COMMONWEALTH OF THE BAHAMAS

MINISTRY OF EDUCATION

PRIMARY SCIENCE CURRICULUM GUIDELINES

GRADES 5-6

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 5 – 6 (REVISED 2010)
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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

The development and production of the Revised Primary Science Curriculum Guidelines was made possible through the collaborative efforts of many.

Our thanks and gratitude are extended to Mrs. Leanora Archer, Deputy Director of Education (Curriculum and Development) for her support and pointed guidance. Mr. Hamblin Newbold for assisting with the editing of this document. The contributions of the Science Standards and Benchmarks by Dr. Davis who provided a point of reference that assisted in aligning the Primary Science Curriculum Guidelines with Science Standards Globally.

Dr. Karen St. Cyr ( ) for her support and collaborative efforts in the integration of Garden-Base Learning.

The following persons are singled out for special commendations for the part they played in bringing to fruition this curriculum revision exercise:

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- Ms. Portia Sweeting, Director of Education of Bahamas National Trust, who begun the process as Facilitator during the initial fact-finding activities for the curriculum.
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- 0fficer for High School Sciences.
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- The Primary Science Co-ordinators and Curriculum Workshop groups on Abaco, Andros, Bimini, Cat Island, Eleuthera, Exuma, Grand Bahama, Long Island and New Providence for their suggestions and input to the Data Collection exercise.
- Ms. Patrice Kemp for her clerical expertise.
- Ms. Portia Sweeting, Danielle Brathwaite, Charlotte Brown and the Science Coordinators on New Providence for assisting with the editing of this document.

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, 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 to 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.

LIFE

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

STRAND 1: LIFE SCIENCE — GRADES: 1-6

LIFE

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. 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

LIFE

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

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

EARTH AND SPACE

Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
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 is a constellation. 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.

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

STRAND 3: PHYSICAL SCIENCE GRADES: 1-6

PHYSICAL

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

UNIT/ TOPIC ALLOCATION
GRADE: 1

SECTION	STRAND	TOPICS	DURATION (Hours)
LIFE SCIENCE	**Characteristics of Organisms**	1. HUMAN BODY – SENSE ORGANS	
		a. Body Parts	✓30 mins. __45 mins. __60 mins.
		b. Function of Body Parts	✓30 mins. __45 mins. __60 mins.
		c. Sense Organs	✓30 mins. __45 mins. __60 mins.
		d. Function of Sense Organs	✓30 mins. __45 mins. __60 mins.
		e. Stages of Human Development	✓30 mins. __45 mins. __60 mins.
		f. Physical Changes in Human Development	✓30 mins. __45 mins. __60 mins.
		g. Keeping Healthy	✓30 mins. __45 mins. __60 mins.
		h. Keeping Clean	✓30 mins. __45 mins. __60 mins.
	Living and Nonliving things	2. WHAT ARE LIVING THINGS?	
		a. Needs of Living Things	✓30 mins. __45 mins. __60 mins.
		b. Uses of Plants and Animals	2x30 mins. __45 mins. __60 mins.
		c. Animals as Pets and Animals That Help People Work	✓30 mins. __45 mins. __60 mins.
		3. LIVING AND NONLIVING THINGS	
		a. Living and nonliving things	✓30 mins. __45 mins. __60 mins.
		b. Similarities of Living and Nonliving Things	✓30 mins. __45 mins. __60 mins.
		c. Plants and Animals	✓30 mins. __45 mins. __60 mins.
		d. Homes of Plants and Animals	✓30 mins. __45 mins. __60 mins.
		e. Plants Parts	✓30 mins. __45 mins. __60 mins.
		f. Animal Parts	✓30 mins. __45 mins. __60 mins.
		g. Plants and Animals Help Each Other	✓30 mins. __45 mins. __60 mins.
		h. Harmful Animals-Vectors	✓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. THE EARTH	
		a. Our Earth	✓30 mins. __45 mins. __60 mins.
		b. Landform – Hills and Valleys	✓30 mins. __45 mins. __60 mins.
		c. Landforms – Plains and Mountains	✓30 mins. __45 mins. __60 mins.
		d. Natural Resources	✓30 mins. __45 mins. __60 mins.
		e. Saving Natural Resources	✓30 mins. __45 mins. __60 mins.
		f. Uses of Water	✓30 mins. __45 mins. __60 mins.
		5. WEATHER AND SEASONS	
		a. Different Types of Weather	✓30 mins. __45 mins. __60 mins.
		b. Weather Changes	✓30 mins. __45 mins. __60 mins.
		c. Weather Instruments	✓30 mins. __45 mins. __60 mins.
		d. Types of Clouds	✓30 mins. __45 mins. __60 mins.
		e. Seasons	✓30 mins. __45 mins. __60 mins.
	Universe and the Solar System	6. CHANGES IN THE SKY	
		a. The Sun	✓30 mins. __45 mins. __60 mins.
		b. Looking at the Sky	✓30 mins. __45 mins. __60 mins.
		c. Day and Night	✓30 mins. __45 mins. __60 mins.
PHYSICAL SCIENCE		7. PROPERTIES AND CHANGES IN MATTER	
		a. Matter	✓30 mins. __45 mins. __60 mins.
		b. Physical Properties of matter	✓30 mins. __45 mins. __60 mins.
		c. Physical Changes in Matter	✓30 mins. __45 mins. __60 mins.
		8. FORCES AND ENERGY	
		a. Push and Pull	✓30 mins. __45 mins. __60 mins.
		b. Using Magnets	✓30 mins. __45 mins. __60 mins.
		c. Attract and Repel	✓30 mins. __45 mins. __60 mins.

UNIT/ TOPIC ALLOCATION
GRADE: 2

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

UNIT/ TOPIC ALLOCATION
GRADE: 2

SECTION	STRAND	TOPICS	DURATION (Hours)
EARTH SCIENCE	**Properties and Structure of Earth**	5. EARTH'S RESOURCES a. Tocks 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. WEATHER CHANGES 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. CHANGES IN THE SKY 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. MEASURING MATTER **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. SOURCES OF ENERGY 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. VERTEBRATES	
		a. Definition/Characteristics/Traits	__30 mins. ✓45 mins. __60 mins.
		b. Vectors	__30 mins. ✓45 mins. __60 mins.
		c. Mammals and Birds	__30 mins. ✓45 mins. __60 mins.
		d. Reptiles, Fish, Amphibians	__30 mins. ✓45 mins. __60 mins.
		e. Body Parts/Function of Fish	__30 mins. ✓45 mins. __60 mins.
		f. Body Parts-Survival	__30 mins. ✓45 mins. __60 mins.
		2. DIGESTIVE SYSTEM	
		a. Parts of the Digestive System	__30 mins. ✓45 mins. __60 mins.
		b. Process of Digestion/Function	__30 mins. ✓45 mins. __60 mins.
		c. Proper Nutrition/Exercise	__30 mins. ✓45 mins. __60 mins.
		d. Food Groups	__30 mins. ✓45 mins. __60 mins.
		e. Health Resources	__30 mins. ✓45 mins. __60 mins.
	Structure and Function	3. PLANT PARTS AND FUNCTION	
		d. Plant Parts/Function	__30 mins. ✓45 mins. __60 mins.
		e. Function of Seeds	__30 mins. ✓45 mins. __60 mins.
		f. Seed Growth Patterns	__30 mins. ✓45 mins. __60 mins.
	Organisms and the Environment	4. ECOSYSTEMS	
		i. Living/non-living organisms in a garden	__30 mins. ✓45 mins. __60 mins.
		j. Types of Gardens	__30 mins. ✓45 mins. __60 mins.
		k. Experiment with seeds – Containerized with Seeds	__30 mins. ✓45 mins. __60 mins.
		l. Rocky and Sandy Shores	__30 mins. ✓45 mins. __60 mins.
		m.The Grouper – Coral Reefs (Home)	__30 mins. ✓45 mins. __60 mins.
		n. The Grouper – Protection/Laws	__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. Earth Materials 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. EARTH'S AIR AND WATER 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. THE EARTH a. The Earth – Relation to Sun b. Motion of Earth	 __30 mins. ✓45 mins. __60 mins. __30 mins. ✓45 mins. __60 mins.
		8. SEASONS 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. MATTER	
		a. States of Matter (solid, liquid, gas)	__30 mins. ✓45 mins. __60 mins.
		b. Properties of Matter	__30 mins. ✓45 mins. __60 mins.
		c. Changes in Matter	__30 mins. ✓45 mins. __60 mins.
		d. Measuring Matter	__30 mins. ✓45 mins. __60 mins.
	Forces and Energy	10. MATTER cont'd.	
		a. Sources and Forms of Energy/Uses	__30 mins. ✓45 mins. __60 mins.
		b. Define fuels	__30 mins. ✓45 mins. __60 mins.
		c. How Fossil Fuels Form	__30 mins. ✓45 mins. __60 mins.
		d. Transfer of Electricity	__30 mins. ✓45 mins. __60 mins.
		e. Magnets – Objects Repel/Attract	__30 mins. ✓45 mins. __60 mins.
		f. Magnets – Uses	__30 mins. ✓45 mins. __60 mins.
		g. Conservation	__30 mins. ✓45 mins. __60 mins.
		h. Ways to Conserve	__30 mins. ✓45 mins. __60 mins.

UNIT/ TOPIC ALLOCATION
GRADE: 4

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

UNIT/ TOPIC ALLOCATION
GRADE: 4

SECTION	STRAND	TOPICS	DURATION (Hours)
EARTH SCIENCE	**Properties and Structure of Earth**	5. CHANGES ON EARTH 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. WEATHER 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. EXPLORING THE PLANTS 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. MATTER CHANGES	
		a. Properties of Matter	__30 mins. ✓45 mins. __60 mins.
		b. Physical Changes in Matter	__30 mins. ✓45 mins. __60 mins.
		c. Physical Properties and Physical Changes in Matter	__30 mins. ✓45 mins. __60 mins.
		d. Measuring Matter (mass and volume)	__30 mins. ✓45 mins. __60 mins.
	Forces and Energy	9. MAKING WORK EASIER	
		a. Force, Work and Motion	__30 mins. ✓45 mins. __60 mins.
		b. Measuring Force (pushes and pulls)	__30 mins. ✓45 mins. __60 mins.
		c. Simple Machines	__30 mins. ✓45 mins. __60 mins.
		d. Wedges and Inclined Planes	__30 mins. ✓45 mins. __60 mins.
		e. Energy Conservation	__30 mins. ✓45 mins. __60 mins.
		10. TECHNOLOGY	
		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. ✓60 mins. __30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins.
		2. <u>Mollusks</u> a. Characteristics identification and classification of mollusks and the queen conch and our economy b. Stinging Cell Animals	 __30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins.
		3. <u>Vectors (Insect)</u> a. Definition, identification and characteristics b. Diseases, treatment and elimination of vectors	 __30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓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. ✓60 mins. __30 mins. __45 mins. ✓60 mins.

UNIT/ TOPIC ALLOCATION
GRADE: 5

SECTION	STRAND	TOPICS	DURATION (Hours)
LIFE SCIENCE	**Structure and Function in Living Systems.**	5. HEALTH 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. PLANTS 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. ECOLOGY 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. EARTH a. Resources of the earth and oceans b. Pollutants, their affect on marine life, prevention and conservation of the oceans	 __30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins.
		9. FOSSILS a. Description, formation and types of fossils	 __30 mins. __45 mins. ✓60 mins.
		10. THE ATMOSPHERE a. Layers of the atmosphere b. Conditions that change weather and its affect on people c. Measuring weather using a rain gauge and windsock	 __30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins. __30 mins. __45 mins. ✓60 mins.
	Universe and the Solar System	6. SOLAR SYSTEM 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. ✓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: 5

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

UNIT/ TOPIC ALLOCATION
GRADE: 6

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

UNIT/ TOPIC ALLOCATION
GRADE: 6

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

UNIT/ TOPIC ALLOCATION
GRADE: 6

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

UNIT/ TOPIC ALLOCATION
GRADE: 6

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

UNIT/ TOPIC ALLOCATION
GRADE: 6

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

STANDARDS AND BENCHMARKS

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)

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[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 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 the 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 describe 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 plants and animals 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 give 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 use their 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 make 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 discuss 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 determine 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 give 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 determine 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 Journey

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

	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6
LIFE SCIENCE	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.

	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6
LIFE SCIENCE	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.

	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6
LIFE SCIENCE	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 what a biome is.
	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.

	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6
LIFE SCIENCE			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.	

	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6
LIFE SCIENCE					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 ad 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 light heat, sound, electricity and their characteristics.			
	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 leaned 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 5
SCOPE OF WORK

TOPIC: INVERTEBRATES **STRAND 1: CHARACTERISTICS OF ORGANISMS**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Describe traits common to all invertebrates.	In order to study animals more easily, scientists divide them into two major groups. Animals with backbones are called **vertebrates** and animals without backbones are called **invertebrates**. Invertebrates live almost everywhere on Earth. Invertebrates make up 97% of all animals. Invertebrates are classified into several smaller groups. Animals that have many of the same characteristics, or traits, are classified in the same group. Jellyfish, spiders, insects, starfish, sponges, worms, crabs, octopus, crawfish and centipedes are all invertebrates.	1. Examine pictures of a variety of animals, classify them as vertebrates and invertebrates and name all the animals in the invertebrate group.	*Science Horizons* Bk. 5 *Treasures in the Sea* *Harcourt Science* Bk. 6 www.brainpop.com "Invertebrates" www.scilinks.org/Harcourt The Animal Kingdom Crustaceans "Lobster Life Cycle Poster" Bahamas National Trust	I. Construct models of crustaceans that are structurally correct using reusable items. Classify animals as invertebrates from a selection of pictures, photos or PowerPoint presentation.
2. Describe the characteristics common to crustaceans.		2. View a transparency of the spiny lobster and describe its characteristics. Based on the form of the body parts, predict the function of each part. Play the game 'pass the parts'.		II & III. Complete a project on crustaceans.
3. Identify invertebrates that are crustaceans.		3. Identify crustaceans from a selection of invertebrate pictures. Collect a variety of pictures from magazines and internet on crustaceans and create a scrapbook. Create a recipe using crab, lobster, shrimp, crawfish as the main ingredients.		

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 5
SCOPE OF WORK

TOPIC: INVERTEBRATES **STRAND 1: CHARACTERISTICS OF ORGANISMS**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
4. Explain the impact of crustaceans on the Bahamian economy.		4. Discuss Crab Fest and its impact on the economy of Andros. Interview and photograph sidewalk vendors to discuss how selling crabs and crawfish enhance their everyday life. Create bar graphs to organize and present data on landings of the spiny lobster. Design traps for catching crabs and crawfish.	www.macalister_elliott.com/media/reports/18reports/18_reports/18_reports.pdf www.bahamasissues.com/archive/indexphpft *Bahamas Handbook 2010* Local Vendors	IV. Explain how Bahamians derive incomes using crustaceans. Collect menus from various places. i.e.: Bamboo Shack, Hotel Restaurants, backs of cars, Fish Fry, other hotels etc. Compare the prices of crawfish, shrimp and crab dishes. Create a graph or Venn Diagram to show your results. Infer reasons for the vast differences in prices.
5. Research the laws that govern the preservation and conservation of the spiny lobster.	Arthropods that have two body sections and two pairs of antennas are called **crustaceans**. They include invertebrates such as lobster, shrimp, crab, krill, spiny lobster and soldier crab. The hard outer covering is called an **exoskeleton**. The exoskeleton protects the organs inside the animal's body. It also prevents the loss of water from the body. The skeleton does not grow, it **molts**. To molt means to shed the outer body covering.	5. Discuss the laws that govern the catching of the spiny lobster. 6. <u>Group Work</u> Create and label a model of a crustacean using local materials.	Collect visual aids from the Ministry of Fisheries. Resource person from Ministry of Fisheries. Google: Bahamas_ Bahamian Fishing Laws and Regulations – First Class Charters. The Bahamas Handbook 2010 www.bahamasvacationonline.com/fishing_regulations.htm www.seachoice.org/profile/103 www.floridasportsman.com>Reions	IV. Explain why the crawfish/spiny lobster are protected by law. Display photos and other visuals that illustrate how the crawfish is caught legally and illegally. Infer how the crawfish protection laws affect its price and proliferation. Use model for discussion and display.

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 5
SCOPE OF WORK

TOPIC: INVERTEBRATES **STRAND 1: CHARACTERISTICS OF ORGANISMS**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	Crustaceans use gills to breathe and they reproduce by laying eggs. The eggs are laid in water and young crustaceans that hatch do not look like the adult. As they grow, their bodies change until they resemble the adult. Most crustaceans spend all their time in water but some crabs live all their adult lives on land. Crabs are the most common land crustaceans found in The Bahamas. The largest crab population is found on Andros. Black and pond crabs are used for food. The spiny lobster and crab are sold locally but the spiny lobster is an Export - sold abroad to help bring money into the Bahamian economy. The spiny lobster is protected by law and can only be captured during the crawfish season August 1st to March 31st.		www.mainelobstermen.org/news.asp?page=oEsec=MLCP	

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 5
SCOPE OF WORK

TOPIC: INVERTEBRATES **STRAND 1: CHARACTERISTICS OF ORGANISMS**

LIFE SCIENCE

<table>
<tr><th>LEARNER OUTCOMES</th><th>CONTENT</th><th>ACTIVITIES</th><th>RESOURCES</th><th>METHOD OF ASSESSMENT</th></tr>
<tr>
<td>1. Explain the characteristics of mollusks.

2. Identify invertebrates that are mollusks.

3. Classify mollusks as no shell, one shell and two shell types.</td>
<td>A mollusk is an invertebrate that has a soft body.
One trait/characteristic that most mollusks share is a body that has 3 parts: head, foot and body mass. Sense organs are found in the head. The foot is used for crawling, swimming or digging. The body mass contains the heart and other organs.
A mantle covers the organs. The mantle is a fleshy covering that protects the organs. In most mollusks the mantle produces materials that form one or two shells.
The conch, octopus, squid, snail and oyster are examples of mollusks.
There are 3 types of mollusks.
<table>
<tr><th>No Shell</th><th>One Shell</th><th>Two Shell</th></tr>
<tr><td>Slug
Squid
Octopus</td><td>Conch
Snail
Curd
Whelk</td><td>Oyster
Clam
Mussel
Scallop</td></tr>
</table>
No Shell
These mollusks have no shell covering the outside of its body.</td>
<td>1. Examine a conch specimen and identify its characteristics and body parts.

Create a conch life cycle wheel.

Listen to the song ‘We love we Conch So’ by Phil Stubbs and answer six to ten questions related to it.

2. Identify mollusks from a variety of animal pictures.

Design a pamphlet on mollusks found in the Bahamas/ and other parts of the world. Create a model of one of the mollusks and explain why it is a mollusk.

3. Collect data on the grade 5 favorite conch dishes and present this information in a pie chart.

Create and present a short skit demonstrating the cultural and economic value of the queen conch.</td>
<td>Science Horizons Bk. 5

www.biologycorner.com/bio1/notes-mollusks

Treasures in the Sea

Harcourt Science Bk. 6

www.butterflyrevolt.com/characteristics-ofmollusks.html

Modern Science for the Caribbean Bk. 5

CD – “Conch Aint Gat No Bone”

Treasures in the Sea

www.scilinks.org/harcourt
The Animal Kingdom Mollusks</td>
<td>I & II. Create a fact box on Mollusks. (individually or group work)
– Make a list of facts on mollusks. (10-12)
– Use aquapure 5 gallon bottle covers to draw circles on white paper.
– Outline each circle with a marker.
– Write a fact on each circle.
– Cut out each circle.
– Place the circle inside the 5 gallon cover.
– Decorate a box and label it ‘Facts on Mollusks’ to store covers in.
(If bottle caps are not available, use cardboard).
I. Explain the characteristics of mollusks.

III. Develop slogans to tell/explain the impact of the queen conch on the culture and economy of The Bahamas.</td>
</tr>
</table>

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 5
SCOPE OF WORK

TOPIC: INVERTEBRATES **STRAND 1: CHARACTERISTICS OF ORGANISMS**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
		Invite a resource speaker to speak on the usefulness of the conch shell, conch body parts and conch harvesting areas in The Bahamas.		
4. Explain the impact of the queen conch on the Bahamian economy	One Shell These mollusks have one shell. The shell has a 'trapdoor' covering the opening. The animal can pull its head back into the opening and shut the trap door. In this way, the animal is protected from enemies. Two Shells These mollusks have a double shell that is hinged. They get their food by filtering it from the water. Tube like parts are used for feeding. The queen conch is one of the largest marine snails. It is used for food. It feeds on algae found on seaweed, sand and floating organic debris. The queen conch also has an important cultural and economic role in The Bahamas. It is vulnerable to over fishing because it matures and moves slowly.	4. Interview vendors from Potter's Cay, local docks and Fish Fry about sales and favorite meals.	www.youtube.com www.nmfs.noda.gov/pr/species/.../queenconch www.enchantedlearning.cpm/subjects/.../Conchprintout.shtml Conch Life Cycle poster Queen Conch Poster *Science Horizon* Bk. 5 *Harcourt Science* Bk. 6	IV. Debate whether or not it is important to conserve the queen conch.
5. Analyze ways to preserve and conserve the queen conch.		5. Classify mollusk pictures as no shell, one shell and two shell types. 6. Research information on conchs other than the queen conch. Investigate • Cleaning conch • Removing conch from the shell • How to clean a conch • Life Cycle of the Queen Conch		V. Classify a variety of mollusk pictures.

