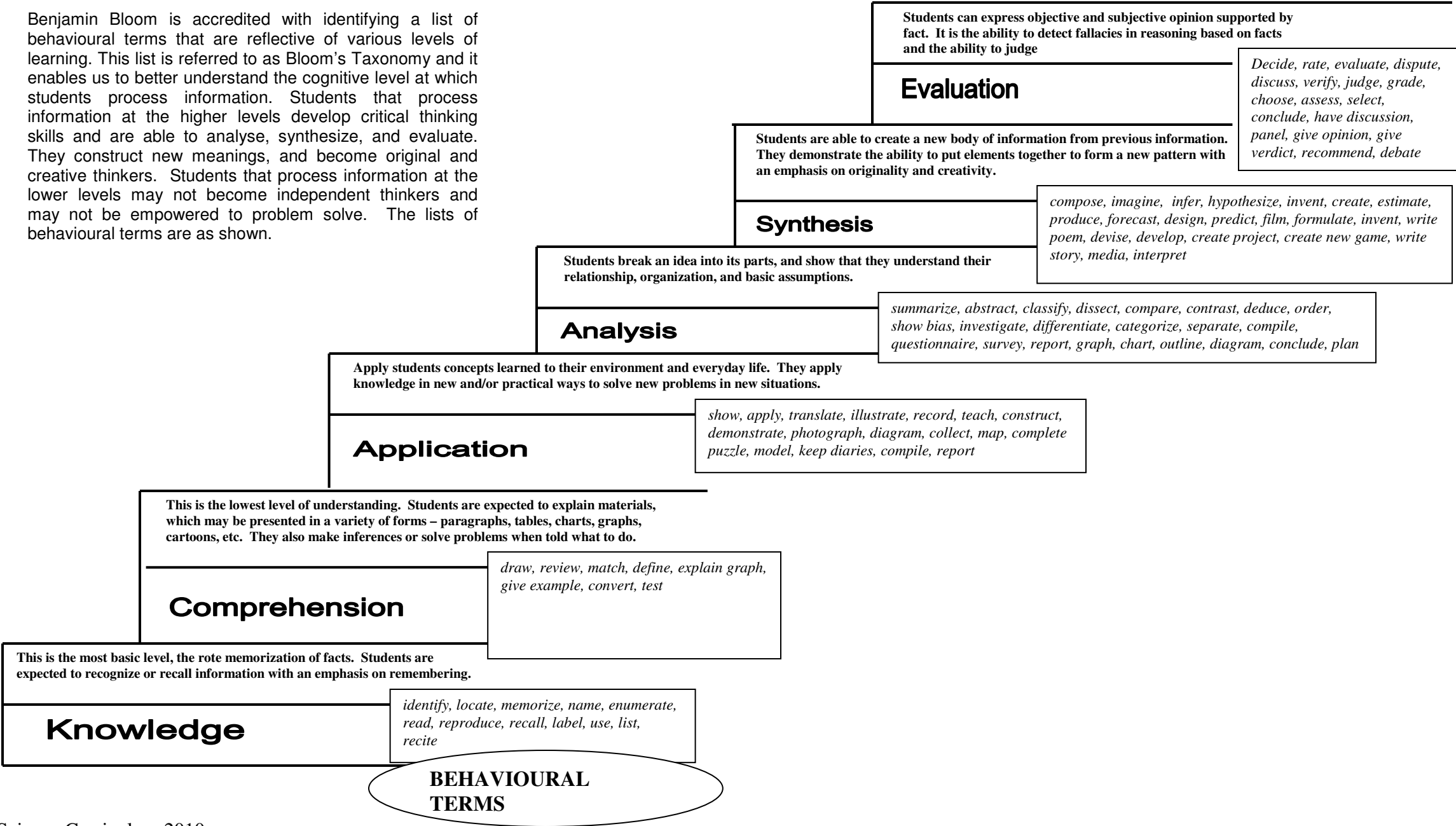
When using the Constructivism Theory, it should be noted that there are times when knowledge has to be imparted directly by the teacher in a detailed and explicit way. Although many benefits can be accrued from utilizing the Constructivism Theory, If it is not used properly, learning may become sporadic and disorganized. Although students should not be stifled in their exploration to acquire knowledge, when using this theory it is important to:

- ◆ Set clear precise goals for the knowledge and skills that the students are expected to acquire
- ◆ Communicate these goals to the students and ensure that they are understood
- ◆ Organize assignments in a clearly planned sequence
- ◆ Provide guidance for the students

Blooms Taxonomy

STEPPING UP TO HIGHER LEVELS OF THINKING

Benjamin Bloom is accredited with identifying a list of behavioural terms that are reflective of various levels of learning. This list is referred to as Bloom's Taxonomy and it enables us to better understand the cognitive level at which students process information. Students that process information at the higher levels develop critical thinking skills and are able to analyse, synthesize, and evaluate. They construct new meanings, and become original and creative thinkers. Students that process information at the lower levels may not become independent thinkers and may not be empowered to problem solve. The lists of behavioural terms are as shown.



SCIENCE PROCESS

Source: The American Association for the Advancement of Science

BASIC SKILLS

1. **Observing.** Observation is an objective process of gathering data or facts through the use of one or more of the five senses – hearing, sight, touch, taste, and smell. The five senses are used to find out about objects and events, their characteristics, properties, differences, similarities, and changes.

★ *Observations are recorded.*
2. **Classifying.** Classification is the process of sorting or grouping objects on the basis of observable traits. When objects share a common characteristic, they are said to form a set.

★ *Lists, tables, or charts are generated.*
3. **Measuring.** Measuring is the process of expressing the amount of an object in quantitative terms, or comparing an object to a standard (metric units, time, student-generated frames of reference).

★ *Measurements are to be recorded in an orderly and systematic fashion with labeled units of measure. Charts, graphs, or tables can be generated manually or with a computer.*
4. **Inferring.** Inferring is an inventive process in which an assumption of cause is generated to explain an observed event. Inferring takes place when we arrive at a conclusion or guess based on what we observe or already know.

★ *More than one inference may be presented to explain an observation.*
5. **Predicting.** Predicting deals with projecting events based upon a body of information. It is a belief based on what will occur based upon present knowledge and understandings, observations, and inferences. The nature of the skill of predicting is to be able to identify a trend in a body of data and then to project that trend in a way that can be tested. Predicting takes place when you tell what you think will happen.

★ A prediction should be followed by a written or oral explanation to clarify ideas and reveal any misconceptions or missing information.
6. **Interpreting.** Interpreting is arriving at explanations, inferences, or hypotheses from data that has been placed in a data table or graph.

7. **Communication.** This process refers to the systematic reporting of data and may be oral, written, or mathematical. It should organize ideas using appropriate vocabulary, graphs, other visual representation, and mathematical equations. The purpose of the communication skills is to represent information in such a way that maximum amount of data can be reviewed with an eye toward discovering inherent patterns of association.
8. **Hypothesizing.** An hypothesis is a response or potential solution to a specific question or problem.
9. **Experimenting.** This is a systematic approach to problem solving. Usually experimenting is synonymous with the scientific method. The scientific method follows five basic steps:

PROBLEM —→ HYPOTHESIS —→ PREDICTIONS —→ TEST OF PREDICTIONS —→ EVALUATION OF HYPOTHESIS

Science Process Skills		
Process Skills	Students	Scientists
Observe	use your senses	computers, microscopes, senses
Experiment	change something; watch what happens	manipulate and control variables
Collaborate	other in classroom	other scientists
Record	science journals and notebooks	field notes, data sheets, computer
Measure	thermometers, lab equipment, etc.	scientific instruments
Sort/Classify	color, size, shape, weight	classification keys, field guides
Compare	Which one is biggest? Which one went the farthest? etc.	change over time, change in conditions
Analysis and Sharing	Why did this happen? Tell others...	data analysis tell others

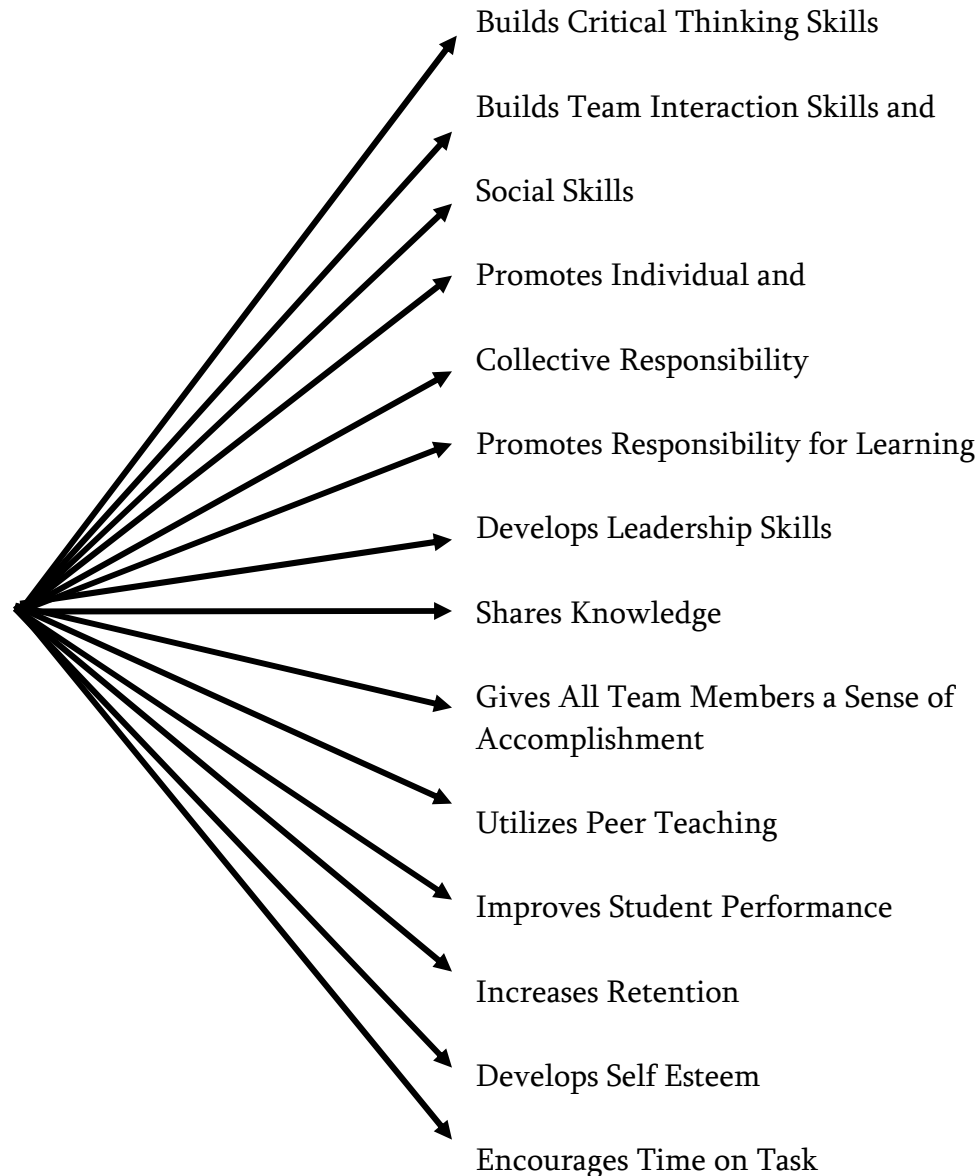
Use of the Scientific Method

*Students need to be taught valuable problem solving skills in order to react appropriately to the many situations that confront them on a daily basis. The **Scientific Method** sets out a sequence of logical steps that are employed in problem solving. It is applicable to **ALL** areas of life and is not restricted only to the teaching of Science.*

The components of the **Scientific Method** and their descriptors are set out below. It is to be noted that students should utilize this format when writing up experiments or laboratory reports.

1. PURPOSE	The purpose is the question that is to be answered by doing the experiment. State the reason or reasons why you are doing the experiment. State the purpose as a question needing an answer.
2. HYPOTHESIS	A hypothesis is an educated guess on how the experiment/activity will turn out, that is based on prior knowledge. Although a good hypothesis is testable, it may not be correct. Experimenting can find out whether or not the hypothesis is correct or not.
3. MATERIALS	All materials required for the activity/ experiment need to be identified. One must be as accurate as possible in describing the materials. Be sure to give exact amounts and quantities.
4. PROCEDURE	The procedure describes everything that will be done during the experiment. The procedure affects the result of the experiment; therefore, care should be taken to explain the procedure as accurately as possible. State the procedure as numbered steps. (It would help if they be written beginning with behavioural terms.)
5. OBSERVATION	The observation describes exactly what happens during an experiment. Report the observations made and the data collected during the experiment. Data are recorded facts or measurements from an experiment. Data should be presented as tables, charts, and graphs, to be easily understood.
6. CONCLUSION	The conclusion is a comparison between the results and the hypothesis of an experiment. To draw a conclusion, the data needs to be analysed to see what is meant. Explain observations and describe how the data relates to the problem. The conclusion should state whether or not the data supports the hypothesis. Part of the conclusion may be a statement or a new hypothesis based on findings and suggestions for testing the new hypothesis in a further experiment.

COOPERATIVE LEARNING



The **Cooperative Learning Technique** allows all students to have a sense of accomplishment.

Cooperative Learning promotes group work and opportunities for verbal face-to-face interactions, which assist students to acquire and apply concepts.

Cooperative Learning builds interpersonal skills and positive interdependence characterized by specific roles, sharing of knowledge and materials and achievement of mutual goals. It encourages group processing as students analyse how well their groups are functioning and design and employ strategies to ensure that they function effectively.

When using the **Cooperative Learning Technique**, the teacher functions as a facilitator and students are more accountable for their learning and share the responsibility for the learning of others. It is important for the teacher to set and evaluate social and academic goals for the groups and the quantity and quality of students' learning.

When forming cooperative groups, it is recommended that groups work together for three to six weeks before students are assigned new roles or groups changed. During the year, each student should have an opportunity to function in each role. Once groups are formed, ensure that all members realize that they are jointly responsible for achieving group goals. They do this by:

- Contributing ideas to the group
- Listening carefully for ideas from others
- Helping the group make good decisions.
- Cooperating rather than competing
- Solving problems in a calm manner

Reference: Circle of Learning: Cooperative Learning in the Classroom by D. W. Johnson et al, 1986

STUDENTS' ROLES AND FUNCTIONS

Supervisor, Leader or Investigator

Does experiments, manipulates materials

Assistant, Helper or Organizer

Collects, organizes and distributes materials and makes sure group cleans up any mess.