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CURRICULUM GUIDELINES
GRADE 5
SCOPE OF WORK

TOPIC: INVERTEBRATES **STRAND 1: CHARACTERISTICS OF ORGANISMS**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Explain the characteristics of stinging-cell animals.	**Stinging-cell animals** have stinging cells that contain poisonous threads. The body is shaped like a hollow sac. The opening or mouth of the sac is surrounded by **tentacles**. A tentacle is an arm-like part that contains the stinging cells. **Stinging cells** help protect the animal and catch food. Stinging cells work when a small animal brushes against a tentacle. The poisonous threads are released from the stinging cells. The poison stuns or kills the animal. The tentacles then bring it into the mouth. Stinging-cell animals include jellyfish, hydra and sea anemone.	1. View pictures/photos and identify the characteristics of stinging-cell animals. Identify stinging-cell animals-jellyfish, hydra and sea anemone. Observe a video/power point presentation illustrating the feeding behaviour of stinging-cell animals. Discuss its content.	*Science Horizons* Bk. 5 *Harcourt Science* Bk. 6 www.youtube.com Killer sea anemone attacks poor crab Hydra feeding Hydra.1 Hydra (budding) reproducing Giant jellyfish Portuguese Man of War (Blue Bottle)	I. Complete a worksheet related to the characteristics and identification of stinging-cell animals. Complete Venn Diagram to show comparisons among stinging cell animals.
2. Identify invertebrates that are stinging-cell animals.		2. Create and play a game emphasizing the content of stinging cell animals. 3. Visit "The Dig" at Atlantis.		II. Create a mural exhibiting stinging-cell animals in their natural habitat.

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TOPIC: INVERTEBRATES **STRAND 1: CHARACTERISTICS OF ORGANISMS**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Define the term vector.	Organisms that spread germs and diseases are called **vectors**. Insects such as flies, mosquitoes and cockroaches transfer germs and diseases to human beings from infected sites. When vectors feed, they come into contact with germs which they carry about in their stomachs, or attached to the hairs on their legs and bodies. Mosquitoes transmit the germs that cause **dengue fever**. This happens when a mosquito sucks the blood of an infected person then puts this blood into a healthy person when it tries to take blood from that healthy person. Mosquitoes must lay their eggs in water. Because of this, we can reduce their chance of producing young mosquitoes by removing empty containers and other items that trap water, by draining ponds and swamps and by spraying areas where they breed with insecticides.	1. View a PowerPoint presentation on vectors.	School Health and Family Life education Curriculum Module – Reducing Pests and Insects Vectors www.youtube.com Mosquito eggs hatching Mosquito Life Cycle Housefly from egg to adult in 14 days The Housefly	I. Collect vectors in glass or plastic jars with the supervision of an adult. View these using hand lenses and microscopes to observe oral parts.
2. Identify invertebrate vectors.		2 & 3. Tour the school and schoolyard and identify places where vectors can breed and proliferate. (These places can be listed or photographed.)		II. Display and label with the uttermost caution and care dead vector specimens.
3. Describe characteristics of invertebrate vectors. (insects)				III. Manipulate pictures to correctly sequence the life cycles of vectors.
4. Explain how vectors affect the health and well-being of Bahamians.		4 & 5. Have a resource person speak to the class from the Ministry of Environmental Health or doctor to speak on diseases contracted from vectors and their treatments.		IV & V. Create an information pamphlet to communicate vectors in our community, the diseases they transmit and possible treatment for disease.
5. Describe diseases caused by invertebrate vectors and their treatments.				
6. Discuss ways to eliminate vectors.		6. Observe and record the amount of garbage collected at school and home, how often the garbage is removed from the classroom and the home and the conditions under which they are disposed of. How often the garbage is removed by Ministry of Health or private firms can also be recorded. Students compare their results.		VI. Create and display on a chart "Effective ways to eliminate vectors". or Create a brochure informing persons of: – What are vectors – What contributes to the proliferation of vectors – Ways to eliminate vectors.

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LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	Flies can only take in food in liquid form but they feed on anything including garbage, rotting food, faeces and dead bodies. They vomit on solid foods to turn them into liquids before sucking them up. When flies feed, germs stick to their bodies and if they land on our food, some of the germs drop off. When we eat this food, germs enter our bodies and make us sick. Flies lay their eggs in the substances they feed on. To prevent the increase in the fly population, we must reduce their chances of laying eggs. To do this, we must dispose of all garbage properly, disinfect all garbage containers regularly, cover food stuffs properly at all times and have dead bodies and refuse removed responsibly by the Ministry of Environmental Health. Cockroaches live in damp, dark, dirty places. They feed on almost anything including the food we eat and they spread germs and diseases in the same way that flies do.	6. Devise a plan to discard, destroy or eliminate the things that cause vectors. Investigate the effectiveness of insecticides on vectors.		

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TOPIC: INVERTEBRATES STRAND 1: CHARACTERISTICS OF ORGANISMS

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	By keeping our environment clean, litter free, and disposing of garbage properly, we can prevent the breeding and **proliferation** of vectors.			

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LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Explain instincts that help animals meet their needs.	An **instinct** is a behaviour that an animal begins with. Instincts are adaptations that help animals meet their needs. The monarch butterfly files south for the winter. It goes to places where they have the food and climate it needs to survive. The behaviour or action of flying south is not something monarchs have learned. It is an instinct. Some animals travel long distance to meet their needs. E.g.: the female Atlantic green turtles go to Ascension Island to lay their eggs in the sand on the beach. The turtles do not learn from other turtles where the feeding areas are or how to get to Ascension island. They know by instinct where to go. This type of instinct is called **Migration**.	1. Examine pictures of animals from charts, photos, powerpoint presentation and explain how instincts help them meet their needs.	*Harcourt Science* Bk. 4 www.si.edu/harcourt/science www.scilinks.org/harcout www.nationalgeographics.com Grizzly mom teaching her cubs (video)	I & II. Complete a project on Behavioural Adaptations of Animals
2. Explain two examples of learned behaviour.		2. Manipulate pictures and word cards to match animals that migrate and those that hibernate.		
3. Differentiate between instinct and learned behaviour.		3. Use a globe or map to measure and trace the migration path of monarch butterflies from Minneapolis to Mexico City. (Research to obtain info for this activity.) Identify butterflies in your environment/Research to explain their origin. Differentiate between instincts and learned behaviours from a list of behaviours (scenarios).	*The Atlantic Green Turtle* OR *Harcourt Science* Bk. 4 www.youtube.com Green turtles Baby sea turtles hatching	III. Explain the term instinct and give examples of types of this behaviour.
4. Identify animals that migrate and hibernate.		4. Create a nest using twigs, leaves, cotton, bones and paper. It must be sturdy and not fall apart when handled. Groups discuss their difficulties and methods to accomplish this activity.	*Harcourt Science* Bk. 4 www.youtube.com Black bear and cubs in hibernation – BBC Wildlife	IV. Writing-Suppose you are an animal that migrates in the spring and fall. Tell what kind of animal you are, where you live in the summer and where you spend the winter. Describe the things you might do and see as you travel.

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	It is the movement of a group of one type of animal from one region to another and back again. It is a behavioural adaptation. Other animals that migrate are pectoral sandpiper, gray whales, pacific salmon. **Hibernation** is a period when an animal goes into a long, deep 'sleep'. An animal prepares to hibernate by eating extra food and finding shelter. During hibernation, the animal's body temperature drops and its breathing rate and heartbeat rate fall. As a result, the animal needs little or no food. The energy it does need comes from fat stored in its body. Animals that hibernate – squirrel, bears and bats. Some animal behaviours are not instincts. They are learned. E.g.:- how to hunt, sound to communicate with each other, how to build homes, how to eat certain foods. i.e.: crack open a nut.	4. Observe the video Monarch migration and answer questions related to it. Harcourt Science Newsroom Video Observe and photograph unusual birds in students' backyards, near bodies of water and bushes. Report findings.		

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CURRICULUM GUIDELINES
GRADE 5
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TOPIC: HEALTH **STRAND 1: STRUCTURE AND FUNCTION IN LIVING SYSTEMS**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Identify parts of the skeletal system.	The **skeleton** is made up of all the bones in the body. There are about 206 bones in the body of an adult human. The skeleton has 3 functions. It supports the weight of the body, enables it to move and protects vital organs.	1. Construct a 3D model of the skeletal system using Styrofoam plates. Identify the bones of the skeleton. Collect, identify and display a variety of bones.	*Harcourt Science* Bk. 4 *Harcourt Health and Fitness* Bk. 5 *Science Horizons* Bk. 5	I. Assemble a skeletal puzzle. Label the skeleton. Identify and name joints of your body. Illustrate how the various joints work.
2. Explain the function of the skeletal system.	The **skull** protects the brain and forms the shape of the face. The **spine** is made up of **vertebrate** that support and protect the spinal cord. The ribs protect the heart, lungs and other organs in the chest cavity. Bones are made of different kinds of tissues. Some bones are hollow. These are light and strong. The outer part of bones is made of hard bone tissue. The hardness is crystals of calcium.	2. Examine a chicken leg quarter, identify the muscle, bone, cartilage and ligament. 2 &3. Measure the mass and length of a variety of bones.	*Science Horizons* Bk. 5 *Science Horizons* Bk. 5	II. Draw a picture to show what your body would look like if you had no skeleton. Present drawing to the class and explain possible adaptations for movement and other functions.
3. Explain why different parts of the bone are important.		3. Examine a chicken bone (leg/drum stick) and identify its parts. Compare the bones of fish and chicken. Discuss similarities and differences between these and the human skeleton. Compare the x-ray picture of a baby's bones, bones of someone about your age and bones of an adult. Discuss findings.	Doctors Hospital or P.M.H. Radiology Department Family Island Clinic *Your Health* Bk. 3 Harcourt/Brace www.youtube.com Skeletal System	III. Identify the skeletons of other animals.

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4. Infer how proper nutrition and exercise are related to good skeletal health.	Where two bones meet is called a **joint**. They are held together by connective tissue called **ligaments**. The ends of all bones are coated with a layer of rubber-like tissue called **cartilage**. This cushions bones and helps them to move against each other smoothly. There are four common types of joints found in the body that allow movement and one that does not. These joints are:- **Hinge Joints** – Allow bones to move against each other like the hinges on a door. These allow joints to flex (bend) and extend (straighten out). E.g.:-knee, elbow and fingers. **Ball and Socket Joints**- Allows joints to move in a circle (rotate). E.g.;- shoulder, hip, ankle and wrist. **Pivot Joints** – Allow joints to move from side to side. E.g.:-neck	4. Experiment to show what happens when calcium is removed from bones. Observe a selection of pictures. Discuss good health practices.	The Human Skeleton www.brainpop.com Health Body Systems (models) *Harcourt Health and Fitness* Bk. 5	IV. Identify calcium enriched foods from a selection of visuals.

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LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	Plane Joints - Allow joints in the hand to glide over each other and allows the spine to bend and twist. **Suture Joints** – do not allow movement. These are called **immovable joints**. E.g.: skull. Calcium helps bones grow strong and healthy. Dairy products contain calcium. E.g.: milk, cheese and yogurt. Dark green vegetables also contain calcium. E.g.: spinach broccoli and collard greens. Exercise makes bones healthy. Sitting up straight with good posture, and never sitting slumped over also keeps bones healthy and makes them grow and develop properly.			

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LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Explain the functions of the muscular system.	The **muscular system** is made up of muscle tissue. The cells which muscle tissue is made of are able to change their lengths by **contracting** and **relaxing**. Muscles are found throughout the body and are responsible for **movement**. There are 3 types of muscles. **Skeletal Muscles** These muscles move the limbs and other parts of the body. They are stretched across the bones. These muscles can only pull on bones and must work in pairs. When muscles contract, they pull on the bones to which they are attached causing the bones to move. **Smooth Muscles** These muscles line the organs of the body. E.g.: kidneys, stomach, intestines. **Cardiac Muscles** These muscles are only found in the heart.	1 & 2. With a partner, flex body parts to observe how muscles move.	*Harcourt Science* Bk. 4 *Harcourt Health and Fitness* Bk. 5 *Science Horizons* Bk. 5	I-III. Complete a crossword puzzle emphasizing the concepts of the muscular system.
2. Identify parts of the muscular system and explain its function.				I-VI. Complete a worksheet on the muscular system with a minimum accuracy of 75%. Have students make arm models using cardboard and rubber bands to demonstrate how muscles work in pairs.
3. Classify muscles as skeletal, smooth and cardiac.		3. Identify the 3 types of muscles in a variety of visuals and poultry specimens. Examine type of muscles under a microscope and draw results. Compare with classmates.		
4. Explain why muscles must work in pairs.		4. Explore Together: What happens when you overwork your muscles? Examine a picture of the brain and locate the cerebellum.	*Science Horizons* Bk. 5 *Science Horizons* Bk. 5 *Harcourt Health and Fitness* Bk. 5	
5. Demonstrate how skeletal and muscular systems work together.		5. Examine the muscles of a body builder as he/she explains how the skeletal and muscular systems work together.	*Harcourt Health and Fitness* Bk. 5	V. Explain how the skeletal and muscular systems work together.
6. Infer how proper nutrition, rest and sleep are related to good muscular health.		6. Design weights to assist with exercising muscles. E.g.: bags with sand, gallon plastic bottles with water.	*Your Health* Bk. 3 Harcourt/Brace *Harcourt Health and Fitness* Bk. 5	VI. Create and present warm up and cool down routines – group work. Infer why it is important to include warm up and cool down time when you exercise.

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TOPIC: HEALTH **STRAND 1: STRUCTURE AND FUNCTION IN LIVING SYSTEMS**

	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE		Muscles are connected to bones by **tendons**. Tendons are connective tissue which is unable to stretch. The muscular and skeletal systems work together to cause movement in the body. Dairy products, fruits and vegetables contain calcium and other minerals that are used by muscles when they contract. Milk, meat, fish and eggs contain proteins. Proteins help build muscle tissues. Breads and cereals provide energy that muscles need to move bones. Exercise helps muscles to become stronger. Rest and sleep also keep muscles healthy.	6. Visit a gym to investigate how various machines and equipment affect the growth and development of specific muscles/parts of the body.	www.youtube.com Muscular System Structure and Function How the Body Works Skeletal Muscles. *Harcourt Health and Fitness* Bk. 5	VI. On a template of the human body, create a collage of pictures from magazines and other sources that keep the muscles strong and healthy or illustrate healthy habits.

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LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Describe how personality, relationship and self-concept affect mental and emotional health.	You may think that you are too short, tall, thin or heavy. Keep in mind that all people are different and they grow and develop in their own ways. Having a realistic body/self image is important. A poor self concept/body image can lead to unhealthy behaviours. Some people, especially girls, become overly concerned about their self image and develop serious eating disorders. People grow especially quickly between the ages of ten and twenty. During these years your body needs plenty of nutrients of every kind. Between these ages, people begin to cut back on the amount of food they eat. Boys hoping to build muscles eat foods rich in protein but lacking carbohydrates. Girls avoid all foods they think are fattening, including calcium-rich dairy products.	1. Look into a hand or wall mirror. Say: I am special because… Explain your best attribute Say I am not perfect because… Explain something about yourself that needs to improve. Explain activities/attitudes when in their cliques. Discuss how you feel alone, with family or in your clique. Explain why.	*Harcourt Health and Fitness* Bk. 6 www.youtube.com Food Pyramid Video The NEW Food Pyramid *Harcourt Health and Fitness* Bk. 5	I. Complete a Photo Essay – Gather and organize information to show growth and development over the years. – Describe changes in physical appearance and personal traits. – Indicate photos that made you feel good about yourself and bad/sad. Explain why.
2. Investigate eating habits, disorders and how they affect health.		2. Identify commercials on TV or in magazines that make students feel uncomfortable, or inadequate, happy, comfortable or adequate. Explain why.		II. Keep a log of the food choices you make each day for one week. Note how many times you practice self control. Look for trends between how you feel and what you eat. Are you making more food healthy choices? Students compare/discuss logs.
3. Explain how good eating habits enhance healthy growth and development.		3. In groups, make a chart of a Food Drum Guide.		III. Create a balanced meal for breakfast, lunch and dinner. Use paper plates, and pictures from magazines and other sources. If a beverage is to be included, a plastic or Styrofoam cup can be used to paste/glue the selected visual on.

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LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	A **nutritional deficiency** is the lack of a certain nutrient in the diet. These deficiencies can cause **anemia** – lack of iron – the blood carries less oxygen than the body needs. If you take in more food than your body needs, the body stores it as **fat**. Being overweight can damage your health. Overweight or obese people can develop high blood pressure, heart disease and Type 2 diabetes. As your body develops and changes, so does your relationships with your parents and friends. Sometimes young people form **cliques** or groups of friends who exclude others from joining. Being a part of a clique can help you feel a sense of belonging and support. Cliques can be harmful if they encourage unhealthy behaviour. To help your body work at its best, you need to eat a balanced diet. A **balanced diet** is a diet of a variety of foods that give the body all the nutrients it needs.		www.brainpop.com *Health Nutrition Personal Health* *Harcourt Health and Fitness* Bk. 5 *Health and Fitness* Bk. 6 *Harcourt Health and Fitness* Bk. 5	

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LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	Vitamins help important chemical reactions take place in your body. Your body needs **water** most. Water helps: – Transports nutrients to all the cells of the body – Builds new cells – Keeps body temperature stable – Helps carry waste out of the body – Keeps joints moving smoothly You should drink 6-8 glasses of water a day. **Fiber** helps food move through the digestive system and prevents some forms of cancer. Carbohydrates, fat, proteins, mineral and vitamins are five basic groups into which food can be placed according to what we get from them.			

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TOPIC: PLANTS **STRAND 1: STRUCTURE AND FUNCTION IN LIVING SYSTEMS**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Describe the process photosynthesis.	Plants make their own food by a process called **photosynthesis**. During this process, plants use light energy to change **water** and c**arbon dioxide** into **sugar**. Sunlight is taken in or **absorbed** by **chlorophyll** in the leaves and other green parts of a plant. Chlorophyll is a chemical found in special structures in plant cells called **chloroplasts**. Water is transported from the roots to the leaves and stems and carbon dioxide enters the plant through tiny openings in the leaves called **stomata**. The food made is called sugar/glucose. Oxygen is released into the air. **Indigenous** plants are those plants that are native to The Bahamas.	1. Experiment to show that sunlight affects photosynthesis. Investigate how plants use leaves. 1-4. Invite a resource person to speak about the uses of bush medicines, indigenous plants and conservation of plants.	*Harcourt Science* Bk. 4 *Harcourt Science* Bk. 5 British American Insurance Calendar 2004 & 2005 Bahamas National Trust *Science Horizons* Bk. 4-5	I. Draw a model of a plant and label its major parts. Indicate on the model how the various parts work together during the process of photosynthesis. Have students create a recipe card for photosynthesis. They will: - List the ingredients and amounts needed. - Provide a clear set of directions explaining how the ingredients are combined and determine the energy source and the results obtained if the recipe is followed properly. Include diagrams and pictures to illustrate the process and ingredients used.
2. Identify indigenous plants of The Bahamas. 3. Identify medicinal plants and their uses.		2 & 3. Create a containerized garden of indigenous and medicinal plants. – Press dry samples of medicinal plants.	*Harcourt Science* Bk. 4 *Harcourt Science* Bk. 3 www.bahamasnationaltrust.org www.answers.com/topic/herbalism	II. Name indigenous plants from a set of pictures. III. Create a reference book of plants and their medicinal uses.