Manager or Motivator

Assists supervisor, leader or investigator, encourages the group, encourages time on task and adherence to goals and safe practices, and also times activities, if necessary.

Writer or Recorder

Records observations, questions, answers, illustrations etc.

Reporter

Collaborates with Writer or Recorder and shares group's data, results, and conclusion with class.

Student- Centred vs. Teacher-Centred Learning

Student-centred Learning develops self-directed learners who are confident in doing Science, proactive in the learning process and willing to share and accept responsibility for their own learning. Student-centred Learning activities are adaptive and cater to the learning needs of students.

COMPARISON OF STUDENT-CENTRED AND TEACHER- CENTRED LEARNING

STUDENT-CENTRED

- ◆ Students' conceptions and experiences are explored.
- ◆ Teacher challenges students to question before accepting information.
- ◆ Discussion is encouraged between students and teacher.
- ◆ Students are allowed to move about in an orderly manner to discuss and problem solve.
- ◆ Students share and help each other. They use peer tutoring.
- ◆ Students actively participate in decision-making.
- ◆ Learning activities cater to multiple intelligences and different learning styles.

TEACHER-CENTRED

- ◆ Teacher is the authority figure and has the final say.
- ◆ Students must never question the teacher.
- ◆ Students only respond when a question is asked.
- ◆ Students must remain seated at all times.
- ◆ Collaboration between students is discouraged and regarded as cheating.
- ◆ Students do not participate in decision-making.
- ◆ There is very little variation in learning activities.

Multiple Intelligences

HOWARD GARDNER

The theory of Multiple Intelligences is a way of understanding the different facets of the intellect and each person's level of intelligence. The intelligences can work individually or in collaboration with the other intelligences, so a person could be operating in more than one intelligence. As we teach children, we should ensure that appropriate provision is made for individual differences and multiple intelligences.

- ❖ **Linguistic Intelligence** is a person's ability to construct and comprehend language. It is the capacity to use language to express feelings and to understand other people. It may be in a person's native language or another language. Poets, writers, orators, speakers, lawyers specialize in linguistic intelligence.
- ❖ **Naturalist Intelligence** is the ability to identify and classify patterns in nature. It the way a person relates to his environment and the recognition of the role that the environment plays in our lives. It is the ability to discriminate among living things like plants and animals and sensitivity to changes in nature e.g. weather patterns, rock configurations.
- ❖ **Spatial Intelligence** is how persons comprehend shapes and images in three dimensions. Spatial Intelligence is utilized to perceive and interpret things that we may or may not see. It is the ability to represent the spatial world internally in your mind--the way a sailor navigates the seas with only the stars or airplane pilot navigates aerial space, or the way a chess player or sculptor represents the spatial world. Spatial intelligence can be used in the arts or in the sciences. Persons with this type of Spatial Intelligence are usually painters, sculptors, architects and scientists that deal with anatomy and topology.
- ❖ **Musical Intelligence** is the ability to perform and compose music. It is the capacity to think in music, to be able to hear patterns, recognize them, remember them, and perhaps manipulate them. Persons with strong musical intelligence are completely preoccupied with music, it is always playing in their minds. Persons with musical intelligence use music to face their challenges and to assist them in solving their problems.
- ❖ **Bodily - Kinesthetic Intelligence** is a natural sense of how the body should act and react in demanding situations. These persons have extraordinary control of their movements, balance, agility and grace. They have the capacity to use their whole body or parts of their body to solve a problem, make something, or put on some kind of a production. **Bodily - Kinesthetic Intelligence** is evident in athletes and persons in the performing arts, particularly dance or acting.
- ❖ **Logical – Mathematical Intelligence** is the ability to mentally process logical problems. Persons with a highly developed **Logical-Mathematical Intelligence** can manipulate numbers, operations and quantities, and they have the ability to process logical questions at an unusually fast rate. These persons have the ability to understand the underlying principles of some kind of a causal system, the way a scientist or a logician does.

- ❖ **Intrapersonal Intelligence** is a person's cognitive ability to sense and understand him or herself. It refers to a very strong self-concept and strength of character, which gives the person the ability to solve internal problems. These persons know who they are, what they can do, what they want to do, how they react to things, which things to avoid, and which things to gravitate toward. These persons have a strong sense of purpose and are not easily deterred from that purpose. They know their strengths and their limitations and know where to go if they need help.
- ❖ **Interpersonal Intelligence** is understanding and interacting with others and interpreting their behaviour. As social beings, it is an essential ability that we all need. However, persons with Interpersonal Intelligence have a greater perception of distinctions between persons and have the ability to judge their moods, temperaments, intentions and motivations. Persons with **Interpersonal Intelligence** become teachers, clergy, leaders, clinicians, salespersons, or politicians. Anybody who deals with other people has to be skilled in the interpersonal sphere.

Learning Styles

DAVID A. KOLB

Persons have their unique, individual way of learning. Understanding how students learn and planning activities that cater to various learning styles will enhance their learning and ensure higher achievement.

- ❖ **Visual Style**

Persons who prefer the visual style convert what they hear and read to pictorial images in their brain. When recalling information they go through a process similar to reviewing pictures in a movie. These students have no problems in obeying conventional classroom rules. They will sit quietly, write neatly and use all materials well. These persons often choose careers like engineer, surgeon, designer, architect and positions of leadership that requires visionary thinking.

- ❖ **Auditory Style**

These persons learn best by hearing and listening, they process information through their listening and repeating skills. They are good storytellers and can successfully talk through their problems. These students can easily repeat what they heard just as it was said. They are the most talkative and the most likely to participate in discussion however, they may experience difficulty in writing. These persons often become psychologists, disc jockeys, great musicians and other occupations that require a great deal of listening.

- ❖ **Kinesthetic Style**

These persons process and remember information through their bodies and their feelings. Kinesthetic learners need to touch and feel what they are learning about. They may become restless unless they are actively involved in the learning process.

Assessment Strategies

WHAT IS ASSESSMENT?

- ◆ Whenever we interact with other people we obtain and interpret information about their knowledge and understanding, and may well make judgments about their ideas, abilities and attitudes.
- ◆ Assessment whether direct or indirect is a human encounter and is a central feature of social life.
- ◆ Educational assessment includes a wide range of methods for evaluating student performance that describes the nature and extent of learning and how it matches up to the objectives of teaching.

When assessing there must be alignment between what is in the curriculum, what is actually taught and what is tested.

WHY DO WE ASSESS?

- ◆ The main purpose of assessment is to judge the attainment or performance level of students, with a view of evaluating or grading them for one purpose or another.
- ◆ Purpose might include:
 - Placing students in appropriate teaching sets;
 - Providing extra motivation for learning and an aid to remembering;
 - Informing parents about progress;
 - Informing other teachers who have to make decisions about students e.g. when students transfer to a new school or new courses, which may have been studied;
 - Accumulating records of achievement;
 - Acting as a diagnostic tool e.g. diagnosing weaknesses so that remedial action may be taken;
 - Making decisions about examination entries involving predictions about future performance;
 - Informing further education institutions or employers about attainment so that suitable placement may be made. In doing this, we are using measured attainment to make predication about likely future performance.

Hence assessment has primarily been used as a means of judging the attainment and progress of students, providing a reporting system and deciding appropriate action.

FORMS OF ASSESSMENT

Assessment may be:

- Informal
- Formal

- ◆ **Informal assessment** takes place during normal learning activities. Much information can be picked up by teachers in their normal interaction with individual students, allowing problems to be overcome at an early stage and progress accelerated. Hence **informal assessment** is often used **diagnostically**.
- ◆ It is often said that **informal assessment** should be unobtrusive if the teacher is to gain reliable insights about students' abilities and the state of development, and that it should be for a specific purpose and for private use only.
- ◆ With **formative i.e. informal assessment** the results are fed back to the learner. Such feedback can be **confirmatory** (a recognition that the particular tasks have been mastered at that particular time) or can be **corrective**, allowing dialogue between teacher and learner to show where the learner went wrong.
- ◆ **Formal assessment** is only aimed at obtaining knowledge about the student. It is obtrusive and may not be able to provide direct instructional function.
- ◆ **Formal assessment** becomes **summative** when information is not available for feedback purposes because it is obtained too late in the learner's career to be used in this way.
- ◆ **Formal and summative assessment** is used largely for public purposes (e.g. BJC, BGCSE and RSA Examinations)
- ◆ Even this is changing with the advent of initiatives such as the GLAT where **formal and summative assessments** are made with students at grade 3 and 6. The results of formal assessments made at an early stage can be used for the benefit of the learner at the next stage of education.

ASSESSMENT MAY ALSO BE TRADITIONAL OR AUTHENTIC

Traditional Assessment measures what the students were taught and basically assesses their ability to recall information. This type of assessment includes **homework, quizzes, tests and book reports**.

Authentic Assessment measures what students have actually learned and can promote further learning. This type of assessment includes **portfolios, journal keeping, anecdotal records, student conferencing, self and peer assessment and projects and reports**.

Although there is no alternative for traditional assessment in certain situations, authentic assessment should be frequently used in the Primary Science Instructional Programme, especially portfolios and the keeping of Science journals.

Contributed by Sheena Williams, Testing and Evaluation Section

The Assessment Process

Assessment is a way of providing feedback to the various stakeholders in the education system and a way of communicating the expectations of that system to all concerned. Data generated through the process of assessment provide the students with feedback on how well they are meeting course expectations and teachers with feedback on how well students are learning. Assessment allows teachers to determine the effectiveness of the instructional strategies employed in the teaching process. Thus, effective assessment practices can drive both instructional strategies employed by the teachers and learning strategies that may be used by students.

National Science Education Standards identified four components of the assessment process: data use, data collection, methods to collect data, and users of data. These components can be combined in numerous ways and should be used to inform decision making and actions taken in science education. National Science Education Standards suggested the following changes in emphasis in assessment:

Less Emphasis on ...

Assessing what is easily measured

Assessing discrete knowledge

Assessing scientific knowledge

Assessing to learn what students do not know

Assessing only achievement

End-of-term assessment by teachers

Development of external assessment by experts alone

More Emphasis on ...

Assessing what is most highly valued

Assessing rich, well-structured knowledge

Assessing scientific understanding and reasoning

Assessing to learn what students understand

Assessing achievement and opportunity to learn

Ongoing assessment by students of their work and that of others

Involvement of teachers in the development of external measurement

Assessing Student Learning

Assessing science through paper-and-pencil tests is akin to assessing a basketball player's skills by giving a written test. We may find out what someone knows about basketball, but we won't know how well that person plays the game.

(Hein and Price, 1994)

Instituting change in the classroom assessment program can be challenging. It is important for the classroom teacher to remember that new assessment strategies should be introduced slowly and carefully, being careful to maintain some traditional testing. A balance of traditional testing and alternative assessments will result in a more complete picture of student progress. In addition to traditional testing, the following assessment strategies have been used effectively in many science classrooms.

- Matched pre-and post-module assessments

- Embedded assessments Prediction activities
- Final assessments, such as hands-on assessments, paper-and-pencil tests, and science notebooks
- Informal assessments
- Documentation and record keeping

Matched Pre- and Post-Module Assessments

Pre- and post-module assessments serve two important functions. The first is to track how much students have learned during the unit. The latter enables the teacher to observe how the student's understanding of a subject has grown.

A pre-module assessment might include a teacher asking a question, assigning an investigation, brainstorming, drawing a picture, or performing a simple experiment at the beginning of the unit to determine how much a student knows about a given subject. As the class progresses through the unit, the teacher might refer to the pre-module assessment to further refine the teaching strategies. The post-module assessment would then be used as a way for the teacher to measure his or her teaching strategies.

Embedded Assessments

Embedded assessments are woven into the instructional sequence in the module. They may be part of the activities that naturally occur in a lesson or a logical extension of the lesson's central activity. Embedded assessment allows the teacher to obtain and record information about student learning.

Prediction Activities

A prediction activity allows the student to predict an outcome based on previous experience and knowledge of a subject. By asking students to make predictions at appropriate times, teachers can assess the science concepts their students have mastered and how well they can apply that knowledge to a new situation.

Final Assessments

Final assessments are used at the end of a science unit or module and can take many forms. Examples of final assessments are described below:

Hands-on Assessments

Hands-on assessments provide opportunity for teachers to observe how well students can perform an experiment similar to one they worked on during the module or unit. Through hands-on assessments, teachers see how students approach a problem, gather data, record results, and draw conclusions from their findings.

Teachers may also use stations to offer a series of tasks for students to complete. Students may work individually or collectively as a group.

Paper-and-Pencil Tests

Paper-and-pencil tests are questions used at the end of the unit to assess student knowledge. The questions can be pictorial or reflective. Pictorial questions evaluate how well a student can think through problems that require both the knowledge and the application of ideas to a new situation. Reflective questions evaluate how well students can express themselves in writing, as indicated by the way they respond to problem solving questions.

Science Notebooks

Students can be asked to prepare individual science notebooks that include all the observations and records generated during a module or unit. The note books may include stories and poems, record sheets, charts, tables, and graphs. Drawing also reveals what students have learned. Teachers should assess the level of detail, use of labels, and quality of explanations accompanying the drawing. Notebooks also provide an effective way for students to keep records of what they have done in the module.

Informal Assessments

It is also beneficial to conduct informal assessments of student progress. Informal assessment might include reviewing written materials, observing students at work, and simply listening to students talk as you stroll around the classroom. By asking the right questions, teachers can uncover students' reasoning and the steps they used to solve problems. The questions that students ask can also provide valuable information about their understanding. Individual and group presentations also provide insight into student understanding or interpretation of concepts. Finally, questions posed by students following presentations can provide opportunities to gather important information.

Documentation and Record Keeping

One of the hardest parts of incorporating alternative assessments into the science program is developing an accurate record keeping system. Many teacher's guides include record keeping charts that help teachers focus on the goals of each assessment instrument.

The record keeping devices may include observation sheets, student worksheets, student profile charts, and evaluation rubrics. These devices provide a structure for teachers to use as they experiment with new assessment strategies and they can be adapted to suit the needs and record keeping styles of different teachers.

Information Technology Linkages/Literacy Skills for the Science Classroom

Our students are known as the **digital or the information generation**. As computers are transforming the way students learn and are making a big difference in the way that their brains process information, we must use information technology to cater to the unique needs of this computer savvy generation. Computer technology can play a pivotal role in the instructional strategies of teachers as they adapt and adjust their modes of teaching to incorporate information technology into their lessons.

As we seek to use information technology to our advantage, we must be forever mindful of the challenges of the information highway and make a comprehensive review of all Web sites before they are used and recommended to students. Please note that the suggested Web sites listed below have been reviewed for currency and suitability for students and teachers. As the Internet is constantly changing, some Web sites may become non functional, outdated or unsuitable.