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LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
4. Describe ways to conserve plants.	These include lignum vitae, gale of wind, life leaf, pigeon plum, goose berry, rooster comb and fever grass. A variety of plants found in The Bahamas have medicinal value. **Medicinal plants** are referred to as **bush medicine** in The Bahamas. Popular plants used for health purposes include cerasee, rooster comb, life leaf, love vine and aloe. They are used to treat a variety of ailments including worms, high blood pressure, diabetes, diarrhea, asthma and gas. Plants are very important to us. We use materials we get from plants for food, making clothing, construction of homes, boats and shelter and for making tools and weapons. As the human population increases, people clear land to build new roads, farms, houses, shopping centres, malls, airports and other infrastructure. These actions change the natural environment and can result in the loss of many plant groups.	4. Discuss ways to conserve plants. 5. Take photos of a number of indigenous plants.	www.bahamasnationaltrust.org Bush Medicines Local Plant Nurseries	IV. Define conservation and explain the importance of conserving plants. Make a list of 20 foods you eat that come from plants. Identify how many of these foods come from roots, stems, leaves, fruits, seeds and flowers. Make a bar graph from your list. Create a booklet on "Conserving native plants".

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TOPIC: PLANTS **STRAND 1: STRUCTURE AND FUNCTION IN LIVING SYSTEMS**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	Plants that are at risk of extinction in The Bahamas are called endangered plants. Lignum vitae, mahogany (Madeira) and the Caribbean pine are endangered indigenous plants. To save plants, we must conserve them. Conservation is the wise use and careful management of resources. The act of conserving plants is to do all we can to protect them from becoming extinct. Ways to conserve plants are:- a. Plant endangered plants in your garden and in their natural habitats. b. Buy native plants instead of non-native ones. c. Do not cut or burn down native plants. d. Do not use endangered plants for building or any form of money making. e. Volunteer at organization such as BNT to help to protect plants in The Bahamas. f. Recycle, reduce, reuse			

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CURRICULUM GUIDELINES
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TOPIC: ECOLOGY **STRAND 1: ORGANISMS AND THE ENVIRONMENT**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Define ecosystem.	An **ecosystem** is an environment where living and nonliving things interact and affect each other. Everything on earth is dependent on **radiant** energy. Radiant energy from the sun reaching the earth is converted into different forms of energy as it flows through an ecosystem. Each species in an ecosystem lives in a habitat, the part of an environment in which an organism lives and has a niche which describes how it fits into the ecosystem. All organisms need energy. An animal that feeds on other living animals is called a **predator**. They are consumers that eat other consumers. E.g.: wolves, coyotes, frogs, eagles, owls, sharks, insects. The animals predators eat are called **prey**. Some predators are also prey. Insects that eat smaller insects may be eaten by birds. Those birds may be eaten by larger birds or other mammals such as foxes. Ecosystems also include animals called **scavengers**.	1. Go on a field to a nearby beach. Observe and record living and nonliving things found in various ecosystems-tidal pools, sandy shore. Compare and contrast various ecosystems.	*Harcourt Science* Bk. 3 *Harcourt Science* Bk. 5	I. Identify and name the various types of ecosystems from a group of pictures cards/ powerpoint presentation.
2. Explain the interdependence of living and nonliving elements of an ecosystem.		2. Manipulate a variety of pictures and identify predators, prey and scavengers.	*Harcourt Science* Bk. 6	II-IV. Observe the food web- (*Treasures in the Sea*, p. 126) identify predator, prey and scavengers. Create food chains using organism cards in the food web.
3. Identify three different groups (predator/prey and scavenger) in an ecosystem.		3. Construct food chains and food webs with the addition of other pictures. Discuss predator, prey and scavenger relationships that students have observed in their communities.	*Harcourt Science* Bk. 6 *Harcourt Science* Bk. 5 *Treasures in the Sea*	
4. Explain components of food chains and food webs.		4, 5 & 6. Construct posters that promote the conservation of water, fisheries and electricity.		
5. Define resources.				V-VIII. Explain the importance of water, fisheries and electricity as resources. Describe at least one way to preserve each.
6. Identify water, fisheries and electricity as resources.				V. Collect materials from the school and home environment and use them to demonstrate the difference between reusing and recycling.

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 5
SCOPE OF WORK

TOPIC: ECOLOGY **STRAND 1: ORGANISMS AND THE ENVIRONMENT**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
7. Describe ways to conserve resources. 8. Define preservation.	These consumers eat the remains of animals that have died. E.g.: vultures, jackals, hyenas. The interactions between predators and prey affect the populations of those animals. A large number of preys can feed a large number of predators. When the population of prey decreases, however, it can no longer feed as many predators. The population of predators then decreases. The movement of energy from organism to organism can be shown in a **food chain**. A **food web** shows the overlapping food chains in an ecosystem. It shows more clearly how energy moves. Some energy is lost each time energy passes from one organism to another. A **resource** is a material that living things use.	7 & 8. Set up a reusing and recycling program to promote environmental awareness and stewardship.	*Harcourt Science* Bk. 4 and 5 *Science Horizons* 4 and 5	
9. Explain the importance of preserving national parks.		9. Research information on the names and locations of our various marine parks. E.g.:-Exuma Cays Land and Sea Park and Central Andros National Parks Discuss the impact these protected areas have on the marine life and ecosystems they preserve. Students role-play a community meeting in which the topic is whether or not to protect a coastal habitat.	50 Things you can do to save the Earth 50 Things Kids can do to save the Earth *Treasure in the Sea* Bahamas National Trust *Treasures in the Sea* www.thebahamasnationaltrust.org/parks.php www.bahamas.gov.bs/BahamasWeb/vistingTheBahamas.nsf/subjects/National+Parks www.youtube.com Ecosystem Dynamics Predator vs. Prey 1	IX. On a map of The Bahamas, indicate the location and description of at least two parks or sanctuaries. (Trace these on sample maps) **OR** Students list pros and cons for protecting the coastal habitat. A minimum of three pros and cons is required. (Use concept maps to communicate this information.) **OR** Create a poster or information pamphlet to share why it is important to conserve resources.

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CURRICULUM GUIDELINES
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SCOPE OF WORK

TOPIC: ECOLOGY **STRAND 1: ORGANISMS AND THE ENVIRONMENT**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	Water, fisheries and electricity are resources that are vital to our existence. **Water** is an inexhaustible resource. Even polluted water can be used again if it is cleaned. Earth's processes help clean water. Fresh water is a limited resource that people need to conserve and keep clean. People need water everyday for drinking, cooking, bathing and cleaning. Factories and farms use water to make products people need.		www.brainpop.com Food Chains OR www.youtube.com Video Tour 9: Food Chains Bill Nye the Science Guy: It's the Food Web www.brianpop.com Science Ecology and Behaviour	

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CURRICULUM GUIDELINES
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TOPIC: ECOLOGY **STRAND 1: ORGANISMS AND THE ENVIRONMENT**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	Fisheries are an essential resource. About 75% of the world's fish catch is used for human consumption. The demand for seafood has been rising globally due to increased awareness of seafood's healthy properties. Many medicines contain compounds derived from marine plants. The ocean provides goods, services and employment to millions of people around the world, e.g. snorkeling, diving and sports fishing. The principal commercial fisheries in The Bahamas are crawfish, conch, shallow water scale fish-grouper, jacks, snappers and grunts and deep water scale fish-red snapper. Fisheries are threatened by habitat loss, over fishing, pollution, introduction of non-native or exotic species, invasive fish species and climate change. Electricity is a form of energy and is another essential resource. This resource is vital because it is used to operate appliances, and make our lives more enriched.			

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TOPIC: ECOLOGY **STRAND 1: ORGANISMS AND THE ENVIRONMENT**

	LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE		**Conservation** is the wise use and careful management of natural resources. Resources can be conserved by: - developing projects that are eco-friendly-maintains relationships in an ecosystem. Disposing of waste, garbage and refuse properly. Making laws to protect the environment. Engaging in activities such as reducing, reusing and recycling unwanted materials. Restoring damaged ecosystems. Reintroducing animals that once lived there. Turning off appliances when not in use. Investigating other forms of energy that can replace electricity. Protection of marine resources may take the form of – education of students about the importance of marine biodiversity, – foster a conservation ethic, habitat protection and restoration, – regulations and enforcement of laws as they relate to the protection of marine life and ecosystems.			

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CURRICULUM GUIDELINES
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TOPIC: ECOLOGY

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LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	Preservation is the protection of an area. In The Bahamas, the Government helps to preserve ecosystems by making laws and setting up protected areas. Marine protected areas are some of the main methods for protecting marine ecosystems and species that depend upon them. These include **Marine Parks** or **Sanctuaries, No-Take Reserves** and **Fully Protected Marine Reserves**.			

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 5
SCOPE OF WORK

TOPIC: EARTH **STRAND 2: PROPERTIES AND STRUCTURE OF EARTH'S SYSTEMS**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Define earth resources.	Any useful minerals and other materials that people take from the earth is called an **earth resource**. The ocean is an important source of resources. Ocean waters are filled with huge amounts of plants and animals. Among the ocean's most important resources are its **Fish** and **Shellfish**. Popular seafood include:- Fish Grouper, Snapper, Jacks, Grunt, Google Eyes, Bonefish Barracuda Mollusks Conch Curds Whelks Crustaceans Crawfish Shrimp Crab	1. Have a fisherman speak to the class. 2. Create a recipe using fish, mollusk or crustacean.	*Harcourt Science* Bk. 5 *Science Horizons* Bk. 5 www.earthresource.org/ www.erwater.com/	I. Create book marks emphasizing a. ocean resources b. ocean pollution/solution c. conservation of the ocean. nationalgeographics.com print'n'go Colouring book I-VI. Create a log on ocean resources and pollution effects on marine life conservation.
2. Identify ocean resources.		2. Conduct research and mount a mini exhibition giving focus to resources from the sea. Experiment: Forming fresh water from salt water *Harcourt Science* Bk. 4	*Harcourt Science* Bk. 4 marinebio.org/oceans/ocean-resources.asp *Harcourt Science* Bk. 5	II. Find ways to use resources from the ocean that are usually discarded/thrown away. E.g.:- conch shells for decorations scales for jewelry.
3. Identify pollutants and explain how they affect marine life.		3. Create an oil spill in an aquarium and have students experiment to find the best ways to clean it up.	*Science Horizons* Bk. 5 *Science Horizons* Bk. 4 library.thinkquest.org/04oct/00116/mainpageashley.htm	III, IV & V. Students draw two beach scenes, before and after an oil spill. They label the scenes indicating at least three examples of how marine life is affected by the spill.

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TOPIC: EARTH **STRAND 2: PROPERTIES AND STRUCTURE OF EARTH'S SYSTEMS**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
4. Suggest strategies that avoid polluting the ocean. 5. Explain ways to conserve the ocean.	Sea plants are another resource. Plants such as seaweed and kelp are used as food. They are also used in products such as hand creams, toothpaste and fertilizers. The ocean floor contains many minerals. Gas and oil are buried deep beneath the ocean floor and sea water itself is an important resource. Pollutants that affect the ocean are: Paper towels card board boxes Cotton rope 6 pk Rings Plastic jugs Fishing lines Human waste Tin cans Diapers Oil slicks Fertilizers Wood Styrofoam cups/buoys Aluminum cans Pollution affects marine life in very harmful ways.	5 & 6. Find ways to use resources from the sea that are usually thrown away. E.g.: conch shells, fish scales etc. 6. Write letters to cruise ship companies informing them of concerns about the pollution of the ocean Take action for our Oceans!	*Treasures in the Sea* www.oceanconservancy.org/-21hoursago www.oceanconserve.org/ *Treasures in the Sea* www.brainpop.com Science Our Fragile Environment Scientific Inquiry	Students will research an environmental or ocean issue, take a position on the issue and write a formal letter to an elected official voicing their position either in support or opposition. Research the recent oil spill in the Gulf of Mexico – Develop REACTION PAPER – on how this affects marine life. Create a model of an ocean free from pollutants. Explain what economic impact this would have on a community.

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TOPIC: EARTH **STRAND 2: PROPERTIES AND STRUCTURE OF EARTH'S SYSTEMS**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	Fertilizers and detergents contain phosphorus. Phosphorus causes algae to grow very quickly. Oceans are also polluted by **natural** means and by humans. People dump waste material into the ocean, and later it washes up on the beach. Often the waste consists of non-biodegradable substances such as plastics. Marine life eats the plastic and strangle. This also occurs in organisms that feed on or near bodies of water. Oil spills are another source of pollution. Oil clean up campaigns – soaked up by substances that absorb oil; spray with detergents that break up oil into droplet; skimmers can be used to remove oil from the water surface; add bacteria that digest oil to the water and the beach.			

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

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TOPIC: EARTH **STRAND 2: PROPERTIES AND STRUCTURE OF EARTH'S SYSTEMS**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	Ocean pollution can be reduced in many ways. – Water can be treated before it flows in to the ocean. – Industries can be more careful about how and where they discard wastes. – Scientists are working to develop new kinds of plastics that are biodegradable. – More substances can be recycled so that they can be reused and not dumped. – We should take every precaution to prevent the pollution of our oceans.			

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TOPIC: EARTH **STRAND 2: PROPERTIES AND STRUCTURE OF EARTH'S SYSTEMS**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
6. Define fossil.	Fossils are the remains or traces of past life found in sedimentary rock. Scientists called **paleontologists** study fossils. Wood, bones, teeth and shells are preserved or saved by being buried. As the sediments harden, the remains become trapped in rock and form fossils. Some fossils show changes long-dead animals made in their surroundings. These are called **Trace Fossils**. Tracks, burrows, droppings and worm holes are some examples of trace fossils. They tell how an animal might have moved, how big or small it might have eaten. A **mold** is an imprint made by the outside of a dead plant or animal. A mold forms when water washes animal or plant remains out of rock. Sometimes sediment or minerals fill a mold and form a **cast**. Whole plants or animals can become fossilized. These can be trapped by sap from trees, glacier ice or tar pits. When fossils are discovered, they are **excavated** and studied.	7. Read and research information on fossils.	*Harcourt Science* Bk. 3 *Harcourt Science* Bk. 4	VII & VIII. Create a story or conduct an interview on fossils and present or record the work for an imaginary radio programme.
7. Describe the process of fossil formation.		8. Investigate how fossils form.	*Harcourt Science* Bk. 5 *Harcourt Science* Bk. 4	VIII. Sequence pictures to analyze the process of fossil formation.
8. Distinguish between types of fossils.		9. Make models of fossils by making prints with leaves, bones, insects etc. in clay or sand mixed with glue. **OR** Cast and Mold Investigation Investigate the making of 'Lost-Wax Casting' Fossil Activities For Kids www.fossils-facts-and-funds.com/fossil_activities.htm/	Google: fossils www.si.educ.harcourt/science *Harcourt Science* Bk. 4 *Science Horizons* Bk. 5 *Harcourt Science* Bk. 4 "Art Link" www.neok12.com/fossils.htm	IX. Identify the different types of fossils from a selection of visuals. Display investigations and other activities and explain to observers how the work was completed. Utilize the 3-2-1 Assessment by having students write three facts that they have learned about fossils, two terms they want to remember, and one question that they have about fossils.

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 5
SCOPE OF WORK

TOPIC: THE ATMOSPHERE **STRAND 2: PROPERTIES AND STRUCTURE OF EARTH'S SYSTEM**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Define atmosphere.	The layer of air that surrounds our planet is called **atmosphere**. The job of the atmosphere is to protect the earth from anything that may fall from the sky. The atmosphere has six layers. 1. **Troposphere** – layer closest to the earth. This is the air we play, work and live in. This is the air we breathe and all weather happens here. 2. **Stratosphere** – the second layer. It contains **OZONE**, a special oxygen that protects earth from Ultraviolet rays from the sun. 3. **Mesosphere** – the third layer and is the coldest layer. 4. **Thermosphere** – the fourth layer and is the hottest layer.	1 & 2. Watch a video presentation on the atmosphere. LRS library	*Harcourt Science* Bk. 4 www.scilinks.org/harcourt Google: Ionosphere *Science Horizons* Bk. 5 *Harcourt Science* Bk. 5 *Science Horizons* Bk. 5 *Harcourt Science* Bk. 3 www.si.edu/harcourt/science *Harcourt Science* Bk. 4	I-VI. Complete a project on the atmosphere and weather.
2. Describe the layers of the atmosphere.				III. Read and interpret a variety of weather maps.
3. Identify conditions that change weather.		3. Create a weather booklet with terms and examples of the different weather conditions.		III-VI. Pretend you are a meteorologist. Give a weather report for one week's weather condition.
4. Describe how weather changes affect people.		4. Collect pictures of children living in different climatic zones. Compare the type of clothing they wear. Construct a model of two countries showing how their climates differ.		IV. Model attire for a specific climatic zone and explain the weather conditions.
5. Measure rainfall using a rain gauge.		5. Record weather conditions from ZNS weather report in a graph; students compare and discuss their findings. Measure rainfall using a rain gauge. Compile data for one week. Record in a graph.		
6. Measure the speed of the wind using a windsock.		6. Investigate how air masses affect weather. Make a windsock to measure wind speed. Record data in a graph.		

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TOPIC: THE ATMOSPHERE **STRAND 2: PROPERTIES AND STRUCTURE OF EARTH'S SYSTEM**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	5. **Ionosphere** begins in the mesosphere and extends upward through the thermosphere. It contains electrically charged particles called **Ions**. This layer plays an important role in making radio and television communications possible. 6. **Exosphere** – the sixth layer. It is also known as outer space. Here the planets, moons, stars and other cestial objects are found. **Weather** is the condition of the atmosphere at a specific time and place. **Conditions** that affect weather are **temperature, air pressure, wind, humidity** and **precipitation**. Weather conditions affect people in many ways. – Food they eat – Clothing they wear – Housing – Transportation – Length of day/night – Storms and other natural disasters Rainfall is measured with a **Rain Gauge**.	5 & 6. Visit the meteorological office to observe instruments, and how officers use them to predict weather. OR Invite a meteorologist to school to speak to his/her work. Research information on weather instruments, and use.	www.brainpop.com Science Weather LRS Video Library (DVD) Severe Weather www.youtube.com Lightning storm *Harcourt Science* Bk. 5 and 6 *Science Horizons* Bk. 5	

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TOPIC: THE ATMOSPHERE **STRAND 2: PROPERTIES AND STRUCTURE OF EARTH'S SYSTEM**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	Wind speed is measured with a **windsock**. The amount of heat in a substance is called **Temperature**. We can measure the amount of heat in a substance by using a **Thermometer**. A thermometer measures heat on a scale called a **Degree**. Two different scales are used on thermometers. One scale is called the **Celsius** scale and the other is called **Fahrenheit**. On the Celsius scale, water freezes at 0^{o} and boils at 100^{o}. On the Fahrenheit scale water freezes at 32^{o} and boils at 212^{o}. Measurements made on the Celsius scale are shown as ^{o}C and on the Fahrenheit scale as ^{o}F.			

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 5
SCOPE OF WORK

TOPIC: SOLAR SYSTEM **STRAND 2: UNIVERSE AND THE SOLAR SYSTEM**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Explain what the solar system is.	The sun and the bodies that move around it form the **solar system**. Planets and moons are part of the solar system. A **planet** is one of the eight large bodies that move around the sun. A **moon** is a body that moves around a planet. Most objects in the solar system travel in orbits around the sun. An **orbit** is a path on which an object travels as it moves around another planet. A planet's orbit is the oval-shaped path the planet travels around the sun. All planets are in motion. They revolve or move in orbits around the sun. The movement of a planet along its orbit around the sun is called **revolution**. A **planet's year** is the time it takes that planet to complete one orbit or one revolution around the sun. Planets rotate or spin like a top. An axis is a straight line that runs through an object. The turning or spinning of a planet on its axis is **rotation**.	1. Create a model of the solar system.	*Science Horizons* Bk. 5 *Harcourt Science* Bk. 4 *Harcourt Science* Bk. 3 *Harcourt Science* Bk. 6 windows2universe.org/our_solar_system/solal_system.htm/ *Science Horizons* Bk. 6 www.kidsnewsroom.org/e/mer/infocentral/space/ www.esa.int/.../SEMF8WVLWFE_OurUniverse_O.html science.nationalgeographic.com/science/space/solar-system	I-II. Think of all the things you have learnt about the solar system. Write a poem describing what makes up the solar system.
2. Identify bodies in the solar system.		2. Create riddles so that students can identify the planets in the models of the planets displayed.		
3. Differentiate between rotation and revolution of planets.		3. Explain/describe the difference between rotation and revolution of planets using a globe and the model in activity 1. (model of solar system)		III. Calculate: Earth spins once every 24 hours. A person standing still on the equator is moving with Earth's rotation at more than 1730 km/hr. How far does he or she move in a 24 hour day?
4. Record the differences between the years on each planet.		4 & 7. Create a place mat on hard card. Use pictures from magazines, internet etc. to make a collage of objects in space on one side. On the other side, draw a table showing the inner and outer planets, distances from the sun, length of year, number of moons and planet rings. Laminate with 3" wide transparent tape. Display.		IV. Create a pictograph showing the differences between the years on each planet.
5. Explain how the sun benefits the earth and other planets.				V. Write and sing a song to your favorite tune about how the sun benefits the earth and other planets.
6. Identify other stars.				VI. Experiment to analyze how scientists learn about the distant stars.
7. Identify and describe other objects in space.				VII. Identify and describe meteoroids, meteors, meteorites, asteroids and comets from a group of pictures.