1. **The Learning Site**

www.harcourtschool.com

A world of Science resources, expeditions, interactive learning games and activities by Harcourt School Publishers.

2. **NSTA SciLinks**

www.scilinks.org/harcourt

Connects students to a variety of innovative Science Web sites.

3. **Teachers**

www.teacher@hmco.com/act_archive

Resource of ideas and activities for each month of the year by the Houghlin Mifflin Company.

4. **Education World**

www.educationworld.com

Lesson plans, resources and assistance for teachers.

5. **Education Place**

www.eduplace.com/science

Houghton Mifflin site with Science related resources that include textbook support, professional development, Science activities, projects and links, etc.

6. **Science**

www.npac.syr.edu/textbook/kidsweb/science.html

Information on the Solar System and Marine Science with links to interactive exhibits of Science museums around the world by Syracuse University.

7. **Windows to the Universe**

www.windows.ucar.edu

Information, fun, games and activities about the Solar System and Earth Science.

8. **Links for Teachers**

www.pe.ca/athena/awebtelk.htm

Links with Web sites for teachers.

9. **Astronomy for Kids**

www.kidsastronomy.about.com

A space site full of fun, information, games, maps and links designed for students and their parents.

10. **NASA**

www.arc.nasa.gov/kids.html

Information on all aspects of space and the work of the North American Space Agency (NASA).

11. **NASA Kids**

www.NASAKids.com

NASA's official fun and comprehensive children's site that includes information about planets, the Solar System, space travel and our universe; space news, features, games, questions and answers and homework questions.

12. **The Canadian Space Agency**

www.space.gc.ca/kidsspace/csasupports

A children's space site that teaches them about the Solar System, space careers and Canada's role in space.

13. Do Science

www.doscience.com

Cool Science tricks, experiments and activities that can be done anywhere.

14. Magic School Bus

www.place.scholastic.com/magicschoolbus/index.htm

Fun filled interactive site that covers many aspects of Science.

15. Cyber Sleuth

www.cybersleuth-kids.com

A comprehensive educational search engine directory and homework helper for levels K-12 that also features information about Science exhibitions.

16. MSNBC Network Broadcasting

[www.msnbc.com/news/SCIENCE front.as](http://www.msnbc.com/news/SCIENCE_front.as)

Science headlines and information about current and innovative science research.

17. MSNBC Network for Kids

www.kids.msn.com/kidz/partnerdiscovery.asp

Fact, fun, games and homework help that give focus to animals and space.

18. Discovery

www.discovery.com

Uses adventure, fun and games to explore the impressive world of discovery with features on nature, Science and technology; also includes homework help.

19. Discovery Channel

www.discoverychannel.com

Exciting information about Science as featured on the Discovery Channel.

20. National Geographic for Kids

www.nationalgeographic.com/kids

Learn amazing Science facts, opportunities to chat with other students about Science, write cartoons and try out outrageous experiments; interactive activities, adventure, exploration and maps.

21. Nickelodeon for Teachers

www.teachers.nick.com

Features include Bill Nye, The Science Guy, The Big Help and 3-2-1 Contact, a programme that exposes children to all aspects of science. This site has activities, lesson plans, resources, cable connections, etc.

22. Yahooligans

www.yahooligans.com/Science and Nature

Information, experiments, games, activities and links to many scientific sites.

23. Canadian Broadcasting Corporation for Kids

www.cbc4kids.ca/general/the_lab

Powerhouse of learning and fun in Science for students, parents and teachers.

24. Kids Science

www.kidscience.about.com

Information, experiments and activities in all areas of Science.

25. The Smithsonian Institution

www.si.edu/info/education.htm

Details on museum's exhibits and educational resources, including activities and lesson plans for teachers.

26. Brain Pop

www.brainpop.com

Features animated activities to learn about cells, tissues, organs and the rest of the body.

27. Fun Brain

www.funbrain.com

Fun, games and trivia on Science and other subjects.

28. The Franklin Institute - Brain Drops

www.fi.edu/braindrops/

"Nuggets" of Science to expand students' knowledge of Science in their environment.

29. Neuroscience for Kids

www.faculty.washington.edu/chudler/neurok.html

Experiments, activities, games and lesson plans to teach students about the senses, the brain and the nervous system, by the University of Washington.

30. **Sandlot Science**
www.sandlotscience.com
A site full of unbelievable optical illusions.
31. **Cool Science for Curious Kids**
www.hhmi.org/coolscience/
Explorations in Life Science by the Howard Hughes Medical Institute.
32. **The Exploratorium**
www.exploratorium.edu
Hands-on Internet museum that lets students explore Science and Art in interactive exhibits and games.
33. **Science Learning Network**
www.sln.org
Experiments, activities and information for students and teachers in all areas of Science (Kindergarten- Junior High School).
34. **Educational Web Adventures**
www.eduweb.com
Exploring Science, Social Studies and Art through storytelling and interactive games.
35. **Ontario Science Centre**
www.osc.on.ca
Students learn how their minds and bodies work through experiments and interaction with some of the exhibits at the Ontario Science Centre.
36. **YES Mag – Canadian Science Magazine for Kids**
www.yesmag.bc.ca/
The latest news about Science and Technology, experiments and activities.
37. **The Lab**
www.abc.net.au.science
Information and interactive activities that cover almost all areas of Science featured in this colourful gateway to Science by the Australian Broadcasting Corporation.
38. **Canadian Hurricane Centre for Kids**
www.ns.ec.gc.ca/weather/hurricane/ids.html
A comprehensive look at hurricanes including a full glossary and list of hurricane links.
39. **Hurricanes**
www.eduscapes.com/42explore/hurricane/htm
Information, activities and links for hurricanes.
40. **EcoKids Online**
www.ecokids.earthday.ca/
Games, news and stories that teach students about the environment.
41. **EcoKids and Teachers**
www.ecokids.earthday.ca/pub/educators/clamate/frm_set.htm
Information about climate change, global warming, the green house effect and other atmospheric conditions for educators and parents
42. **SciCentral K-12 Science**
www.Scicentral.com/K-12/
Features lesson plans, suggestions for Science exhibition projects and links to “Ask a Scientist” service.
43. **Dr. Bob’s Interesting Science Stuff**
www.frontiernet.net/~docbob/
Interesting Science and Technology facts, articles, bulletin board ideas, Science Exhibition projects, questions and answers and Science links.
44. **CyberFair – Science Project Steps**
www.isd77.k12.mn.us/resources/cf/steps.html
See sample projects and get information on how to do projects.
45. **Bonus**
www.bonus.com
Super resource for students that offers activities, interactive games and graphical toys to help them learn to about Science and other subjects.

Literacy Skills for the Science Classroom

The following sites feature information and strategies for helping students develop the reading and writing skills needed for success in the science classroom.

Sites That Matter

Resources for Science Literacy: Professional Development

The mission of Project 2061, a long-term initiative of the American Association for Advancement of Science, is to advance literacy in science, math, and technology through workshops for teachers, principals, curriculum and materials developers, policy makers, and others. There are also self-guided courses and trade book information for teachers. This site also includes a fabulous evaluation tool for comparing Benchmarks for Science Literacy with the benchmarks set by the National Council of the Social Studies, the National Council of Teachers of Mathematics, and the National Research Council.

www.project2061.org/publications/rsl/online

Science and Literacy, by Ellen Stone, National Energy Foundation

This brief article is posted on the Science Site from the Utah Office of Education. The author explains why the science curriculum ought to help students learn to read and write about science. She includes suggestions for how to integrate reading into a science program and lists strategies for helping students comprehend nonfiction.

www.usoe.k12.ut.us/curr/Science/ReadScience/NEF%20Sci%20and%20Lit.html

Reading and Writing in the Science Classroom, by Dr. Patricia Bowers

This article from the Professional Development section of Houghton Mifflin's Science Discovery Works site emphasizes the connection between science and what the author calls "the communication skills of reading and writing". Focusing primarily on the upper and lower elementary grades, the author provides a chart that demonstrates how the process skills of science, reading, and writing are interrelated, and she includes suggestions for how to develop an integrated unit. www.eduplace.com/science/profdev/articles/bowers.html

MCPS Science Instruction

This section of the Montgomery Country Public Schools web site contains numerous ideas and strategies for integrating reading and writing with science instruction.

www.mcps.k12md.us/curriculum/science/instr/instr.htm

Learning Styles and Writing in Science

This report from England's Department for Education and Skills list numerous strategies for integrating writing into the science curriculum. The strategies are organized into categories based on Howard Gardner's multiple intelligence theory: visual, auditory, kinesthetic, intrapersonal, and interpersonal.

www.standards.dfes.gov.uk/midbins/keystage3/Learning%20styles%20and%20writing%20in%20science.PDF

Use of Writing in Science Class

This web page from the University of Akron's K-12 Science Education site gives a concise rationale for including literacy instruction in the science class and gives some practical suggestions for how to do it.

www.agpa.uakron.edu/k12/best_practices/using_writing_resources.htm

Journals and Logs: Science, Conversation, and Writing

This article from Perspectives in Education and Deafness describes different types of logs and journals and includes ideas for how they can be used in the science classroom.

Laboratory Safety

An integral part of a successful science program is conducting laboratory experiments, activities, and investigations. Laboratory experiments, activities, and investigations can lead to accidents or injuries. Prevention is the best cure to reduce the possibility of such accidents or injuries. Preparation and planning is the key to laboratory safety.

Safety should be the first priority in preparation and planning every experiment, activity, and investigation. The teacher should provide an environment where laboratory safety is always considered. While it is not possible to anticipate every accident, a well planned experiment, activity, or investigation will minimize potential. Keys to safety in elementary school science are planning, management, and monitoring. Listed below are areas for consideration:

- Teachers should perform an experiment prior to class presentation to determine any inherent safety issues
- Teachers should model safety procedures at all times
- Teachers should supervise and monitor student behavior and enforce safety rules and procedures immediately
- Teachers must be present during the entire laboratory session
- Students should understand rules dealing with glassware, electrical equipment, chemicals, fire, sharp instruments, and eye safety
- Safety rules should be prominently posted in the classroom laboratory
- Appropriate protective equipment should be provided and worn as required (eye, hand, clothing, etc.)
- Teachers should be aware of student allergies
- Safety equipment should be immediately accessible in laboratory/classroom and in working order (eye station, fire extinguisher, ground-fault interrupters (GFI), first aid kit, etc)
- Laboratory equipment should be cleaned or sanitized, age appropriate, and in working order
- Teachers should understand basic first aid rules, in case of injuries
- Proper storage of materials and equipment is required

Chemical Safety Hazards

Laboratory chemicals pose a potential hazard in the elementary science classroom. Most elementary school teachers are not formally trained in chemistry, yet chemicals are sometimes used in their science programs. Listed below are chemicals considered too hazardous for use in elementary science classrooms.

- a. **Acids.** Acids such as hydrochloric, sulfuric, or nitric acid should not be used. Even diluted solutions of these acids can cause skin and eye burns. Two acids generally safe to use are vinegar or a weak citric acid solution. When working with acids, always wear chemical splash safety goggles.
- b. **Asbestos.** Asbestos should not be used and should be discarded according to school system policy.
- c. **Bases.** Sodium hydroxide (lye) or potassium hydroxide is an extremely strong base. Even diluted solutions will irritate the skin, and if splashed in the eyes, may cause injury before one can begin to wash the eye out. For acid-base (pH) activities, the teacher should consider sodium bicarbonate (baking soda) when making a basic solution. When working with bases; always wear chemical splash safety goggles.
- d. **Mercury.** Mercury compounds should not be used in the elementary school classroom. Any thermometers or other instruments containing mercury have no place in the elementary classroom and should be properly disposed of. (Mercury thermometers can be identified by their silver-colored liquid.) When thermometers are needed, use alcohol-filled thermometers.
- e. **Smoke Generating Activities.** Smoke of any kind affects the lungs because smoke is composed of particles floating in the air. Any classroom demonstration that produces smoke should be done in a fume hood, near an exhaust fan, or outdoors with students upwind.
- f. **Other Chemicals.** Teachers should use only those chemicals that are approved for the use in elementary classrooms.

Science Safety

Teachers should communicate the following safety rules to their students and ensure that they are obeyed.

In the Classroom

- Listen to your teacher for special safety directions. If you do not understand something, ask for help.
- Wear safety goggles when your teacher tells you to wear them.
- Tell your teacher if something breaks or spills. Move away from it and wait for the teachers' instructions.
- Be careful around a hot plate, a candle or open flame. Only use these items if instructed to do so by the teacher.
- When heating materials in test tubes, always slant the tubes away from yourself and others.
- Wear safety aprons if you work with anything messy or anything that might spill.
- Read all of the directions before doing experiments or using equipment. Make sure you understand them. If you do not, ask your teacher for assistance.
- Carefully read the label on the container of a product before you use it; follow the manufacturer's instructions and pay special attention to health or safety warnings.
- Keep your hair and clothes away from open flames. Tie back long hair and roll up long sleeves.
- Keep your hands dry around electrical equipment.
- Know the location and proper use of the fire extinguisher and first aid kit.
- Never run or play around in the Science Laboratory classroom.

- Never eat, drink or smell unless you are instructed to do so by the teacher.
- Never draw any material into a tube with your mouth.
- Clean up your work area, and wash your hands afterwards.
- Put tools and equipment safely away the way your teacher tells you to as soon as you finish using them; do not leave them out where they may be stumbled over.
- When using liquids or other potentially messy substances, cover work surfaces with newspaper.

On Field Trips

- Always be accompanied by a trusted adult – like your teacher or a parent or guardian.
- Never touch animals or plants without the adult's approval. The animal might bite. The plant might be poisonwood or another dangerous plant.
- Stay with your group and keep within sight of the accompanying adult. Report any scrapes, cuts, and injuries to your teacher immediately.

Responsibility

- Treat living things, the environment, and each other with respect.

Rubrics

Rubrics offer the teacher an opportunity to evaluate the student’s understanding of a scientific topic by levels of performance on certain criteria. A rubric can evaluate the depth, breadth, creativity, and conceptual framework of an essay, presentation, skit, poster, project, lab report, portfolio, etc. A rubric may be applied to numerous tasks in the classroom. Rubrics are scoring criteria that are:

- summative – provide information about a students’ knowledge
- formative – provide information about a student’s strengths and weaknesses
- evaluative – provide ways to create instruction that better fits each student’s needs
- educative – provide students with an understanding of how they learn science

In the classroom, they can make assessment more meaningful, clarify expectations, and yield better feedback. Specifically, rubrics are matrixes that define what is expected in a learning situation. For the students, a rubric clarifies the often mysterious grade at the end of a unit, project, paper, or presentation by giving insight and direction about what is important about the science activity. There are two predominant types of rubrics; holistic and analytical.