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TOPIC: SOLAR SYSTEM **STRAND 2: UNIVERSE AND THE SOLAR SYSTEM**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	The time it takes a planet to rotate once on it axis is a planet's day. The time of rotation differs from planet to planet, so, the length of a day also differs. The sun is in the center of the solar system. It is a star. It is 93 million miles away from the earth. Stars are the only bodies that give off radiant energy. It is a ball of burning gases and molten material. The sun provides heat and light to all of the planets. There would be no life on earth if the sun stopped giving off radiant energy. Energy from the sun warms the earth and allows green plants to turn raw materials into food. Gravity on the sun is very strong. This is because of its great size. The entire solar system can fit inside the sun. Gravity is the force of one object's pull on another. The sun's gravity helps hold all the objects in the solar system in place or in orbit. The four closest planets to the sun are in one group. They are called the **Inner Planets**. These planets are **Mercury, Venus, Earth** and **Mars**.	5. Experiment to illustrate why conditions on earth support life.	*Harcourt Science* Bk. 6	
		6. Locate the southern Cross, North Star, Big Dipper, Little Dipper, Orion and as many signs of the Zodiac as you can find on a map of the night sky. Investigate the brightness of stars. Investigate how to make a constellation box.	 *Harcourt Science* Bk. 5 *Harcourt Science* Bk. 4	
		1-6. Visit the planetarium at the Adventure Learning Centre. Visit the Science Museum, Orlando, Florida	*Harcourt Science* Bk. 6 www.brainpop.com Science Space www.youtube.com The Inner Planets	

CURRICULUM GUIDELINES
GRADE 5
SCOPE OF WORK

TOPIC: SOLAR SYSTEM

STRAND 2: UNIVERSE AND THE SOLAR SYSTEM

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	They are: – Closest to the sun – Smallest planets – Have rocky surfaces – Warmer than the other planets – Have no more than 2 moons The four other planets are called **Outer Planets**. They are **Jupiter, Saturn, Uranus** and **Neptune**. They are: – The furthest from the sun – Mostly frozen gases – Surfaces are colder – Have many moons – Have rings of dust and ice around them The sun is the only star in the solar system but there are millions of stars in the universe. We can only see a small portion of them with our naked eyes. Some stars seem to shine brighter than others. This is because they are closer to the earth or because they give off more radiant energy.	www.youtube.com The Outer Planets		

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CURRICULUM GUIDELINES
GRADE 5
SCOPE OF WORK

TOPIC: SOLAR SYSTEM **STRAND 2: UNIVERSE AND THE SOLAR SYSTEM**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	People who study the stars are called Astronomers. Astronomers classify stars by their surface temperatures, colour and brightness. There are several prominent stars that can be seen in the night sky. Some are arranged in the shape of animals and objects. A group of stars such as these is called a **constellation**. Some common constellations are, Southern Cross, Great Dipper, Little Dipper, Orion and the twelve signs of the Zodiac. There are many other bodies found in outer space. The most common is the **meteoroid**. It is a mass of metal or stone moving through space. Sometimes meteoroids fall to the earth. When they enter earth's atmosphere, they burst into fire. The streak of light produced passes through earth's atmosphere and is called a **meteor**. If any part of a meteor survives and reaches the earth, it is called a **meteorite**.			

CURRICULUM GUIDELINES
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SCOPE OF WORK

TOPIC: SOLAR SYSTEM

STRAND 2: UNIVERSE AND THE SOLAR SYSTEM

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	Another object is called an **asteroid**. This is a chunk of rock found mainly between Mars and Jupiter. The asteroid belt orbits the sun. Another space object is the **comet**. Comets are made of rocks, frozen water, frozen gas and dust. When a comet gets close to the sun you will be able to see a long glowing tail or **coma**. This coma consists of particles ejected from the comet as the sun's heat vaporizes the frozen components.			

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

CURRICULUM GUIDELINES
GRADE 5
SCOPE OF WORK

TOPIC: INVESTIGATING MATTER **STRAND 3: PROPERTIES AND CHANGES IN MATTER**

PHYSICAL SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Explain how matter is classified.	Matter can be classified as a **mixture** or as a **substance**.	1. Read from the text to classify matter as mixtures or substances.	*Science Horizons* Bk. 5	I-II. Investigate a variety of substances to identify mixtures.
2. Differentiate between substances and mixtures.	A **substance** is something made of only one kind of matter. A **mixture** is made of two or more different substances. The substances do not change by being mixed. In most mixtures, the kinds of matter may be present in any amount and need not be spread evenly. E.g. conch salad, birdseed, Kool-Aid, cheeseburger, tossed salad, air. Mixtures can be separated easily using our fingers, a sieve, rake or shaking or filtering. A **solution** is a special mixture. It is made up of two different substances. One substance is **dissolved** (melted) in the other substance. The substance that melts is called the **solute** and the substance that does the dissolving is called the **solvent**. When water is added to sugar, a solution is made. The sugar dissolves (the big sugar crystals break into smaller crystals then mix in, but do not combine with the water particles).	2. Create several mixtures. Switch with other groups. Each group examines the mixtures and identify the substances that make them. Experiment to show how to separate mixtures of sand and sugar, sand and stones and sand and iron filings.	*Harcourt Science* Bk. 3 *Harcourt Science* Bk. 4 *Harcourt Science* Bk. 5 *Harcourt Science* Bk. 6 www.brainpop.com Science Matter and Chemistry	II. Almost all soups are mixtures. Choose a familiar tune and write song lyrics for a younger child about your favorite soup, telling why its a mixture.
3. Define solution.		3. Create solutions. Identify the solute and solvent in each solution. Experiment to separate solutes in black ink. Experiment to explain. Making a solution-which works better, hot water or cold water?		III. Draw a picture of a mixture and a solution. Explain the relationship between mixtures and solutions using specimens of substances. Use the Concept Map to compare mixtures and solutions.
4. Identify solutes and solvents in substances.		4. Examine a variety of solutions. Identify the solutes and solvents in each.		IV. Investigate a variety of solutions to identify solutes and solvents. Brainpop.com Create a model to demonstrate solutes/solvent.

CURRICULUM GUIDELINES
GRADE 5
SCOPE OF WORK

TOPIC: INVESTIGATING MATTER STRAND 3: PROPERTIES AND CHANGES IN MATTER

PHYSICAL SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	In this solution, the sugar is the **solute** and the water is the **solvent**. Liquid solutions are always transparent, or clear. They may be coloured or colourless. Several factors affect the rate at which a solute dissolves. One factor is the particle size of the solute. When the solute has a large surface area, more solute comes into contact with the solvent. E.g.: an equal volume of loose sugar crystals would dissolve at a faster rate than a sugar cube. Heating the solvent can also speed up dissolving. Stirring is another factor that affects the rate at which a solute dissolves.			

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

CURRICULUM GUIDELINES
GRADE 5
SCOPE OF WORK

TOPIC: ENERGY **STRAND 3: FORCES AND ENERGY**

PHYSICAL SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Define energy. 2. Differentiate between potential and kinetic energy. 3. Describe the effects of forces on the motion of an object.	**Energy** is the power to do work. It is the ability to cause change. **Work** is done when the position of an object is changed either by using a pushing, lifting, pulling, dragging or dropping force. The object may be at rest or in motion when a force is applied to it. The force that is used to affect an object is produced when energy is used. There are many different forms of energy. Heat, light, chemical, sound and electrical energy are some forms of energy. Each form of energy can exist as energy in motion or energy at rest – stored energy. One form of energy is **Potential** energy. It is the energy of position or condition. It is stored energy. E.g. a rock at the top of a hill has potential energy because of its position. Water stored behind a dam has potential energy. A stretched rubber band has potential energy because of its condition.	1 & 2. Create objects to show potential and kinetic energy. 3. Make a device which can demonstrate kinetic energy. Tell which form of energy is being used.	*Harcourt Science* Bk. 3 *Harcourt Science* Bk. 4 *Harcourt Science* Bk. 5 *Mathematics Today* Bk. 5 Google: simple machines lever and screw www.brainpop.com Simple Machines Google: Energy and Technology www.scilinks.org/harcourt www.brainpop.com Science Energy	I. Identify potential and kinetic energy using a variety of pictures. Create an illustrative chart to show differences. II. Label each description below as PE (potential energy) or KE (kinetic energy). 1. ___ A skate board at the top of a hill. 2. ___ A tennis ball speeding through the air. 3. ___ A coiled spring 4. ___ The spinning blades of a fan 5. ___ A parachuter about to jump from an air plane. 6. ___ A pencil rolling off a desk. 7. ___ Water falling over a cliff. 8. ___ a child at the top of a play ground slide III. Describe the forces used to complete everyday activities. – Take an item off a shelf and place in a trolley – Sit in a chair – Inflate a balloon – Put on a pair of pants

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

CURRICULUM GUIDELINES
GRADE 5
SCOPE OF WORK

TOPIC: ENERGY **STRAND 3: FORCES AND ENERGY**

PHYSICAL SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
4. Identify forms of energy.	Potential energy can be changed to **Kinetic** energy. This is the energy of motion. If a rock rolls down a hill, the potential energy of the rock is changed to kinetic energy. If a dam bursts, the water behind it will flow. The stored energy is changed to kinetic energy. If the rubber band is released, the potential energy it had in its stretched condition is changed to Kinetic energy as the rubber band springs back. Many times, potential energy is changed to Kinetic energy. When a form of energy changes into another form of energy, it is called an **Energy Transfer**. POTENTIAL ENERGY ↓ KINETIC ENERGY ↓ WORK IS DONE E.g.: A light bulb can change from electrical energy to light energy and then to heat energy.	4. Identify forms of energy illustrated in a variety of visuals. E.g: lamp = light energy	*Harcourt Science* Bk. 3 *Harcourt Science* Bk. 5 *Science Horizons* Bk. 4 www.eia.doe.gov/kids users.freshpond.net/j/…/energyunit.htm/ www.kids.esdbg/uses.htm/ Reference Library_Science_Forms of Energy www.kidport.com/Refib/science/Energy/EnergyForms www.emints.org>eThemes	IV & V. Measure the temperature of a variety of matter in ^{O}C and ^{O}F. Graph results. Create a chart of objects and devices that use or make heat to make our lives better.
5. Explain the differences between heat and temperature.		5. Investigate what kinds of objects get hot.		
6. Explain how energy can be changed into other forms.		6 Investigate how energy is changed from one form to another.		VI. Identify at least three changes in energy that occur when a battery – operated flashlight is activated. Communicate this information using a comic strip or information brochure.

CURRICULUM GUIDELINES
GRADE 5
SCOPE OF WORK

TOPIC: ENERGY **STRAND 3: FORCES AND ENERGY**

PHYSICAL SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	A moving car can change mechanical energy to kinetic energy and then to sound energy and later heat energy. Energy development through technology is the ongoing effort to provide sufficient Primary and Secondary energy sources to power the world economy. It involves both installation of established technologies and research and development to create new energy related technologies. Major considerations in energy planning include cost, impact on air pollution and whether or not the source is renewable. Technologically advanced societies have become increasingly dependant on energy sources for transportation, manufactured foods and energy services. Technology has provided the use of energy for many comforts in our lives. E.g.:- energy efficient cars GPS, HD, DVD, CD			

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

CURRICULUM GUIDELINES
GRADE 5
SCOPE OF WORK

TOPIC: ENERGY **STRAND 3: FORCES AND ENERGY**

PHYSICAL SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
7. Discuss the impact of technology on forms of energy.	Energy brings us information about everything around us – light energy enables vision, sound energy vibrates our eardrums, and electrical energy can be used to create sound and light.	7. Research the inventions of high tech devices and show them on a time line. E.g.: cell phone, DVD, space shuttle, lap tops, hybrid cars. Microwave, video game. Etc.	www.youtube.com Simple Machines Eureka! Episode 12 The Lever The Screw *Science Horizons* Bk. 4 *Harcourt Science* Bk. 3 *Harcourt Science* Bk. 4 www.sasked.gov.sk.ca/docs/midlsci/gr5uemsc.htm/	VII. Compare the benefits and problems of three forms of energy. Display on a chart and present to the class. (group work)
8. Define simple machines.	People use machines to do work. A simple machine is a device that changes the size or direction of a force. Simple machines make a task easier to do. There are four kinds of simple machines. They are INCLINED PLANES, LEVERS WHEELS AND AXLES, and PULLEYS. Examples of simple machines: hammer, pliers, scissors, nutcracker, wrench, can opener, egg beater, fishing rod, piano keys, paddle, scooter, broom, seesaw and the wheelbarrow. **Levers** are simple machines used to lift weights. A lever is made up of a bar that turns around a fixed point. Wrapping an inclined plane around a pole makes a **screw**. Turning a screw moves things up the spiral ramp. E.g.:- spiral staircase.	8. & 9. Investigate how one kind of lever works. – Observe a cartoon where several objects are used to alarm and help people. Discuss/Describe the simple machines used. – Investigate an Archimedes' screw using various materials.		VIII. Explain: Why is using a screw better than hammering a nail? Create a simple machine to wake someone up. (e.g. similar to and alarm clock)

CURRICULUM GUIDELINES
GRADE 5
SCOPE OF WORK

TOPIC: ENERGY **STRAND 3: FORCES AND ENERGY**

PHYSICAL SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
9. Identify compound machines that use the lever and screw to help us do work.	A **Compound Machine** is made up of two or more simple machines.	9. Collect pictures from a variety of resources showing compound machines. Identify those that use the lever and screw to help us do work.		IX. Build a toy with moving parts using the materials egg carton/milk carton paper clips string plastic lids (juice/water lids) paper fasteners rubber bands straws paper plate Test models and identify the use of the screw and lever in their designs.

CURRICULUM GUIDELINES
GRADE 5
SCOPE OF WORK

TOPIC: ENERGY **STRAND 3: FORCES AND ENERGY**

PHYSICAL SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
10. Explain the importance of conserving energy.	Like matter, energy cannot be created or destroyed. Once we have used up the supply of energy, it can not be renewed. Energy supplies must be **conserved** or used carefully and other substances need to be looked at for energy. Energy sources include wind power, energy stored in moving ocean waves and solar energy. There are many ways to conserve energy. In the Kitchen: – Keep fridge door closed as much as possible. – Let hot food cool before refrigerating it. – Use pots/pans with flat bottoms. – Boil only as much water that is needed at one time. – Avoid opening the oven door frequently to check on cooking food. – Operate dishwasher only when there is a full load.	10. Observe a video – "Conserving Energy" or Invite Guest Speaker to share on Conserving Energy. – Use the jig-saw strategy to explain the importance of Energy Conservation. Create a flyer to promote – "Energy Conservation".	Learning Resources Unit Media Centre/ District Resource Centres www.maketheswitch.ae/.../importance_of_energy_conservation.html Resource Speaker: Bahamas Electricity Corporation ezinearticles.com/?Energy_Conservation:-Why-Its-So… HowToTeachChildrentoConserveEnergyeHow.com *Harcourt Science* Bk. 4 and 5 *Science Horizons* Bk. 4	X. Research: How can wind be used as a source of energy? In cooperative groups – students design/create a solar powered house. Demonstrate how it works/ Explain how energy is conserved.

CURRICULUM GUIDELINES
GRADE 5
SCOPE OF WORK

TOPIC: ENERGY **STRAND 3: FORCES AND ENERGY**

PHYSICAL SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	In the Bathroom: – Take brief showers instead of tub baths. – Do not let hot water run; plug the sink for washing or shaving. – Cut down on the use of hair dryers by towel drying. In the Laundry – Use cold water as often as possible. – Operate washer only with a full load. – Do not over dry clothes. Throughout the House – Turn off lights when not in use. – Provide lighting directly over a work space instead of an entire room. – Decorate rooms with light colours which reflect more light. – Pull out the plug of an “instant on” TV set when it is not in use.			

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 6
SCOPE OF WORK

TOPIC: CELL **STRAND 1: CHARACTERISTICS OF ORGANISMS**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Identify and describe parts of the cell and their functions.	The cell is the basic unit of structure and function of all living things. Cells work together to perform basic **life processes** that keep an organism alive (movement), breathing, feeding, reproducing, excreting, (growth). All cells have similar parts. However, plants cells have a cell wall and chloroplasts which contain chlorophyll. These are not present in animal cells. The parts that are common to both plant and animal cells are **nucleus, cell membrane, cytoplasm, and vacuole**. The nucleus controls the activities of the cell. The cell membrane holds the parts of the cell together. It also separates the cell from its surrounding and controls what material enters and leaves the cell. Cytoplasm is a jellylike substance containing many chemicals to keep the cell functioning. The vacuole stores food, waste and water. The cell wall, only found in plants, is a stiff outer layer that protects the cell and gives it shape. Chloroplasts contain chlorophyll that plants need to make food.	1. Observe pictures of magnified cells.	*Harcourt Science* Bk. 6 *Science Horizons* Bk. 5 *Scott Foresman Science* Bk. 5 *Modern Curriculum Press* Level D. www.teachersdomain.org www.wisegeek.com www.cellsalive.com/cells/cell_mode/.htm	I. Create a model of a plant or animal cell using reusable materials.
2. Differentiate between plant and animal cell (microscope).		2a. Observe specimen of animal and plant cells using (a) microscope (b) magnifying glass 2b. Assemble pictures of cells (puzzles).		II. Label a plant and an animal cell.
3. Observe plant and animal cell parts and record their functions.		3a. Make information cards with the parts of the cells and the function of each part. 3b. Short skit with students emphasizing the importance of each cell part.		III. On a teacher-made worksheet, draw a line to match the parts of the cell to their functions.

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CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: FUNGI **STRAND 1: CHARACTERISTICS OF ORGANISMS**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Use specimen or pictures to classify four types of fungi by their traits.	Fungi are plantlike living things that do not contain chlorophyll. Fungi do not move from place to place like plants. Unlike plants, fungi cannot make its own food. To get energy, fungi must take in food. Four types of common fungi are **mushrooms, mold, yeast** and **mildew**. Fungi can be both harmful and helpful. They need moisture and warmth to grow. Mushrooms grow on the ground, on fallen logs and on live trees. Mushrooms growing on live trees are **parasites**. Mushrooms growing on fallen logs act as decomposers. People use some mushrooms as food, but some mushrooms are deadly poison. Mushrooms sold in stores are safe to eat; however, you should not touch or eat wild mushrooms. Mold grows on bread, fruit, or in any damp, warm area. The mold that grows on orange is used to produce the **anti-biotic** called **penicillin**.	1a. Make a chart showing the four types of fungi. 1b. Experiment to show the reaction when yeast and sugar are combined.	*Science Horizons* Bk. 5 *Concepts and Challenges in Life Science II* www.extension.iastate.edu/news/2006/jan/071801.htm www.blurtit.com/q192927.html www.scienceproject.com.au/facts028.html	I a. Label the diagrams that show each kind of fungi. I b. Write a paragraph to compare fungi to plants.
2. Distinguish between harmful and helpful fungi.		2. Examine an edible mushroom. Identify its parts. Place mushrooms on black paper. Cover with glass jar. Leave overnight. (Observe spores)		II. Make a chart showing the four types of fungi. III a. Collect pictures of things made from useful fungi. E.g. pizza, yoghurt, etc. Paste pictures in a folder or on a chart. Make a pamphlet about useful and harmful fungi. b. Research different types of mushroom on the internet.

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CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: FUNGI **STRAND 1: CHARACTERISTICS OF ORGANISMS**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
3. Compare and contrast the growth of fungi to the growth of plants.	Yeast is used to make bread rise. When the yeast uses sugar, carbon dioxide gas is formed. The carbon dioxide makes bread rise. Mildew grows on damp cloth, leather or on plants. Mildew growing on leaves can damage the plant. Some fungi are helpful, but, others are harmful. Helpful fungi break down decaying matter (mushroom). Many products are made with fungi. Fungi help to give cheese its flavor, colour and texture. Some types of fungi cause human diseases that affect the skin. Athlete's foot is caused by a fungus that grows between the toes. Ringworm and shifting clouds are also caused by a fungus. Most fungi have one cell, but mushrooms have many cells. Plants grow from seeds, but fungi grow from **spores**.	3a. Use pictures of each type of fungi. Paste them on a blank sheet of paper. Under each picture write how the fungus is harmful or helpful. 3b. Class: Design experiment for a fungus to grow on bread or orange. Use hand lenses to observe the growth.	www.britannica.com/EBchecked/topic/.../fungus/.../Growth www.workershealth.com.au/facts028.html www.mbgnet.net/bioplants/grow.html	III. Under each picture state how each one is harmful or helpful. Collect pictures of foods made from a fungus.