Holistic Rubric

Proficient – 3 points	The student’s project has a hypothesis, a procedure, collected data, and analyzed results. The project is thorough and the findings are in agreement with the data collected. There are minor inaccuracies that do not affect the quality of the project.
Adequate – 2 points	The student’s project may have a hypothesis, a procedure, collected data, and analyzed results. The project is not as thorough as it could be; there are a few overlooked areas. The project has a few inaccuracies that affect the quality of the project.
Limited – 1 point	The student’s project may have a hypothesis, a procedure, collected data, and analyzed results. The project has several inaccuracies that affect the quality of the project.

Analytical Rubric

Criteria	4 points	3 points	2 points	1 point
Has a plan for Investigation	The plan is thorough	The plan is lacking a few details	The plan is missing major details	The plan is incomplete and limited
Use of Materials	Manages all materials responsibly	Uses the materials responsibly most of the time	Mishandles some of the materials	Does not use materials properly
Collects the Data	Thorough collection	Some of the data	Major portions of the data are missing	The data collection consists of a few points

Construction a Rubric:

- Know the goals for instruction – what are the learning outcomes?
- Decide on the structure of the rubric – holistic or analytical – what fits best for the task?
- Determine the levels of performance – are there levels of performance specific to each criterion?
- Share the rubric with your students – students should have an opportunity to see, discuss or even design the rubric prior to the performance or the science activity.

Adapted from “Design Your Own Rubric” by Julie Luft, *Science Scope*, February 1997

Examples of Rubrics

Holistic Rubric for Essay Questions		
Response	Criteria	Rating
Exemplary	Clarity of thought, Complete. Shows understanding of all processes, reasonable hypothesis or thoughtful questions, conclusions supportable by data, shows creativity, some graphic representation of data or concepts.	11
Competent	Clarity of thought, shows understanding of major processes, includes good hypothesis or questions, draws acceptable inferences and conclusions, may have graphic representations.	10
Minor Flaws	Completes the assignment, but explanations may be slightly ambiguous or unclear, may contain some incompleteness, inappropriateness, or unclearness in representation, hypothesis, understanding of processes or conclusions.	8
Nearly Satisfactory	Begins successfully, but omits significant parts or fails to complete, may misuse scientific terms, representations may be incorrect or omitted, incorrect or incomplete in analysis, inferences and conclusions.	6
Fails to complete	Assignment and explanation is unclear, or major flaws in concept mastery, incorrect use of scientific terms, inappropriate or omitted hypothesis.	4
Unable to begin effectively	Product does not reflect the assignment, does not distinguish what information is needed, restates the question without making an attempt at a solution.	2
No attempt	Does not begin assignment.	0

Analytical Rubric for Logs and Journal Writing

Area of Product	Criteria	Rating
Daily entries	Regular daily entries	4
	Entries 90% of the time	3
	Entries 80% of the time	2
	Entries less than 80% of the time	1
Use of scientific language	Consistent, accurate usage of terms	4
	Adequate usage of scientific terms	3
	Occasional use with few errors	2
	No terms or frequent errors in usage	1
Application to the real world	Able to apply learning	4
	Usually finds practical application	3
	Occasionally relates to real life skills	2
	No practical application	1
Concept understanding	Shows understanding of key concepts	4
	Usually demonstrates understanding	3
	Inadequately demonstrates understanding	2
	Poor understanding of concepts	1
Clarity of thought	Well organized	4
	Adequate organization	3
	Limited organization	2
	Poor organization	1

Analytical Rubric for Contour Maps (Earth Science)

Neatness	Map is crystal clear, no isolines touch or cross, no stray pen or pencil marks, and overall appearance shows care and attention to detail. Numbers are legible, yet unobtrusive, symbols are unmistakable.	3 points
	Map is clear, although signs of carelessness may appear. Isolines do not cross, and stray pencil marks are minimal or mostly erased. Numbers are legible, symbols conform with handout guidelines.	2 points
	Map lacks clarity. Isolines are nebulous, extraneous marks litter the page. Numbers are messy, symbols confusing.	1 point
	Map is an utter mess. No attempt at neatness is evident. Includes a blank page.	0 points
Completeness	Every isoline is present on map and clearly labeled. Proper lines are used for topographic elements, and symbols represent all known or discernible structures.	3 points
	Required isolines are present, some labels may be missing. Most identifiable structures in landscape are represented by appropriate symbols.	2 points
	Some isolines missing, labels intermittent. Few structures are represented by the appropriate symbols.	1 point
	More isolines are missing than are present, labels rare to nonexistent. Symbols for other structures are not present whatsoever.	0 points
Accuracy	Map clearly corresponds to given landscape. Geologic formations are clearly identifiable, and distances between objects on map are directly related to reality.	3 points
	Map represents landscape. General contours are identifiable, although details may be slightly off. Distances are mostly consistent with reality.	2 points
	Map is a gross interpretation of reality. Hills and valleys exist, but shapes vary from given landscape. Distances between objects are only roughly proportional to given landscape.	1 point
	Are you sure you were mapping the landscape I gave you?	0 points

Joel Stachura, 1995

Holistic Rubric for Lab Write-Ups

Frequent and proper use of scientific terminology appropriate for the lab.

1	2	3	4	5
strongly disagree		somewhat agree		strongly agree

Data collection was within expected norms, explanations were given where they deviated.

1	2	3	4	5
strongly disagree		somewhat agree		strongly agree

Conclusion is appropriate for the data collected and shows a strong grasp of the scientific concepts.

1	2	3	4	5
strongly disagree		somewhat agree		strongly agree

Writing style shows neatness, grammatical correctness, and good spelling.

1	2	3	4	5
strongly disagree		somewhat agree		strongly agree

The lab write up was complete with graphs and charts where appropriate. Check the parts present.

Purpose _____ Materials List _____ Procedures _____ Data and Observations _____ Calculations _____ Questions _____ Conclusion _____

1	2	3	4	5
strongly disagree		somewhat agree		strongly agree

The responses to the questions were carefully thought out and well reasoned.

1	2	3	4	5
strongly disagree		somewhat agree		strongly agree

By Barbara Schaner

SECTION E

APPENDICES

Teaching and Learning Strategies

http://www.newhorizons.org/strategies/front_strategies.html

In this area of the website you will find information on some of the best researched and the most widely implemented methods of helping all students to learn more successfully. The information includes a description of how the teaching and learning strategies work, where they have been applied, results, and where to find further information from experts in the field, books, websites, and other resources. They have been demonstrated to be successful with students of all ages and ability levels, including those with various kinds of disabilities and those who do not learn in traditional ways. Following are links to different teaching and learning strategies, a description of how they work, where they have been applied, results, and where to find more information from individuals, books, web sites, and other resources.

[Accelerated Learning Techniques](#)

[Action Research](#)

[Applied Learning](#)

[Arts in Education](#)

[Assessment Alternatives](#)

[Character Education](#)

[Cognitive Coaching](#)

[Cooperative Learning](#)

[Democratic Classrooms](#)

[Differentiated Instruction](#)

[Emotional Intelligence](#)

[Environmental Education](#)

[Environments for Learning](#)

[Graphic Tools](#)

[Instrumental Enrichment](#)

[Keeping Fit for Learning](#)

[Learning Styles](#)

[Literacy](#)

[Multicultural Education](#)

[Multiple Intelligences](#)

[Service Learning](#)

[Teaching for Understanding](#)

[Technology in Education](#)

[Thinking Skills](#)

Some Teaching and Learning Strategies that work in Science

I. “OWL STRATEGY”

Credit is given to Ansberry and Morgan 2005 for the creation of the OWL Strategy. This strategy is a three – column chart – OBSERVATIONS, WONDERINGS and LINK TO LIFE/LEARNING where students record their **observations** about a phenomenon or object, their **wonderings/thoughts** and what they **learned** as it relates to **life**.

II. “READ ALOUD” ~SCIENCE LITERATURE/CONCEPTS

This strategy is appropriate for all grade levels. Many researchers contend that this strategy improves reading skills and increase interest in reading and literature and can improve overall academic achievement.

III. “FRAYER MODEL”

The Frayer Model is a tool used to help students develop their vocabulary. Frayer believes that students develop a stronger understanding of concepts when they study them in relational manner. Participants write a word (e.g. ECHINODERMS) in the middle of a box and proceed to list characteristic, examples, non-examples, and a definition in other quadrants of the box. They are encouraged to proceed in any order, using the examples and characteristics to help them formulate a definition.

IV. “ALPHABOXES”

This strategy could be used as a brainstorming activity to elicit student’s prior knowledge and to activate learning, or it could be used at the end of a unit to assess what students learned. Students would be given a blank alphabox (with letters from A to Z – see sample handout). They are given a topic (e.g. MATTER) and are given a time period to write or suggest a word/phrase beginning with each letter of the alphabet associated with the given topic.

V. “PUT RHYTHM TO WORDS”

This strategy could be used to aid students in learning definitions of science words and assessing their knowledge of concepts taught in a lesson/unit.

This strategy provides the opportunity for participants to be creative. In small groups, participants are provided with five definitions each. Example: “AN ECOSYSTEM IS A PLACE WHERE LIVING AND NONLIVING THINGS AFFECT EACH OTHER.” They are encouraged to read the definitions, identify key words in the definitions, identify the part of speech for selected words in the definitions – (integrating Language Arts) discuss meaning and finally use words in a rhythmic beat so that the definition can easily be remembered.

To assess definition of words, each word of the definition is placed in squares of firm construction paper and cut out individually. (Word puzzle.) The words are shuffled and participants are given a specific time to put word puzzle in correct order.

VI. USING MUSIC

Using music instead of memorization is a technique used to show how science concepts can be taught. Example: Information on “Bones Found in the Human Body” is provided. In small groups, participants use the tune of familiar nursery rhymes and songs to learn basic content on a topic.

VII. **VOCABULARY WHEELS (by Jane Feber)**

Participants create a moving wheel that was placed within a folded piece of paper, which has a small opening cut on both sides. Through the small openings, students write science words on one side of the wheel and their definitions on the other side of the wheel. This visual tool which participants can make can be used to test vocabulary in Science.

VIII. **SWAT**

This is a fun way to review vocabulary. Teachers are encouraged to select an area in the classroom where science words can be mounted (science wall).

At the end of each unit, the students are grouped into two teams. Each team is provided a light plastic fly swatter. At various intervals two persons (one from each team) stand with fly swatter and back toward the wall. Remaining students are given the initiative to give the definition of a word on the word wall. The “GO” Sign then give permission for the two individuals to turn and SWAT the correct word for the meaning given as quickly as possible. This game reinforces concepts and allow students to have fun while learning.

IX. **FOLDABLES (by Denise White)**

Foldables are great hands-on instructional strategies and more valuable than worksheets. Students can create various styles of foldables using sheets of colored paper. They can use the foldables for note taking or written activities.

X. **VOCABULARY CHARADE (by Madeline Marcotte)**

This strategy can be used with any age group. The purpose of this technique is to review Science vocabulary previously studied. The techniques utilize visual/spatial, body/kinesthetic and interpersonal intelligences.

- Students are given cards with science vocabulary words (one word per card).
- Each student is given the opportunity to choose two persons to work with them.
- A time limit is given for discussion of vocabulary in small groups, and then participants ACT out the WORDS for the class without using oral language.
- The class observes the ACT and then makes an effort to identify the WORD. This technique can be used in conjunction with a visualizing activity in which students draw a small picture or symbol next to each word in their notes.

XI. **“CONCEPT DEFINITION MAP”**

The teacher will choose a word or concept, which relates to topic being studied and write it in the center of the graphic; keep in mind a few questions:

1. What is the central word, concept, research question? (example: Vertebrates)
2. What are the concepts? The items, descriptive words, or telling questions that you can associate with the concept, topic etc. (for example: animals with backbone, warm blooded).

The Concept Definition Map could be used during or after reading of a Science passage. It can be used with expository and narrative text. (See www.forpd.ucf.edu/strategies/samMap.html)

Sample Glossary

GRADES: 1 – 2

WORD:	DEFINITION:
Adult	The final stage in an animal.
Attract	To push something. A magnet attracts things made of iron.
Backbone	The long row of bones in the back of an animal.
Balance	An instrument to find and compare the masses/weight of things.
Ear	The sense organ of hearing.
Eye	The sense organ for sight.
Gas	A kind of matter that does not have its own shape.
Habitat	A place where an animal finds food, water and shelter.
Hill	A high place that is smaller than a mountain.
Lake	A body of water with land all around it.
Leaves	The parts of a plant that take in light and air to make food.
Liquid	A kind of matter that flows and takes shape of its container.
Living	Needing food, water, and air to grow and change.
Magnet	An object that will attract things made of iron.
Matter	Any substance which has mass and occupies space.
Moon-Earth	Closest neighbor in space.
Mountain	The highest kind of land with sides that slope towards the top.
Natural Resource	Anything from nature that man can use.
Nonliving	Not needing food, water, and air, not growing.
Nose	The sense organ of smell.
Plain	Flat land that spreads out a long way.
Repel	To push away. Poles that are the same on a magnet repel each other.
River	A large body of moving water.
Roots	The parts of a plant that hold it in the soil and take in water and nutrients.

WORD:	DEFINITION:
Ruler	A tool usually made of metal, plastic or wood that is used for drawing straight lines and measuring lengths.
Season	The seasons are spring, summer, fall and winter.
Sense organ	Body parts that tell a person about touch, sight, hearing, taste or smell.
Shelter	A place where animals can be safe.
Skin	A natural protective body covering and site of the sense of touch; "your skin is the largest organ of your body".
Solid	A kind of matter that keeps its shape.
Spring	The season after winter where the weather gets warmer.
Star	An object in the sky that gives off its own light.
Stem	The part of a plant that holds up the plant and let food and water move through the plant.
Stream	A small body of moving water that flows downhill.
Summer	The season after spring that is usually hot. Summer has many hours of daylight.
Sun	The star closest to earth.
Temperature	A measure of cold or heat, often measurable with a thermometer.
Thermometer	A tool used to measure temperature.
Tongue	The sense organ of taste.
Valley	A low land between mountains or hill.
Weather	What the air outside is like.
Wind	Moving air.
Wind Vane	A tool that is used to show the direction in which the wind is moving.
Winter	The season after fall that is usually cold. Winter has the fewest hours of daylight.

SECTION F

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