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CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: INVERTEBRATES **STRAND 1: CHARACTERISTICS OF ORGANISMS**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Research and describe traits common to all sponges.	Sponges are marine animals. **Sponges** are **invertebrates**. They usually remain anchored in one place all their lives. Sponges are **filter feeders** (they filter tiny particles of food from the water). A sponge has only two layers of cells. The outer covering of the sponge's body is covered with tiny holes called **pores**. These pores lead to canals which are made up of specialized cells with whip like structures that beat rapidly. This motion helps purified water into canals. Thread like structures remove the tiny pieces of food from the water. The water then flows out through an opening called a **vent**. Sponges have **needle like parts** that give them shape. Different species of sponges have different colors, shapes and sizes. Sponges are found on reefs in The Bahamas. At one time, Bahamian fishermen harvested sponges which were sold to foreign countries where sponges were processed into a variety of household items that could be used for decorations and bathing.	1a. Observe the pores on natural and synthetic sponges. 1b. Experiment to compare the amount of water different types of sponges can hold. 1c. Create a sponge using desired materials.	*Science Horizon* Bk. 5 *Concepts and Challenges in Life Science II* *New Integrated Science for the Caribbean I* www.worldcreatures.com www.earthlife.net/inverts/porifera.html	I. Complete a table by inserting the missing traits of sponges. II. Make a collage of different kinds of sponges on chart paper. or Use a box as a T.V. and paste pictures of sponges on long sheets of paper to roll as they are viewed on the T.V. screen. Use paint to print designs using different sponges on a variety of materials. Etc. paper, cloth.

CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: INVERTEBRATES **STRAND 1: CHARACTERISTICS OF ORGANISMS**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	At that time the **sponging industry** was the most important economic activity in The Bahamas.			
2. Describe the traits of echinoderms.	**Echinoderms** are marine **invertebrates**. They have external skeletons, a nervous system and are covered with **spines** that stick out from their bodies or hard plates. The spines of echinoderms protect them from predators. The spines break off easily when touched. These spines are actually a part of the animal skin. Echinoderms live only in the ocean. They use tiny gills to get oxygen from the sea water. Examples of echinoderms found in The Bahamas are starfish, sand dollar, sea urchin and sea cucumber. Others include brittle star, sea feather and sea biscuit. **Echinoderms** do not have brains, but they have nerves that enable them to move and feed. Most adult echinoderms appear to have **radial symmetry**, with five arms extending from the centre of their bodies. Sea Urchins and sand dollars do not have arms like the starfish, but they	1. Observe pictures \videos to identify various echinoderms. 2. Play "What Am I?" card game. Write the description of each echinoderm on a card and the name of the echinoderm on another. Half the class will have name card while the other half will have description card. The teacher will begin by calling on a child to begin by reading the information on the card. The child with the matching card must respond. (I'm Looking For"). 1. Sort pictures\ plastic models, cured specimens of invertebrates. 2. Students with animals (starfish, sea urchin) move about through the class to locate their traits which the students who are sitting will have on cards.	*Science Horizons* Bk. 5 *Harcourt Science* Bk. 5 www.starfish.ch/reef/echinoderms.html http://wiki.answers.com/Q/List_traits_of_echinoderms www.answers.yahoo.com>Science&Mathematics>Biology	II a. Name echinoderms and (label) list traits common to all echinoderms. II b. Collect pictures of echinoderms. Design a collage of the pictures on card. Then cut them into pieces to make a puzzle.

CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: INVERTEBRATES **STRAND 1: CHARACTERISTICS OF ORGANISMS**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	have paired vows of **tube feet** extending symmetrically from the mouth. The mouth is at the centre of the underside of the body. Many echinoderms have powerful jaws and **poison** glands hidden among the spines. These adaptations help them get food and defend themselves.	Field trip on a glass bottom boat or snorkeling trip to view sponges, echinoderms and other animals in their natural habitat.		
3. Research to distinguish between different kinds of worms.	**Worms** are **invertebrates**. Three kinds of worms are **Flat worms, Round Worms** and **Segmented Worms.** **Round Worms** have round tube-like bodies with **two body openings**. At the end, food is taken in and at the other end, waste is passed out. A round worm has a nervous system with a brain and other sense organs. Hook worms are round worms. They are **parasites**. Some round worms live in animals and can pass into humans if they eat meat that is not properly cooked. **Flatworms** have a flattened body, a digestive system and one body opening. Planarians, tapeworms and flukes are flatworms. The planarian is not a common worms.	3a. Observe pictures/specimens of worms with hand lenses. 3b. Create three dimensional models of worms to show their differences.	*Science Horizons* Bk. 5 http://askville.amazon.com/kinds-worms…/AnswerViewer.do? www.allaboutworms.com/types-of-worms	III a. Research information to design information worm cards. III b. Interview a nurse or a veterinarian to find out more information about the effect of parasitic worms on humans and animals. Share the information with the class.

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CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: INVERTEBRATES **STRAND 1: CHARACTERISTICS OF ORGANISMS**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1, 2 & 3. Examine a variety of invertebrates and classify them as sponges, echinoderms and worms.	They have a triangular-shaped head and eye sports on the head. They regrow parts. If a planarian is cut into two pieces, the head part will grow a tail and the tail part will grow a head. All parasitic worms lay eggs. Tapeworms lay eggs in the **digestive system** of the **host**. If these eggs burrow themselves into tissues in our brains, hearts or kidneys, they will kill us. **Segmented Worms** have bodies in sections. The earth worm and leech are segmented worms. Their bodies are in sections. The leech is a parasite which sucks blood. The earthworm lives in the soil. It makes the soil soft, and also enriches the soil with its waste which comes from the dead leaves that it eats. The names of some sponges are purple vase, Red branching and Venus's-flower-basket.	Provide pictures cards of sponges, echinoderms and worms. Have students place them under the correct heading on a chart and present to the rest of the class justifying their classification choices.	*Science Horizons* Bk. 5 *Harcourt Science* Bk. 6 http://wiki.answers.com/.../why_are_worms_and_sponges_are_alike_and_different www.diveasis.com/reef-guide/sponges.htm www.mysciencesite.com/invertebrates.pdf	I, II & III. Make an invertebrate pamphlet featuring sponges, echinoderms and worms. Visit a library to find out more about the Sponging Industry in The Bahamas. Collect pictures and share the information with the class. Interview a fisherman and record stories of how they caught, cured and sold sponges, starfish and sea urchins.

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 6
SCOPE OF WORK

TOPIC: CIRCULATORY **STRAND 1: STRUCTURE AND FUNCTIONS IN LIVING SYSTEMS**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Identify parts of the Circulatory System.	The main organ of the circulatory system is the **heart**. Its main job is to pump blood to every living cell in the body. The heart is divided into four chambers. The two upper chambers are called **atrium** and the two lower chambers are called **ventricles**. A partition separates the right side of the heart from the left side. This prevents the blood on the left and right chambers from mixing. This is important because the left side of the heart has blood rich in oxygen, but the right side has blood with very little oxygen. Blood is carried around the body in blood vessels called **veins, arteries** and **capillaries.**	1. Make a model of a stethoscope.	*Harcourt Science* Bk. 5 *Modern Curriculum Press* Level D www.smm.org/heart/lessons	I. Label the diagrams of a. the circulatory system b. the heart
2. Discuss and label a simple diagram of a heart.		2. Students make one lap around playground or complete a series of exercises, then use the stethoscope to count the hearts per minute.	*Science Horizon* Bk. 4 www.kidshealth.org>kids>HowtheBodyWorks www.childrensheartinstitute.org/...heartwrk/bloodf/w.htm	II. State the importance of the heart by completing a teacher-made worksheet.
3a. Investigate and describe the function of the heart.		3a. Take your pulse for ten seconds. Multiply that number by six and record how many times your heart beats in a minute.	www.imcpl.org/kids/guides/health/circulatorysytem.html www.accessexcellence.org?AE/AEC/CC/heart_anatomy.html	III. Observe 6 pictures of people performing certain activities. Number each picture from 1-6 according to which activity will make the heart beat fastest.
3b. Research and identify the blood vessels in the circulatory system.		3b. Use a clear tube and a solution of red food coloring and water to show how blood moves in blood vessels (straw)	*Harcourt Science* Bk. 6 www.fi.edu//earn/heart/vessel www.kidskonnect.com/subject_index/31.../337_human_body.html	Have students prepare a comic strip of the 3 kinds of blood vessels. Each of them should argue regarding who is more important.
4. Investigate and identify risk factors to health and how these may affect the circulatory system.	Caring for your Circulatory System. 1. **Exercise** every day to keep your heart strong. Exercise strengthens your heart by making it beat harder, which makes the heart muscles larger and able to push more blood with each "squeeze" or "beat".	4. Make an information card telling how the circulatory system can be kept healthy.	*Harcourt Science* Bk. 1 *Harcourt Science* Bk. 5 *Harcourt Health and Fitness* Bk. 6	IV. Students unscramble key words used. E.g. e_ _ rci_ _ (exercise) In groups have students brainstorm ways to obtain physical activity and healthy foods to eat.

CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: CIRCULATORY **STRAND 1: STRUCTURE AND FUNCTIONS IN LIVING SYSTEMS**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	2. Keep germs out of your blood. Wash cuts with soap and water. 3. Never touch someone else's blood. 4. **Eat healthy** foods to avoid diseases such as hypertension and diabetes. 5. Do not ever smoke. Smoking harrows blood vessels and can cause high blood pressure.		*Harcourt Science* Bk. 6 *Harcourt Science* Bk. 6 *Harcourt Science* Bk. 6 *Harcourt Health and Fitness* Bk. 5 and 6 www.sesameworkshop.org/initiatives/health/healthyhabits	They will then develop and write an individual plan for healthy living and commit to enforcing their plan for a period of one week, recording their activity on a log. IV. Use the internet to find different ways of making a stethoscope. Then make a model to show and explain to your 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 6
SCOPE OF WORK

TOPIC: IMMUNE SYSTEMS **STRAND 1: STRUCTURE AND FUNCTIONS IN LIVING SYSTEMS**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Research and describe the functions of the Immune System.	Organs, tissues and cells that help the body fight illnesses and diseases make up the Immune System. Diseases are caused by **bacteria** and **viruses** which enter the in large numbers and give off poisons that upset the normal functions of the body. Some bacteria release poisons that injure and kill the cells in our bodies. Viruses **reproduce** inside cells and destroy the cell. Not all illnesses are caused by infection. Some people are born with certain illnesses. Some of these include certain forms of heart disease. White blood cells are the main defenders of the body. When the body is infected (overrun by bacteria and viruses), the number of white blood cells increases. Some white blood cells trap bacteria. When this happens, poisons from the bacteria kill some of the white blood cells. The dead blood cells form a yellow material called "**pus**". Some white bloods cells make chemicals called "**antibodies**".	1a. Make a booklet (4 pages) showing the stages of a virus attacking a live cell. 1b. Design a model showing how white blood cells fight infections. 2. Invite a resource person such as a nurse or a doctor to share more information about the systems of the human body.	*Science Horizons* Bk. 6 *New Integrated Science for the Caribbean I* *Science Horizons* Bk. 5 *Harcourt Science* Bk. 6 *Harcourt Health and Fitness* Bk. 5 and 6 www.essortment.com-Health&Fitness www.thebody.com/content/art1788.html www.ehow.com>...>FamilyHealth>GeneralFamilyHealth	I. Create a card informing your peers about the function of the Immune System. Distribute picture/scenario cards depicting various illnesses or bad health habits to cooperative groups. Have each group identify the problem and describe how the immune system responds.

CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: IMMUNE SYSTEMS — STRAND 1: STRUCTURE AND FUNCTIONS IN LIVING SYSTEMS

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	These chemicals destroy poisons made by bacteria also. **HIV** and **AIDS** are diseases that destroy the Immune System. When Bacteria and viruses produce more than our systems can fight off, we use medicines to help us fight the disease.			
2. Explain how negative habits affect the Immune System.	Medicines help the Immune System to fight diseases. A medicine is a drug-a chemical taken into the body the affects how the body functions. Not all drugs are medicines. The misuse of drugs is called drug abuse. The abuse of drugs harms the body. Two drugs that are abused all over the world are alcohol and nicotine. Alcohol decreases brain cell activity. **Nicotine** is found in **tobacco. Cigarettes, cigars** and snuff are made from tobacco. Nicotine is harmful because it increases the rate of the heartbeat and it affects the respiratory system. The use of **illegal drugs** is increasing among young people in	2a. Create a mural showcasing labels of a variety of over the counter medicines. Discuss the illness each medicine is used to treat. 2b. In groups, deign a chart showing the effects of drinking alcohol and smoking tobacco.	*Science Harcourt* Bk. 6 http://ezinearticles.com/?How...Affects-The-Immune-System&id... www.medicalnewstoday.com/articles/102505.php *Harcourt Health and Fitness* www.personalityresearch.org/papers/beaton.html www.stress.about.com/…/Stress_and_Your_Health_How_Stress_Affects_Your_Immune_System_andMore.htm	II a. List 5 drugs that are abused. b. Design posters to discourage drug abuse. c. Interview 10-20 young people between the ages of 14 and 20 to find out how many of them drink alcoholic beverages and their drink of choice. i. Compare number of male to female drinkers. ii. Make a bar graph to show most popular alcoholic beverage.

CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: IMMUNE SYSTEMS — STRAND 1: STRUCTURE AND FUNCTIONS IN LIVING SYSTEMS

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	The Bahamas and the western world; two illegal drugs that are used very frequently by young people are Cocaine and Marijuana. These are two very dangerous drugs. They affect the Immune System and the Nervous System. They destroy brain cells and reduce the body's ability to fight off diseases.			
3. Identify risk factors to health and how these risks may be reduced.	Abuse of these drugs can weaken the body's defense systems so severely that an attack from and illness or disease may lead to death.	3. Invite the school nurse or other health resource person to speak to students about drugs and the effect on the Immune System and other body systems.	Resource Person *Harcourt Health and Fitness* Bk. 4, 5, 6 www.tampabay.com/news/...habits-keep...immune-system.../1053748	III. Complete questionnaire. Teacher designed based on all the information that is shared. IV. Design a pamphlet that convinces people why it is important to be healthy.

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CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: FROM FLOWER TO FLOWER **STRAND 1: STRUCTURE AND FUNCTIONS IN LIVING SYSTEMS**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Observe specimens of flowers to identify the parts of a flower, and explain its function.	Most of the plants that we are familiar with are flowering plants. Another name for flowering plants is angiosperms. All flowering plants produce seeds. The seeds are produced by flowers. Flowers are an adaptation that is important to the success of angiosperms. The main parts of a flower are the sepals, the petals, the pistil and the stamens. The sepals are the green leaves that protect the flower while it is in the bud. Petals are the colourful parts that surround and protect the male and female parts of the flower. The pistil is the female part of the flower and the stamens are the male part of the flower. The female part of the flower produces the fruit and the seeds and the male parts produce pollen.	1a. Pick a variety of flowers and use hand lenses to study each part closely. 1b. Use coloured paper to cut and paste the parts of a flower together on a separate paper. Make labels and paste them near the part named.	*Harcourt Science* Bk. 5 *Science Horizons* Bk. 4 *Science Horizon* Bk. 5 *Modern Curriculum Press Level D* www.naturegrid.org.uk/qca/flowerparts.html www.primaryresources.co.uk/online/pwerpoint/flower.ppt www.saps.plantsci.com.ac.uk/primparts.htm www.blithfieldeducationcentre.co.uk/.../flower_life_cycle.htm	I. Label the picture of a flower to show the four main parts. II. Create a Venn Diagram to explain the function of plant parts.
2. Research and explain the life cycle of a flower. (plant)	Flowers help to ensure that pollen from the male part of the flower gets to the female part of the flower. This process is called pollination. Pollination is the first important step in seed formation.	2. Sequence pictures to show the life cycle of a flower (plant).	www.bbc.co.uk>Home>Science>Livingthings	II. Use numbers under each picture to indicate which stage of development of the flower is shown.

CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: FROM FLOWER TO FLOWER **STRAND 1: STRUCTURE AND FUNCTIONS IN LIVING SYSTEMS**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	Seeds have very tiny plants inside them. These grow into new plants and ensure that the group continues to survive. The fruit protects the seeds and provides them with food and minerals to produce a protective coat called the "seed coat". When seeds are mature, the fruit ripens. Animals eat the fruit and scatter the seeds. This allows the seeds to grow into new plants in different places. The changes that occur from the time a seed grows into a new plant until that plant produces seeds, make up the life cycle of a plant.			II. Collect a variety of seeds and sort them in sandwich bags. Paste, tape or staple them on hard card. Beside each bag of seeds, put a picture of the flower or fruit that is produced from the seeds.

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CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: PLANT GROWTH AND RESPONSES **STRAND 1: STRUCTURE AND FUNCTIONS IN LIVING SYSTEMS**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Predict and experiment to discover the needs of plants for growth.	To grow and be healthy every living thing needs certain things from its environment. Plants need **light, water, oxygen, carbon dioxide, minerals, proper temperature** and enough **space** in which to grow. Different plants have different growth patterns. **Trees, vines** and **shrubs** grow differently. A tree is a plant that has one main woody stem or truck. A shrub is usually a middle sized plant that has many stems or trunks. A vine is a plant with a climbing stem that may grow on the sides of a building, fence or a tree. Growth-rate is also different for the different plant types. Some plants grow only during the wet seasons. Others grow all year round. Growth-rate also can be controlled by changes in the environment. Like all living things, plants respond to things in the environment. Plants **respond** to a variety of things (stimuli) such as light, gravity and water.	1. Conduct a class experiment a. Plant without water b. Plant without light c. Plant without air d. Plant with all of the above. Make a table to record the results after one week.	*Science Horizon* Bk. 5 *Harcourt Science* Bk. 6 *Harcourt Science* Bk. 5 *Concepts and Challenges in Life Science II* www.biology-online.org/3/10-growth-patterns www.acessexcellence.org/AE/.../0236.MichaelJDemchik/ www.flipkart.com/growth-patterns...plants.../0931146267-tax3f92quy www.school.discoveryeducation.com/lessonplans/…tropisms www.teachersdomain.org/resource/viewtext_printer---14620	I. Draw a plant and list what it needs for healthy growth.
2. Investigate and compare the growth patterns of different plants.		2. Students work in groups. Each group will be given a picture of a tree, vine or shrub. After discussion among themselves, a reporter from the group will explain whether the picture shows a tree, vine or shrub and support the choice.		II a. Draw, use pictures or cut and paste to show a tree, vine and shrub. II b. Collect and press the leaves of 5 trees, 5 shrubs and 5 vines.
3. Experiment to show how plants respond to their environment.		3. Class experiment: put a small plant under a box. Put a tiny hole in the box to allow a little light to enter the box. Record the results after one week. 4. Make up a rap to describe plants different growth patterns and responses. (Use cowbells or other creative musical instruments when performing.)		III. Write a paragraph to explain what happened in the experiment that was conducted. (Use a picture to enhance the explanation). Conduct the same experiment with a different plant. Compare the results to the experiment that was completed in class.

CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: PLANT GROWTH AND RESPONSES **STRAND 1: STRUCTURE AND FUNCTIONS IN LIVING SYSTEMS**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	A plant's response that involves growth is a "**tropism**". Plants bend towards light as they grow. The growth response of a plant to light is called "**phototropism**".			
4. Explore a variety of plants to conclude their adaptive method for survival.	Responses to gravity and water also help plants survive. A stem responds to gravity by growing in the direction opposite to the pull of gravity. When stems grow upward, leaves can get light. Roots respond to gravity by growing in the direction of the pull of gravity. The downward growth of roots helps the roots reach water in the ground. Roots also respond by growing towards the water itself. A plant's response to gravity is called "gravitropism". Plants that live in different environments have different adaptations. Pine trees grow where there is little rainfall. Pine trees have needle like leaves. These leaves have a small surface area. So pine trees do not lose much water through their leaves.	4. Visit The Bahamas Natural Trust/ Family Islands – a similar area with a variety of plants. or Botanical Gardens	www.springerlink.com/index/tx51h75762532307.pdf www.desertusa.com/du_plantsurv.html	IV. Record the names of ten plants and describe how they are adapted for survival. V. Write answers to questions provided by the teacher about the entire unit on plant growth and adaptations.

CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: PLANT GROWTH AND RESPONSES

STRAND 1: STRUCTURE AND FUNCTIONS IN LIVING SYSTEMS

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	The cactus plant has long roots that spread out just below the surface. They can absorb water quickly after it rains. The thick stems of the cactus store the water that is used during the long, dry spells. Some wild plants, like locoweed, produce poisons to prevent animals from eating the leaves. This prevent the growth of young plants. New plants do not grow around that tree. This poison is an adaptation because there are no new plants to compete with the tree for space. Some leaves are covered with wax to prevent water loss.			IV. Walk around the school yard or at home or any appropriate place to find out the adaptive method of at least 10 plants. Record Information.

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CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: BIOMES **STRAND 1: ORGANISMS AND THE ENVIRONMENT**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Investigate to define what a biome is.	A **biome** is a large region on the earth that has a certain **climate** and certain kinds of **organisms**. There are six land biomes: **Tropical Rain Forest, Deciduous Forest, Desert**, Grassland, Tundra and Taiga. Tropical Rain Forests are noted for strong sunlight and warm, wet climate which provide ideal growing conditions for a variety of plants and animals. Most plants and animals on earth live in the tropical rain forests. The Bahamas has a climate very similar to that of the tropical rain forests. Many insects, bats, birds and mammals live in the tropical rain forest. The plants in the rain forest are in three layers: **canopy, understory** and **forest floor.** The Deciduous Forest has plants with broad leaves. The plants shed leaves every year and remain off the trees for almost three months during winter. Several **layers** of plants can be found in the Deciduous Forest. They are **canopy, understory, shrub layer** and **forest floor**.	1a. Use a map to locate the biomes on Earth. 1b. Make a graph to show the number of each biome found on the map.	*Science Horizons* Bk. 5 *Harcourt Science* Bk. 5 *Harcourt Science* Bk. 6 www.ucmp.berkeley.edu/exhibits/biomes/index.php www.mbgnet.net/sets/ www.teachersfirst.comlessons/biomes/biomes.html www.enchantedlearning.com/biomes/	I. Make a card to explain what a biome is and name the six land biomes. Describe the climate in each Biome.
2. Research and infer why organisms live in certain biomes.		2a. Choose two animals and two plants from each biome. Write 3 sentences to explain how it survives in its biome. (use pictures) 2b. Make a chart to show the rainfall and temperatures in the desert, tropical rain forest and deciduous forest.		II. Teacher provides pictures/ drawings of the tropical rain forest, deciduous forest and the desert. The students will match picture cards of organisms to the correct biome.
3. Compare and contrast the tropical rain forest to the deciduous forest.		3. Make a Venn diagram to compare similarities and differences between the two forests. 4. Group Work Create "Biome Bottles". Decorate each 5 gallon bottle to depict the animals, plants and climates of each biome. Or Create Dioramas		III. Create two samples: one picture of the tropical rain forest and the other picture of the deciduous forest.

CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: BIOMES **STRAND 1: ORGANISMS AND THE ENVIRONMENT**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	A variety of plants and animals live in the deciduous forest. Some animals are squirrels, deer, rabbits and beavers, foxes, black bears hawks and snakes. The desert biome receives very little rainfall. The rain that does fall evaporates quickly. During the nights, deserts are often very cold. Desert plants are adapted to survive with very little water. The common desert plants, **cacti**, store water in their **thick stems**. Plants such as the creosote bush, have **small, waxy leaves**. Desert animals also have adaptations to prevent water loss. Snakes and lizards have **dry scaly, skin**. Many desert animals hunt at night to avoid the heat.			IV. Keeping warm. Find out whether fat can act as an insulation to keep you warm. You need a bowl of ice water and some vegetable fat. Mold vegetable fat around one of your index fingers. Completely cover the finger with a layer of fat at least 1cm (0.5 in.) thick. Then hold both of your index fingers in ice water. How long does it take for each finger to get cold?

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CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: ENVIRONMENTAL CHANGES CAUSING ENDANGERMENT OR EXTINCTION **STRAND 1: ORGANISMS AND THE ENVIRONMENT**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Research and compare the results of natural disasters on the environment.	In ecosystems there is usually stability. However, changes occur constantly. These changes may be sudden or gradual. Storms, such as hurricanes and tornados, as well as forest fires can cause rapid changes to the environment. After a change in the ecosystem, the environment reacts by permitting new additions of plant and animal life. These new additions are called "**succession**". Fires speed up the process of succession. Forest fires occur on most of the islands of The Bahamas during the dry season. Some forest fires burn dead leaves and branches on the forest floor releasing nutrients into the soil. After a fire, grasses sprout and dormant seeds germinate in the rich soil. The bark of pine trees are resistant to fires which enable them to survive forest fires. Small changes in climate, in soil conditions or in plant or animal population can change an ecosystem. This change is gradual over thousands of years.	1. Fold a blank sheet of paper in halves. Label one side "Storms" and the other side label "Forest Fires". List the changes each one of these cause to the environment.	*Harcourt Science* Bk. 5 *Harcourt Science* Bk. 5 *Concepts and Challenges in Life Science II* *Harcourt Science* Bk. 4 www.einews.com/bahamas/newsfeed-Bahamas-natural-disasters www.bahamas.gov.bs/bahamasweb2/... www.fema.gov/kids/dizarea.htm www.esa.int/esaKIDSen/Naturaldisasters.html	I a. Make two posters – One showing an empty lot that was cleared down. The other showing the lot before it was cleared. I b. List the effects on living things in the lot as a result of the change.

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CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: ENVIRONMENTAL CHANGES CAUSING ENDANGERMENT OR EXTINCTION **STRAND 1: ORGANISMS AND THE ENVIRONMENT**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
2. Communicate and summarize the effects of human activities on the environment.	Pollutation also changes the ecosystem. Mass **land clearing, cutting down of hills, filling in of mangroves** and **digging canals** and **marinas** also affect the ecosystems. Human activity contributes greatly to the changes in the environment. Activities such as adding chemical fertilizers to soil, building new roads, homes, schools, shopping centres and burning fossil fuels lead to the **endangerment** and **extinction** of organisms.	2a. Students work in groups to write a short skit that informs about how each human activity affects the environment. 2b. Each group will suggest ways to save the environment.	www.bahamas.gov.bs/BahamasWeb/VisitingTheBahamas.../EndangeredtSpeciest&tEco	II. Visit an area where there was a forest fire. Draw two posters. One showing the area before the fire and the other showing the area after the fire. (Family Island) The students will be given a worksheet with 10 sentences. Six will be facts that will cause harm to the environment. Four will be facts that will help the environment. The students will circle only six sentences to identify the harmful facts.
3. Research and identify animals (organisms) in The Bahamas that are endangered.	Animals such as the **white crown pigeon**, the **iguana**, the **green sea turtle** and the **Bahama Parrot** are **endangered**. Laws are being enforced to prevent the capture of these animals. This way the number of these species can increase to avoid extinction.	3. Play a game "Who Am I?" Student picks a folded piece of paper with the name of one of the animals on the paper. The student will give the class clues so that they can guess which animal it is. (Other endangered or extinct animals may be added in the bag so that the game may last a little longer.)	Resource Person from the National Trust/Family Island-any knowledgeable person or resource books from the National Trust. www.bahamas.gov.bs/BahamasWeb/VisitingTheBahamas www.bnt.bs/download-main.php?mode=download&catid=4...39	III. Students make a booklet with pictures/drawings of the endangered species (white crown pigeon, iguana, green sea turtle and Bahama parrot). Under each picture write where the animal is found (island) and the approximate number of them surviving. Also, how the animal became endangered.

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 6
SCOPE OF WORK

TOPIC: EARTH'S LAYERS **STRAND 2: PROPERTIES AND STRUCTURE OF EARTH**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Identify and compare the layers of the earth.	We live on Earth's crust which is about 32 km (20 ml) thick under the surface of the **continents** and about 8 km (5 ml) thick under the **ocean floor**. Earth's outermost layer is the **crust**. The layer directly beneath the crust is the **mantle**. The innermost layer is the **core**. The core has an **inner core** and an **outer core**. The inner core is mainly **iron** and **nickel**. It is extremely hot and metals would usually melt at that extreme heat. But the inner core is solid because of the pressure and weight of the other layers around it. The crust is the thinnest layer of the earth. It is made up of rocks with loose dirt covering the rocks. The mantle is the thickest layer. Some of the upper mantle is melted because of the heat; however, great pressure keeps a part of the mantle solid. Scientists study the crust by drilling to get samples from it. The other layers are studied from materials taken after an earthquake and materials that come to the surface after a volcanic eruption.	1a. Cut an apple/peanut, M & M candies to compare the layers of each one to the layers of the earth. 1b. Construct a model of the earth showing the three layers. (Use desired materials)	*Harcourt Science* Bk. 6 *Science Horizon* Bk. 6 www.science.pppst.com/layers.html www.library.thinkquest.org/28327/…/earth/…/layers_of_earth.html www.enchantedlearning.com/subjects/.../earth/Inside.shtml	I. Draw a picture showing the three layers of the earth. (Use colours) under the picture draw three columns labeled: Crust | Mantle | Core (inner/outer) Then write two facts about each layer under the labels. II. Build Earth layer by layer: Make a model of Earth's interior. Use clay of different colours to show Earth's Layers. Label each layer.

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 6
SCOPE OF WORK

TOPIC: AIR POLLUTION **STRAND 2: PROPERTIES AND STRUCTURE OF EARTH**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Infer what natural resources are and where they are located.	Natural resources are materials found in the environment that are useful to humans.	1. List 10 things in the class that were made from a natural resource.	*Science Horizons* Bk. 5 www./hup.edu/smarve//seminar/fall-2000/.../crissey.htm *Harcourt Science* Bks. 5 and 6 www.enwikipedia.org/wiki/Renewable_resource www.enwikipedia.org/wiki/Non-renewable_resource www.facts_about_solar_energy.com/renewable_resources.html	I. Collect pictures to cut and paste in a folder to show natural resources in The Bahamas.
2. Classify resources as renewable or nonrenewable.	Natural resources can be grouped as renewable or nonrenewable. Renewable resources can be replaced or used over and over. Soil, air, water, and trees are renewable resources. A nonrenewable resource is a resource that cannot be replaced easily or reused. Fossil fuels, such as oil, coal and natural gas are examples of nonrenewable resources.	2. Make a booklet to show renewable and nonrenewable resources. Explain why they are grouped together.		II. Draw a tree or any kind of plant. Under the picture, write 10 things that trees are used for. Display pictures of the things.
3. Investigate the environment to distinguish between air, land and water pollution,	When natural resources such as, air, soil and water become polluted, they are unsafe for use. Pollution occurs when harmful substances contaminate the air, land or water. The harmful substances are pollutants. Air can be polluted in several ways. The pumping of exhaust fames from motor vehicles and smoke stacks of factories and ships and smoke from cigarettes are common causes of air pollution. When these pollutants mix with water vapour in the air, they produce acid rain. Acid rain can contain a combination of gases and solid particles that produce smog.	3a.Make a poster/draw or cut pictures with activities that show how the air becomes polluted. Have students identify and photograph images of pollution in their community. They will determine the scientific process behind, and the cause and possible effects of, the pollution in their photograph. Then have student groups present their images and their related cause and effects to the rest of the class.	*Science Horizon* Bk. 5 *Harcourt Science* Bks. 5 and 6 www.botany.uwc.ac.za/SCI_ED/grade10/ecology/.../poll.htm www.greenstudentu.com/encyclopedia/pollution www.eduationalimages.com/lit060001.htm www.springerlink.com/index/W7011303824Q7740.pdf	III a. Write an essay. Give three reasons why people should not pollute the air. Explain each reason clearly.

CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: LAND POLLUTION **STRAND 2: PROPERTIES AND STRUCTURE OF EARTH**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	Air can also be polluted by the addition of chlorofluorocarbon (C.F.C.'s). These are gases used in refrigerators, air conditioners and fire extinguishers. They float to the top of the atmosphere and breakdown the ozone layer. This allows harmful radiation from space to enter the atmosphere. The radiation causes humans to develop cancer. Another harmful effect of air pollution is the: "greenhouse effect". This is the trapping of heat in the atmosphere. The land is also being polluted. Garbage from homes and businesses and chemical wastes from industry and farming are being dumped into and on the land. Land pollution can be reduced in a number of ways including the use of specially designed landfills and leak proof cans.	Discuss: - How easy was it to find pollution to photograph? - What do these images tell them about pollution in their community? - What surprised them during the process? - What are the most common causes of pollution in their community? 3b. Class: Decorate a garbage bin encouraging people to use the bin instead of the ground. 3c. Arrange a clean up day at school/classroom. 3d. Make a "no dumping" sign for your school, home or the beach. 3e. Use a dictionary to define biodegradable and non biodegradable. 3f. Take an item that has been used and design it for another use. (e.g. can, bottle, popsicle sticks, phone cards, etc.).		III b. Make a pamphlet encouraging people to keep their surroundings, Clean, Green and Pristine. III c. Class arrange a beach clean up. III d. Write 5 ways that people waste water. Then, write how they can use the water wisely. III e. From a list of 20 items, form two columns Biodegradable/ Non Biodegradable. Put each item in the appropriate group.

CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: WATER POLLUTION **STRAND 2: PROPERTIES AND STRUCTURE OF EARTH**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	Most of the water on earth is salt water. Both salt water and fresh water are being polluted by a variety of sources including sewage, garbage, chemicals, like motor oil, bleach and other chemicals fishermen use to catch fish. Pollution promotes breeding of vectors and also provides vectors with homes. Some items that pollute the resources are biodegradable, but others are non biodegradable. Conservation is the wise use of natural resources. Resources can be conserved by reducing (use only what is needed), reusing (use things again) and recycling wherever possible.			III a-f. Worksheet containing different kinds of pollution. The students will classify each picture as: Air pollution, Land pollution or Water pollution. Design a garbage bin to encourage students to use it.

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 6
SCOPE OF WORK

TOPIC: OIL, COAL AND NATURAL GAS **STRAND 2: PROPERTIES AND STRUCTURE OF EARTH**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
4. Research and compare coal, oil and natural gas.	Coal, oil and natural gas are some of the most important fuels. A fuel is a substance that is burned to release its stored energy. They are also called fossil fuels. Fossil-fuels are made from decayed plants and animals that lived long ago. Coal was formed from the remains of plants. Coal is grouped as either hard or soft. Soft coals were formed most recently. They were under low pressures and low temperatures. Hard coals are the oldest coals and were formed under high temperatures and high pressures. Oil and natural gas formed the same way that coal was formed. However, they were formed from the remains of simple animals and plants. These tiny organisms lived on the earth many millions of years ago. Over time, high pressures and temperatures changed their remains to oil and natural gas. Many common products are made from oil. Gasoline and diesel fuel are both made from oil.	1a. Class discussion of method that were used long ago to light a fire. 1b. Make a poster that shows items made from oil. 1c. Watch video of how oil is taken from the ground.	*Science Horizon* Bk. 5 www.moorlandschool.co.uk/earth/earthresources.htm Resource Person from one of our local dealers of Esso, Texaco or Shell to discuss a. How Gasoline, diesel etc. get to the Bahamas. b. The cost in dollars and time for one shipment to arrive in New Providence. www.32/energy.com 2hoursago www.wikianswers.com/.../How_does_nuclear_power_compare_to_coal_oil_or_natural_gas_in_terms_of_cost_per_kwh www.naturalgas.org/environment/naturalgas.asp	I. Students answer questions about the formation of coal, oil and natural gas. Dramatize "The Importance of the Careful Use of Gasoline and Diesel etc." Cut out magazine pictures for a collage that illustrates the formation of coal, oil and natural gas.

CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: PETROLEUM AND NATURAL GAS **STRAND 2: PROPERTIES AND STRUCTURE OF EARTH**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	One of the main products made from natural gas is methane. Methane is the gas that is burned in most stoves. Coal, oil and natural gas are nonrenewable resources.			
5. Research to compare/explain advantages and disadvantages of fossil fuels.	Petroleum is a liquid that is found underground. It is sometimes called oil. Oil can be as thick and black as tar or as thin as water. Petroleum has a lot of energy. It is turned into different fuels – like gasoline, kerosene and heating oil. Most plastics and ink are made from petroleum. Long ago people did not dig for oil. The oil seeped from under the ground into ponds. It floated on the water. People gathered the oil from the top of the water. The energy in petroleum came from the energy in the plants and animals. It was formed from long ago. That energy came from the sun. Petroleum that is used today was formed millions of years ago. It is a nonrenewable resource. Petroleum has to be drilled from small pockets in rocks.	1a. Watch video which shows how oil is taken from the ground. 1b. Experiment to show how oil floats on water.	www.library.thinkquest.org/20331/types/fossil/advent.html www.alternativeenergysecret.com/fossil-fuels.html www.wiki.answers.com/…/What_are_the_advantages_and_disadvantages_of_fossil_fuels- www.ehow.com>...>Science&Nature>Science	I. Students answer questions about advantages and disadvantages of fossil fuels. II. Research: use the internet or product map to find out which countries have oil as a natural resource. Assign a fossil fuel (coal, oil, natural gas) to cooperative groups. Have each group use research cards to prepare a three minute radio documentary script about the advantages and disadvantages of fossil fuels.

CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: PETROLEUM AND NATURAL GAS **STRAND 2: PROPERTIES AND STRUCTURE OF EARTH**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	Oil wells are drilled into the rocks to reach the oil. A lot of oil is also under the oceans. Oil rigs that float are used to get this oil. After the oil is pumped, it is sent to refineries. At the refineries, it is separated into different kinds of fuels. Most of the oil is made into gasoline. Oil is also used to make products such as plastics, paints, medicines and soap. Burning fuels made from oil can pollute the environment. Natural gas is a gaseous fossil fuel consisting mainly of methane. Before a fuel, it must undergo extensive processes to have almost all other materials removed from it except methane. Compressed natural gas is a substitute for gasoline. It environmentally "clean" and it is safer than other motor fuels in the event of an oil spill. Natural gas is lighter than air, so it disperses quickly. Natural gas is also cheaper and is being used more in vehicles.	2. Interview dealers at Esso, Texaco and Shell gas stations to find out how gas prices have risen in 2008. Show this on a table/graph.	http://enwikipedia.org/wiki/naturalgas	

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 6
SCOPE OF WORK

TOPIC: PREDICTING WEATHER — **STRAND 2: CHANGES IN EARTH AND SKY**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Research and identify factors of weather.	**Weather** is the condition of the atmosphere at a certain time and place. Weather is predicted for only a few days because weather is always changing. Most weather conditions take place in the **troposphere** (the closest layer of the **atmosphere** to earth). A **meteorologist** is a person who studies the weather. A meteorologist uses certain instruments to predict the weather. These include a wind vane, rain gauge, thermometer, **barometer, anemometer** and **hydrometer**. An anemometer is used to measure wind speed and direction. A barometer measures air pressure. Air pressure is the weight of the air pressing down on the earth. A hydrometer (psychrometer) is used to measure relative humidity. Humidity is the amount of water vapour in the air. The conditions that make up weather and are measured are rain, air, **humidity**, **air pressure**, temperature, wind and water vapour.	1. Watch the weather channel and record for one week the weather conditions in Nassau or your island (or listen to the radio). Factors to record are: rainfall, temperature, air pressure, wind speed and direction and relative humidity. Channel: 37	*Science Horizons* Bk. 5 *Harcourt Science* Bk. 6 *McGraw Hill Science* Bk. 3 www.ecn.ac.uk/Education/factors_affecting_climate.htm World Map Resource Person	I. List the factors of weather on cards to write descriptive sentences.
2. Manipulate/look at pictures of models of weather instruments to identify them and explain how they work.		2a. Make models of some weather instruments. a. anemometer b. barometer c. hydrometer/psychrometer. 2b. Listen to a guest speaker from the Meteorological Office.	www.wiki.answers.com/../what_are_the_factors_affecting_climate_and_weather	II. Match the weather instrument to the factor of weather it measures. Rainfall–rain gauge (precipitation)
3. Explain the difference between weather and climate.		3. Work in groups. Study a map and choose one place. Discuss the types of climate that country would have according to its position on the map. Share with the class.	www.usda.gov/oce/weather/ www.weatherwizkids.com/ www.cybersleuth_kids.com/sleuth/Weather/Weather_Instruments www.hometrainingtools.com/weather-climate/c/21/	III. Research and write five facts that state how Bahamians benefit from the type of climate we experience in The Bahamas.

CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: PREDICTING WEATHER **STRAND 2: CHANGES IN EARTH AND SKY**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	Climate is the average weather conditions year after year. Scientists were able to tell what kind of climate a place had by observing the weather conditions of the area over a long period of time. In The Bahamas, we experience a sub-tropical climate.			IV. Visit the Met. Office to observe how they set up the weather station. Make a poster to show that (competition).

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 6
SCOPE OF WORK

TOPIC: WEATHERING AND EROSION **STRAND 2: PROPERTIES AND STRUCTURE OF EARTH**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Observe the environment and visuals to differentiate between weathering and erosion.	**Weathering** is the changing of rocks near the earth's surface through the actions of natural elements such as **wind, rain, heat, wave action, ice** and **snow.** The Earth's surface is constantly changing and breaking down due to the process of weathering and the effects of **erosion**. Weathering breaks rocks into smaller pieces while erosion carries these weathered materials from one place to another. Weathering occurs because of the changes in temperature and exposure to water and air (water, wind, ice and gravity are agents of erosion). Once rock is weathered and eroded, water, wind, ice and gravity deposit weathered material from the rocks to other places. This process is known as **deposition**. Earthquakes cause rapid changes on earth. An **earthquake** is a **vibration** or shaking of Earth's crust. Most earthquakes occur along **faults**. A fault is a break in the crust along which rock moves.	1a. Watch videotape on effects of erosion. 1b. Go on field trips to rocky shore, beach or hills to observe different stages of erosion. 1c. Collect samples of rocks and place them in different solutions. a. Saline b. Bleach c. Plain water d. Sugar water e. Vinegar Make observations after two weeks. Record data on erosion.	*Science Horizon* Bk. 5 *McGraw Hill* Bk. 5 *Harcourt/Brace* Bk. 6 Activity by Emily Miller Fresh Creek Primary Central Andros (1c) *Harcourt Science* Bk. 4 www.scarborough.k12.me.us/high/projects/../erosion.htm	I. Fold a sheet of paper in halves. On one side draw a picture to show erosion and on the other side draw a picture to show weathering. (Group work) A reporter from each group will explain each picture to the class.
2. Research and identify the forces that cause weathering and erosion.		2. Students study pictures and under each picture write the force that is responsible for the weathering. • Use a fan to represent wind and place it near soil to show soil being blown to another area. • Pour water slowly through a straw over soil to show the movement of soil by water.	www.kidsgeo.com/geology_for_kids/0060_weatgerubg_php www.nature.nps.gov/GEOLOGY/usgnps/misc/gweaer.html www.science.nationalgeographic.com/.../weathering-erosion-article.html	II. Locate an area in the environment (home, school) that was weathered or eroded. Sketch a picture of it and explain what caused the weathering or erosion.

CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: WEATHERING AND EROSION **STRAND 2: PROPERTIES AND STRUCTURE OF EARTH**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	Rock on either side of a fault can move up and down, side to side, or both. Earthquakes are measured on a **Richter Scale** which uses numbers from 1-9. A **volcano** is a mountain that forms when red hot melted rock flows through a crack onto the earth's surface. Melted rock inside Earth is called **magma**. Melted rock that reaches Earth's surface is called **lava**. The lava and gases that erupt from volcanoes are very hot and often destroy everything in their path. Volcanic eruptions also form new crust on continents.			III. Go to your school library with a friend to read about Earthquakes and Volcanic Eruptions. Name the mountains and state the damage it caused. Also, find out the measurement on the Richter Scale of the eruptions.

CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: STORMS **STRAND 2: CHANGES IN EARTH AND SKY**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Research to compare the traits/characteristics of storms.	A **storm** is an unusual weather **disturbance**. There are many kinds of storms. But all storms have some conditions in common. All storms start when warm, moist air rises. The rising air causes low air pressure at the earth's surface. Other common weather conditions include clouds, and either rain, sleet, hail or snow. Storms also have strong winds and lightning. A **thunderstorm** is a small local weather disturbance which can be identified by tall clouds, heavy rain and thunder and lightning. Most thunderstorms form along the edges of cold fronts. A **hurricane** is large tropical storm that is formed in warm waters. It has very high winds and heavy rainfall. The centre of a hurricane is called the "eye". This area has calm winds. However, the winds around the eye are very powerful. A **tornado** is a small funnel of quickly spinning air. Tornados are formed on land. This is the most dangerous storm which lasts for only a few minutes.	1a. Discuss what damages storms/hurricanes usually do. (Katrina and others) 1b. View video of damages after a hurricane. Have students look at pictures of storm damages. They will describe the damages and then and determine which type of storm caused it.	*McGraw Hill Science* Bk. 3 *Science Horizon* Bk. 5 *Harcourt Science* Bk. 6 www.yokota.af.mil/photos/mediagallery.asp?galleryLD=3107 www.en.wikipedia.org/wiki/storm_(Marvel_Comics) www.answers.yahoo.com/question/index?qid	I. The students will be given a sheet of paper with three information boxes. They must read the clues and decide whether the information in each box are those of a hurricane, tornado or thunderstorm. II. Research to find out how storms are named.

CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: STORMS **STRAND 2: CHANGES IN EARTH AND SKY**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	The winds are more powerful than the winds of a hurricane. Tornados often form during violent thunderstorms. They are also referred to as cyclones and waterspouts depending on where they form.			III. Research at least five years before to find the names of the worst hurricanes for each year. Use a map to mark the route each one traveled. Students can also describe the damage caused by those hurricanes.
2. Investigate and record safety precautions during a storm.	**Safety Precautions During a Storm:** 1. Remain indoors. Avoid small buildings that are isolated from other buildings. 2. Do not touch electrical outlets, telephones with cords (except for emergencies), faucets or plumbing pipes. 3. If you are out in the open, lie flat. 4. Don't take shelter under a tree. 5. Stay out of water. 6. Secure any loose objects outdoors that can become missiles. 7. Make sure you have medical supplies, canned food, water, flashlights, candles, a radio and batteries. 8. Secure your property especially those that are on the outside.	2. Pretend to be a reporter telling people how to be safe during a storm.	*Science Horizons* Bk. 6 *Harcourt Science* Bk. 5 www.yourradioplace.com/weather/lightening.htm home.howstuffworks.com/home...safety/.../storm_safety_tips.htm www.fema.gov/hazard/winter/wi_before.shtm	II. Make a flyer to inform people how to prepare for a storm. Select magazine pictures, to compile a storm safety booklet.

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 6
SCOPE OF WORK

TOPIC: PLANETS **STRAND 2: UNIVERSE AND THE SOLAR SYSTEM**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Collect data to compare and contrast the surface and atmosphere of the planets.	**Mercury** has hardly any atmosphere at all. Its surface is covered with crater like Earth's moon. It is covered with rocklike dust. The main gases are helium, hydrogen and oxygen. Scientists think that **Venus** has a rocky core and surface. Pictures of its surface show mountains, rolling plains and what may be active volcanoes. There is no water on Venus. The main gases are carbon dioxide and nitrogen. **Mars'** surface is covered with **red dust**. The atmosphere of Mars is thin and consists mainly of carbon dioxide gas. Mars also has volcanoes, canyons, craters and sand dunes. **Jupiter's** well known feature is the Great Red Spot. This is believed to be a swirling storm in the atmosphere. Jupiter is made mainly of hydrogen and helium gases. **Saturn's rings** are thought to be made up of ice. The main gases in **Saturn's** atmosphere are hydrogen, helium and methane. Uranus is the planet that **rotates on its side**. The atmosphere consists of the gases hydrogen, helium and methane.	1a. Draw a table to show the gases each planet's atmosphere is made up of. 1b. Search the internet for a song about the planets. Share it with the class. 1c. Make a model of the Solar System. Students can create their own songs about the planets and share with the class.	*Science Horizon* Bk. 5 *Science Horizon* Bk. 6 *Harcourt Science* Bks. 5 and 6 www.factmonster.com>...>TheSolar System www.msnucleus.org/membership/htmk/k-6/uc/.../ucss5_3a.html www.universetoday.com>guidetospace>thesolarsystem www.kidsastronomy.com/the_planets.htm www.smartconversion.com?..?surface_area_of_planets_and_the_Sun.aspx	I. Match planet clues on cards to each planet. II. Make a model of the Solar System using Styrofoam balls of different sizes or other desired materials. Use a table to compare and contrast the planets.

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 6
SCOPE OF WORK

TOPIC: PLANETS **STRAND 2: UNIVERSE AND THE SOLAR SYSTEM**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
2. Hypothesize which planets are susceptible to life.	**Neptune** is a pale blue planet with an atmosphere of methane, hydrogen and helium. The atmosphere has a Great Dark Spot that is believed to be a huge storm system the size of earth. **Pluto**, which is no longer considered to be a planet, was recorded as being made mostly of frozen gases and the coldest of all the planets. The atmosphere is thin and made of methane. **Earth's** atmosphere consists of about (4/5) four fifths nitrogen gas and the remaining one fifth (1/5) is mostly oxygen gas. Earth is the only planet with that amount of oxygen. Oceans of liquid water cover nearly three quarters of the surface of earth. Clouds of tiny droplets of water or ice crystals hang above Earth's surface. Ice covers the poles. Mountains, valleys and deep canyons are found on Earth. Earth seems to be the only planet that has living things on it.	2. Make up a rap to any desired tune to explain why earth has living things on it. Cut circles and manipulate them to represent the composition of gases in earth's atmosphere.	www.astro.rug.nl/~onderwys/sterllproject97/.../index.html www.columbia.edu/cu/augustine/arch/frear/rutler97.htm	II a. Design a model of planet earth. Let it hang from a hanger (mobile). Use strings to attach at least four living things from the hanger. (Other versions may be made.) II b. Build Earth layer by layer: Make a model of Earth's interior. Use clay of different colours to show Earth's layers. Label each layer.

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 6
SCOPE OF WORK

TOPIC: EXPLORING THE UNIVERSE AND SURVIVING IN SPACE **STRAND 2: UNIVERSE AND THE SOLAR SYSTEM**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Research to identify equipment used to study objects in space.	The study of objects in space is **astronomy**. A scientist who studies objects in space is an **astronomer**. Astronomers use devices, including telescopes to study distant objects in space. A telescope is a device that makes objects that are far away, appear closer. Some telescopes collect more light than the unaided eye can see. A light telescope collects visible light and uses it to form images of distant objects. One of these telescopes is called a **Refracting telescope**. It uses lenses to form objects. Another type of light telescope collects light with a saucer-shaped mirror. This is called a **Reflecting telescope**. Scientists now have a reflecting telescope out in space. It is called the **Hubble Space Telescope**. This telescope is designed to be in orbit around Earth and to send images to Earth from space.	1a. Study picture/video of various telescopes. 1b. Use class telescopes around the school and measure the distance that objects can be seen clearly. 1c. Make a telescope.	*Science Horizon* Bk. 5 *Harcourt Science* Bk. 6 www.en.wikipedia.org/.../United_States_Space_Surveillance_Network www.xml.coverpages.org/gbXML-schema.txt www.rasc.ca/im/education/saskatchewan.pdf	I a. On a sheet of paper each student explains the difference between Reflecting and Refracting telescopes. Exchange papers then check the answers. Discussion with the teacher will follow. Students correct their mistakes after receiving their sheets with their answers. I b. Write the advantages of using the telescope to study objects in space. I c. Research the internet to find out how to build a model telescope.

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 6
SCOPE OF WORK

TOPIC: EXPLORING THE UNIVERSE AND SURVIVING IN SPACE **STRAND 2: UNIVERSE AND THE SOLAR SYSTEM**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
2. Investigate and identify pictures of vehicles used to explore the universe safely.	Scientists use special crafts to explore space. The crafts are pushed into space by powered rocket engines. Three types of spacecrafts are presently being used. The **space probe** does not carry humans. It gathers data about objects in space and sends that information back to earth to be processed. One of the most useful spacecrafts is the **space shuttle**. A space shuttle is a vehicle composed of giant fuel tank, large rocket (engine) and an obiter. The orbiter can be launched into space and returned to earth. It carries passengers and equipment. A **space station** is a spacecraft in space at all times. This is where scientists live while working in space. The two countries that have done the most work in space are the U.S.A. and Russia. Other countries involved in space exploration are China and a group of European countries.	2. Collect pictures of spacecrafts and paste them in a booklet. Identify each picture. In groups students will design and build a Crew Exploration Vehicle (CEV) that will be a model for future space exploration	*Harcourt Science* Bk. 4 *Science Horizon* Bk. 5 http://www1.nasa.gov/pdf/146851main_Designing_a_CEV_Student.pdf	I & II. Complete a questionnaire about the information that was given about space crafts. I & II. Visit the planetarium at the Adventure Learning Centre. Probe Research. Type the words "Starchild NASA Space Probes" into an internet search engine. Click on the website that ends in "nasa.gov," and read the latest news on space probes. Write a short report on what you find, and read it to the class.

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 6
SCOPE OF WORK

TOPIC: PHYSICAL PROPERTIES AND CHANGES **STRAND 3: PROPERTIES AND CHANGES IN MATTER**

PHYSICAL SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Manipulate objects to identify physical properties. 2a. Predict and experiment to explain physical changes in objects. 2b. Manipulate equipment used to measure physical properties of matter.	All substances have certain characteristics called **properties**. Properties can be **physical** or **chemical**. A physical property is a feature that can be observed or measured without changing the substance or any of the materials it is made of. Physical properties that can be observed are **colour, shape, size, luster** and **texture**. Physical properties that can be measured are **density, heat, length, height, width** and **thickness**. Some physical properties such as melting point, boiling point and colour do not change. When we change the physical properties of a substance, this is called a physical change. Examples of physical changes include sharpening a pencil, grating coconut, cutting paper and melting wax. Although change took place, the properties of each substance remained the same.	1. Describe an object while the remainders of the class guess what the object is. 2a. Work in groups: Each group will be given an object. Together they will decide how to change the object without changing the properties. (i.e. Chalk, popside sticks, orange, paper, cloth, etc.) 2b. Class experiment: heat water to change it to steam, then let the steam go on a plate to be changed back to water.	*Harcourt Science* Bk. 6 *Science Horizons* Bk. 5 *Science In Your World* Bk. 6 www.chem4kids.com/files/matter_intro.html www.emints.org>eThemes www.youtube.com/watch?v=pmHxYE_vDBs www.2.mcdaniel.edu/Graduate/TI/pages/../matterweb.htm	I. Students list 3 physical properties of pictures of six objects. II. Students pop corn then measure the densities of the popped and unpopped corn using a balance. III. Observe the densities of different liquids. Draw and record observations. 1. Measure and pour the same volume of honey, cooking oil and water into a jar. Replace the lid tightly then shake. 2. Observe and record your observations over the next hour or so. 3. What can you conclude about the density of the liquids you used?

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 6
SCOPE OF WORK

TOPIC: CHEMICAL PROPERTIES AND CHANGES **STRAND 3: PROPERTIES AND CHANGES IN MATTER**

PHYSICAL SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
3. Experiment and record chemical changes in objects and substances.	Chemical properties describe how particles are re-arranged when one substance **reacts with another substance**. When two substances react and a new substance is produced, which is unlike either of the original substances used, a chemical change has taken place. **A new substance is formed during a chemical change**. Some substances react quickly while others react slowly. Combustion (burning) and decomposition (rotting) are types of chemical reactions. Some chemical changes give off energy. E.g. burning coal releases heat and light energy. Some changes require the addition of heat energy. Examples of these are the chemical changes that cause food to spoil or iron to rust. Naturally occurring chemical changes can be harmful. To avoid the effect of naturally occurring chemical changes, we can resort to freezing or drying to preserve food.	3. Teacher conducted experiment: Light a piece of paper using a match to show how the properties of the paper will change. Smoke and ashes will be formed.	*Harcourt Science* Bk. 5 *Science Horizons* Bk. 5 *Science In Your World* Bk. 6 www.chemistryabout.com/od/…/a/chemphyschanges.htm www.chem4kids.com www.lessonplanspage.com/SciecneMDChangeMatterChocolates57.htm www.iit.edu/~smile/cheminde.html www.ccboe.net/../elementary www.acs.org/kids www.teachers.yale.edu/curriculum/search/viewer.php?id+houston_04	III a. Students describe in a short paragraph how a chemical change takes place.
4. Investigate chemicals to identify some that will cause changes in matter.		4. Students experiment: Materials: 20ozs plastic bottle, balloon, baking soda, spoon, funnel, white vinegar. a. Put two spoonfuls of baking soda in the balloon. b. Pour a little vinegar into the bottle. c. Place the mouth of the balloon over the bottle. d. Pour the baking soda from the balloon to the bottle. e. Draw the diagram and explain the results.		IV. Collect labels from chemical items used in the house to clean. E.g. Joy, Ajax, tile cleaner, washing detergents. – Identify which substances contribute to the make-up of each item.
5. Research to distinguish between a physical change and a chemical change.		5. Collect three jars and three nails: pour the same amount of coke, alcohol and salt water in each jar. Place one nail in each jar. Place one nail in each jar. Record the results over a one month period.		Va. Student will complete a worksheet. 10 activities will be on the worksheet. The students will write whether the activities show a physical or a chemical change.

CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: CHEMICAL PROPERTIES AND CHANGES **STRAND 3: PROPERTIES AND CHANGES IN MATTER**

PHYSICAL SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
	Tools can be kept well oiled to prevent rusting. Rusting takes place when chemicals react with oxygen. Substances that prevent corrosion (rusting) are called **antioxidants**.			V b. Class activities: b. Make a fruit salad. c. Bake cup cakes. Explain why the fruit salad is an example of, a physical change, but the cup cakes demonstrate a chemical change.

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 6
SCOPE OF WORK

TOPIC: COMPARING AND MEASURING MATTER **STRAND 3: PROPERTIES AND CHANGES IN MATTER**

PHYSICAL SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Experiment to compare and measure matter.	Many physical **properties** can be measured with instruments. Mass is one of those properties. **Mass** is the amount of matter in an object. A golf ball has more mass than a table-tennis ball, but to find the exact mass of each ball, it must be measured with a **balance**. **Density** is a property that is related to mass. Density is the measure of the mass of a certain volume of a substance. Suppose that two substances have the same mass but that one takes up more space. The one that takes up more space has the lower density. The amount of space that matter takes up is called **volume**. Measuring cups and spoons are used to measure volume. Scientists measure volume with a beaker or a **graduate**, a tall cylinder with measuring marks on the side.	1a. Guess which objects will be heavier or lighter. Measure them and record the results. (Use scale) 1b. Measure the volume of objects such as stones, marbles etc. by using a graduate with water. 1c. Collect 10 household items and record the measurement of each one.	*Science Horizon* Bk. 5 *Harcourt Science* Bk. 4 www.cmouston.org/en/cev/1436 www.eduplace.com/math/.../te_1_10_measure_developl.html www.classroom.jc-schools.net/sci-units/matter.htm www.oecta.on.ca/curriculum/matter/grade5/5Intro.pdf	I. Complete a table by filling in the instrument that is used to measure each object on the table. E.g. sugar, Wesson oil, tin of soap, etc. Also, state the units of measurement for each one. Have students collect items used for measurement at home and at school. Then have them make a list of the items and beside each measurement whether it is used as a measure of length, volume, or mass and then indicate the correct unit of measurement. E.g. Milk – volume - Liter

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 6
SCOPE OF WORK

TOPIC: MAGNETISM **STRAND 3: FORCES AND ENERGY**

PHYSICAL SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Experiment with magnets to locate the poles and the magnetic field.	The force in which magnets are used is the force of magnetism. A magnet is an object that attracts certain material, usually objects made of iron or steel. A magnet has two ends called magnetic poles or just poles. A magnet's pull is strongest at the poles. The north-seeking pole is usually marked N and the south-seeking pole is usually marked S. At times magnets pull toward each other, but at other times they push away from each other. This is a magnetic force caused by magnetic fields. A magnetic field is the space all around a magnet where the force of the magnet can act. Opposite magnetic poles attract (NS). The same magnetic poles repel. (NN/SS)	1a. Students work in with different kinds of magnets to feel the push and pull of the poles. 1b. Use a magnet and iron filings to show the lines formed in the magnetic field. 1c. Experiment: a. Attach a piece of sting (6-8 ins) or cord to a paper clip. b. Anchor the string to the desk with clay. c. Use a magnet to attract the paper clip. d. Pull the magnet away from the paper clip to see how far the magnetic field extends.	*Harcourt Science* Bk. 4 *Science Horizons* Bk. 5 *Science In Our World* www.eskimo.com/~billb/electrom/statbot/.html www.education.jlab.org/qa/electromagnet.html www.image.gsfc.nasagov/poetry/magnetism/magnetism.html www.science.howstuffworks.com>…>PhysicalScience>Physics	I a. Design the lines of a magnetic field on a coloured sheet of paper. I b. Draw bar magnets to show when they will repel and when they will attract. I c. Use a magnet to go around the school to find out which things will be attracted to the magnet. Record observations and make a note of what you expected to be attracted and which things surprised you.

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CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: MOTION AND FORCES **STRAND 3: FORCES AND ENERGY**

PHYSICAL SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
2. Manipulate objects to infer the relationships between motion, speed and direction.	Motion is any change of position. To observe motion, an object's position must first be determined. Position is an object's place or location. If an object's position is changing, the object is in motion. If the object is still, it is at rest. One way to describe the motion of an object is its speed. Speed is the measure of the distance an object moves in a given amount of time. A force is a push, pull or lift of an object. A force can start a motion, stop a motion or change direction of a motion. It can also change the speed of motion. If a force pushes an object in the same direction as the object's motion, the speed will increase. If it pushes in the opposite direction, the speed will decrease.	1a. Make a ramp using books. Use small toy cars to go down the ramp. Measure the distances in inches/cm and record results on a graph. 1b. Students go outside to bat balls. They must then explain how the direction and speed of the ball changes. Have students work in pairs to describe the changing motions of a yo-yo using the vocabulary words: force, speed, gravity, and friction. All partners will help each other clarify explanations as they practice. Record on a class chart which students are able to successfully use the vocabulary in their explanation.	*Harcourt Science* Bk. 4 *Science Horizon* Bk. 5 www.physics4kids.com/files/motion_velocity.html www.skwirk.com.au/...motion/motion/motion/direction-and-speed-velocity www.pbs.org/wgbh/nova/teachers/activities/2513_mir.html	I. Students make cards to define: Motion, speed, force, direction, position and rest. II. Write a story that has to do with an object that has to be moved but is difficult to move. Describe different ways that are used to apply force to the object. Make the story lively and humorous. III. Collect small toys (usually given in "Kids Meals" at fast food places e.g. K.F.C.) Display the toys and label each one with the kind of motion it has. Have each student design a poster including diagrams to illustrate the motion of the yo-yo as it falls and moves back up the string. Ask them to identify where the yo-yo moves fastest and slowest with labels and arrows. Ask students to use the vocabulary words in their descriptions.

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CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: SIMPLE ELECTRIC CIRCUIT **STRAND 3: FORCES AND ENERGY**

PHYSICAL SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Experiment to explain how a simple circuit works.	A flow of electric charges is called an **electric current**. A wire, a bulb and a battery are needed to make a path in which negative charges could flow. This path is called a **circuit**. The battery is an electric cell which supplies energy to move charges through the circuit. The electric wire is made of metal, mainly copper. This wire is the **conductor** that allows current to pass through it easily. The plastic covering the wire is called an **insulator**. Insulators do not allow current to pass through them easily. A switch is used to turn an electric current off or on. When the switch is on, the path is complete. Then the light bulb comes on. (Closed circuit). When the **switch** is off, the path is broken (open circuit). The light bulb would be off.	1a. Students use wires, bulb, batteries and switch to make a simple circuit. 1b. Explain what each part of the circuit is used for. (bulb, wires, switch, battery)	*Harcourt Science* Bk. 4 *Science Horizons* Bk. 5 www.science.howstuffworks.com>,,,>Energyproduction www.cando.com/uci/lessons99/electricity.html www.hantsfire.gov.uk/circuits www.earthcarecanada.com/EarthCare.../6_simplecircuits.pdf www.electronics.howstuffworks.com>…>SolidStateElectronics	I a. Write the steps in sequence that were carried out to make the light bulb come on. Draw a diagram. I b. Explain how conductors and insulators are different. I c. Make a simple circuit on a wooden board or hard card. Design questions and answers to display how it works.

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CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: FRICTION **STRAND 3: FORCES AND ENERGY**

PHYSICAL SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Investigate objects and materials to discover the effects of friction on them.	**Friction** is the force that resists the movement of one object against another when objects touch. Friction enables you to push against the ground and move your body forward. Friction is involved in the most ordinary actions of your daily life. Although friction is needed to produce motion, it is also needed to reduce motion. (I.e. friction between nails and wood will hold the wood together). At times, friction is not useful (too much friction can prevent moving parts on a machine to stop working). It causes wear and tear in clothing, tennis and shoes. The amount of friction can be changed by using different materials.	1. Demonstrate activities on certain materials to find out the affects of friction on them. a. Try to open the door knob with oil on the hands. b. Attempt to slide on the carpet with shoes on. c. Push a heavy book across the desk, then put the book on some round pencils then push the book across the desk again.	*Science Horizon* Bk. 5 *Harcourt Science* Bk. 5 *Science In Your World* Bk.6 www.sciencebuddie5.org/science-fair.../ApMech-p012.shtml www.science.jrank.org/pages/2858/Friction.html	I. Students choose three activities in the classroom or outside. They must state how friction affects these activities. (E.g. teaching writing on the chalk board with chalk; erasing with a rubber for ink versus a rubber for pencil lead.)

CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: PULLEYS AND WHEEL AND AXEL **STRAND 3: FORCES AND ENERGY**

PHYSICAL SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Research to identify pulleys and wheel and axle. 2. Experiment to conclude how pulleys and wheel and axles make work easier.	**Work** is done on an object when a force moves the object through a distance. People have made some machines to make work easier. A **pulley** is one such machine. It is made up of a rope or chain and a wheel around which the rope fits. When you pull down on one rope end, the wheel turns and the other rope end moves up. A pulley that stays in one place is called a fixed pulley. It is used to raise and lower something lightweight, such as a flag or a small sail. The other kind of pulley is called a moveable pulley. It is free to move up and down. One end of the rope is tied down. The load is hooked to the pulley. Pulling upon the rope makes both the pulley and the load rise. **A wheel and axle** is made up of a large wheel attached to a smaller wheel or rod. A doorknob is part of a wheel and axle. The large, round knob turns the smaller axle. The axle is what pulls in the latch to open the door. Without the large knob, it would be difficult to turn the axle. The small effort force you use to turn the knob becomes a large resulting force put out by the axle.	1. Observe pictures and videos of pulleys and whell and axle. 2. Examine the school's flag and draw a picture to show how it works. Write a short paragraph to explain how it works.	*Harcourt Science* Bk. 4 *Harcourt Science* Bk. 6 Invite a resource person in from B.T.V.I or in the community. *Science Horizon* Bk. 3 www.science.jrank.org/page/4060/Machines-Simple.html www.lessonplanel.com/search?...pulleys%2C+wheel...axle www.owlnet.rice.edu?~elec201/Book/basic_mech.html	I. Use the internet to collect pictures of pulleys and wheel and axle. II. Students learn how to make a simple pulley or wheel and axle. III. List some simple machines in your house. Compare your list with your neighbor's.

CURRICULUM GUIDELINES
GRADE 6
SCOPE OF WORK

TOPIC: CONSERVATION OF ENERGY **STRAND 3: FORCES AND ENERGY**

PHYSICAL SCIENCE

LEARNER OUTCOMES	CONTENT	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Investigate and describe ways in which energy can be conserved.	Like matter, energy cannot be created or destroyed. Once we have used up the supply of energy, it cannot be renewed. We must conserve (use wisely) the energy supplies that we have and look to other substances for energy. Some of the areas we might be able to find additional energy include wind power, the energy stored in moving waves of the sea and solar energy. Scientists are exploring ways of utilizing these now. One way to conserve energy in out homes is to turn off lights and other electrical appliances like fans and televisions when they are not in use.	1a. Discuss general practices in the homes regarding lights, fans, T.V., refrigerators and air conditioners. 1b. Watch a video about energy.	50 Things You Can Do To Save The Earth www.enwikipedia.org/wiki/Energy_conservation www.library.thinkquest.org/2745/data/lawcel.htm www.earthcarecanada.com/EarthCare.../EarthCARE_lessons.asp classroom.jc-schools.net/SCI-units/energy.htm www.internet4classrooms.com/skills_2ndscience_tx.htm	I. Students record 10 things they did at home to conserve energy. Divide class into groups with 2 - 4 students. Give the students pictures of items (E.g.: TV, coffee pot, dishwasher, electric clock, hair dryer, phone, refrigerator, toaster, can opener, fan, vacuum cleaner, stereo, computer, VCR, iron, electric blanket, washer/dryer, etc.) that are found in our homes and which use electricity. Students will pretend that there is an energy shortage and they have to pick only twelve items from the above pictures. In their groups they will rank their choices using numbers. Each group discuss their choices and reasons for making those particular choices.

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.

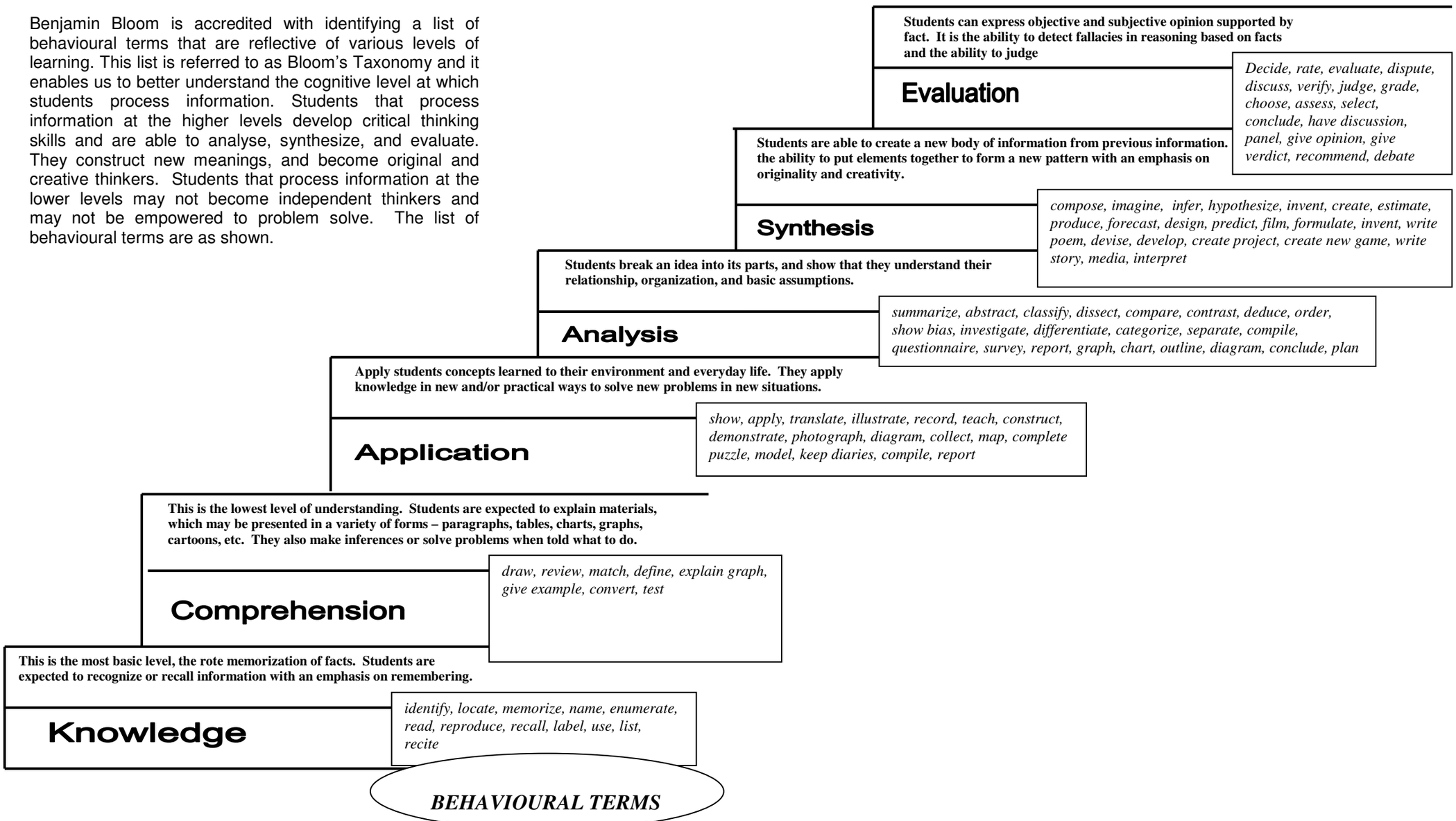
When using the Constructivism Theory, it should be noted that there are times when knowledge has to be imparted directly by the teacher in a detailed and explicit way. Although many benefits can be accrued from utilizing the Constructivism Theory if it is not used properly, learning may become sporadic 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 list 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 patters 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 he 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.

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 judgements 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 predications 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 provides 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 …	*More Emphasis on …*
Assessing what is easily measured	Assessing what is most highly valued
Assessing discrete knowledge	Assessing rich, well-structured knowledge
Assessing scientific knowledge	Assessing scientific understanding and reasoning
Assessing to learn what students do not know	Assessing to learn what students understand
Assessing only achievement	Assessing achievement and opportunity to learn
End-of-term assessment by teachers	Ongoing assessment by students of their work and that of others
Development of external assessment by experts alone	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, assign an investigation, brainstorm, draw a picture, or perform 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 form 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 student scan express themselves in writing, as indicated by the way they respond to problem sobbing 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 the 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
    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 features 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 were chemical splash safety goggles.

b. **Asbestos.** Asbestos should not be used and should be discarded according to school system policy. Some forms of this mineral – commonly used in hear-proofing applications – is know to cause cancer.

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 though, 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 though, 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
	Requires 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 Oservations _____ Calculations _____ Questions _____ Conclusion _____

1	2	3	4	5
strongly disagree		somewhat agree		strongly agree

The response to the questions were carefully though 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 use 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 encourage to proceed in any order; using the examples and characteristics to help them formulate a definition.

IV. **"ALPHABOXES"**

This strategy could be use as a brainstorming activity to elicit student's prior knowledge and to activitate learning, or it could be use 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 use 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 encourage 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 remember.

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 use 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 use to test vocabulary in Science.

VIII. **SWAT**

This is a fun way to review vocabulary. Teachers are encourage 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 to word 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 strategy 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 use 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 observe the ACT and then make 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

GRADE: 5 – 6

WORD:	DEFINITION:
Angiosperm	A plant in which the sex organs are within flowers and the seeds are in a fruit.
Antioxidants	Substances that prevent corrosion (rusting).
Astronomer	A scientist who studies objects in space.
Astronomy	The study of objects in space.
Atmosphere	The layer of air that surrounds our planet.
Atrium	The two upper chambers of the heart.
Balanced Diet	A diet of a variety of foods that give the body all the nutrients it needs.
Biodegradable	The chemical breakdown of materials by a physiological environment.
Biome	A large region on the earth that has a certain climate and certain kinds of organisms.
Cartilage	The ends of all bones are coated with a layer of rubber-like tissue.
Cell	The basic structural and functional unit of all organisms.
Chemical property	The property of changing readily from a solid or liquid to a vapor.
Chlorophyll	Chlorophyll is a chemical found in special structures in plant cells
Chloroplasts	Food producers of the cell
Circuit	A wire, a bulb and a battery are needed to make a path in which negative charges could flow. This path is called a circuit.
Climate	The average weather conditions year after year.
Compound Machine	Made up of two or more simple machines.
Conservation	The wise use and careful management of natural resources.
Constellation	A group of stars such as Southern Cross, Great Dipper, Little Dipper, Orion and the twelve signs of the Zodiac.

WORD:	DEFINITION:
Core	The central part of the Earth.
Crust	The outer layer of the Earth.
Crustaceans	Arthropods that have two body sections and two pairs of antenna
Degree	A thermometer measures heat on a scale.
Density	How full area is: the concentration of people or things within an area in relation to its size.
Drug	A medicine is a drug-a chemical taken into the body the affects how the body functions.
Drug abuse	The misuse of drugs.
Echinoderm	Echinoderms are marine invertebrates.
Ecosystems	An environment where living and nonliving things interact and affect each other.
Electric current	A flow of electric charges.
Energy	The power to do work. It is the ability to cause change.
Exoskeleton	The exoskeleton protects the organs inside the animal's body.
Fiber	Helps food move through the digestive system and prevents some forms of cancer.
Flower	The reproductive structure found in flowering plants.
Food Chain	The movement of energy from organism to organism.
Food Web	Shows the overlapping food chains in an ecosystem. It shows more clearly how energy moves.
Fossil fuels	Fuels formed by natural resource.
Fossils	The remains or traces of past life found in sedimentary rock.
Friction	The rubbing of two objects against each other when one or both are moving.
Fungi	A kingdom that is separate from plants, animals and bacteria.

WORD:	DEFINITION:
Graduate	A tall cylinder with measuring marks on the side.
Greenhouse effect	Warming that result when solar radiation is trapped by the atmosphere.
Heart	The main organ of the circulatory system.
Hibernation	A period when an animal goes into a long, deep 'sleep'.
Hurricane	A large tropical storm that is formed in warm waters.
Indigenous	Plants that is native to The Bahamas.
Invertebrates	Animals without backbones.
Kinetic Energy	The energy of motion.
Levers	Simple machines used to lift weights.
Ligaments	Are connective tissue.
Magnetic field	The lines of force surrounding a permanent magnet or a moving charged particle.
Magnetism	Describe how materials respond on the microscopic level to an applied magnetic field.
Mantle	Covers the organs. The mantle is a fleshy covering that protects the organs.
Mass	A body of matter that forms a whole but has no definable shape.
Meteorologist	A specialist who studies processes in the earth's atmosphere that cause weather conditions.
Migration	Turtle's instinct on where to go.
Mixture	Made of two or more different substances.
Mollusk	An invertebrate that has a soft body.
Motion	The act or process of moving, or the way in which somebody or something moves.
Muscles	Found throughout the body and are responsible for movement.

WORD:	DEFINITION:
Natural resource	Occur naturally within environments that exist relatively undisturbed by mankind.
Non renewable resource	A finite mass of material which cannot be restored after use, such as natural gas. Non-renewable resources may be sustained by recycling.
Non-Biodegradable	Waste that cannot be broken down by other living organisms.
Orbit	A path on which an object travels as it moves around another planet.
Paleontologists	Scientists who study fossils.
Parasite	Mushrooms growing on live trees.
Photosynthesis	A process in which plants make their own food.
Physical property	A feature that can be observed or measured without changing the substance or any of the materials it is made of.
Planet	One of the eight large bodies that move around the sun.
Pollination	The process by which plant pollen is transferred from the male reproductive organs to the female reproductive organs to form seeds.
Pollutant	waste matter that contaminates the water or air or soil
Pollution	Changes the ecosystem.
Pore	The outer covering of the sponge's body is covered with tiny holes.
Potential Energy	It is the energy of position or condition. It is stored energy.
Predator	An animal that feeds on other living animals.
Prey	The animals that predators eat.
Reflecting telescope	A telescope in which light from the object is initially focused by a concave mirror.
Renewable resource	Any natural resource that can be replenished naturally with the passage of time.
Reproduce	To produce offspring or new individuals through a sexual or asexual process.
Resource	A material that living things use.

WORD:	DEFINITION:
Retracting telescope	Uses lenses to form objects.
Revolution	The movement of a planet along its orbit around the sun.
Richter scale	A scale for measuring earthquakes, which uses numbers from 1-9.
Rotation	The turning or spinning of a planet on its axis.
Shrub	Woody plant with several stems: a woody plant without a trunk but with several stems growing from the base.
Skeleton	Made up of all the bones in the body.
Solar System	Made up of all the planets that orbit our Sun.
Solute	The substance that melts.
Solution	When water is added to sugar, a solution is made. It dissolves in another substance.
Solvent	The substance that does the dissolving.
Speed	Distance travelled per unit time.
Sponge	Sponges are marine animals, invertebrates, filter feeders (they filter tiny particles of food from the water).
Stimuli	A detectable change in the internal or external environment.
Stinging-Cell Animals	Have stinging cells that contain poisonous threads.
Stomata	Tiny openings in the leaves.
Storm	An unusual weather disturbance.
Substance	Something made of only one kind of matter.
Succession	The series of changes that create a full-fledged plant and animal community.
Temperature	The amount of heat in a substance.
Tentacles	A tentacle is an arm-like part that contains the stinging cells.

WORD:	DEFINITION:
Thermometer	Measures heat on a scale.
Thunderstorm	A small local weather disturbance which can be identified by tall clouds, heavy rain and thunder and lightning.
Tornado	A tornado is a small funnel of quickly spinning air.
Tree	A figure that branches from a single root.
Tropism	A plants response that involves growth.
Troposphere	The closest layer of the atmosphere to earth.
Vectors	Organisms that spread germs and diseases.
Vent	An opening.
Ventricle	The two lower chambers of the heart.
Vine	A plant with a weak stem that derives support from climbing, twining, or creeping along a surface.
Vitamins	Vitamins help important chemical reactions take place in your body.
Volcano	A mountain that forms when red hot melted rock flows through a crack onto the earth's surface.
Weather	Weather is the condition of the atmosphere at a specific time and place.
Weathering	The changing of rocks near the earth's surface through the actions of natural elements such as wind, rain, heat, wave action, ice and snow.
Work	When the position of an object is changed either by using a pushing, lifting, pulling, dragging or dropping force.
Worm	Worms are invertebrates.

SECTION F

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