COMMONWEALTH OF THE BAHAMAS
MINISTRYOF EDUCATION
AND TECHNICAL AND VOCATIONAL TRAINING

PRIMARY SCIENCE CURRICULUM GUIDELINES

GRADES 4-6

2022-2027

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PREFACE

We live in a world that is scientifically and technologically oriented – a world of phenomenal scientific advancement and innovations. As The Bahamas keeps pace with this advancement, our children must be exposed to effective, comprehensive Science Education early in life. We must take advantage of their innate curiosity and zeal for learning about theenvironment before it diminishes.

Science is important because it links to technology and industry, which are areas of priority for a country's development. Science provides ways of making sense of the world systemically. Opportunities must be provided for our children to experience science at an early age. It is important for them to understand scientific ways of thinking and to haveadequate knowledge of science if they are to keep pace with the technological advances and innovations of the 21st Century.

The production of the revised Primary Science Curriculum Guidelines consisted of local educators who accepted the challenge of producing this document – a third document for the Department of Education: Science Unit (August 2001, June 2010, and December 2021). The Production Team has ensured that the purposes of developing sciences are met. A few ofthese aims are to communicate, to relate science to everyday life, and to explore, apply and investigate scientific and technological knowledge and ideas.

In accomplishing these aims, instructional facilitators will guide students through the use of various communication modes, developing their awareness of the importance of science inlife. Students will be encouraged to make decisions based on their knowledge of science and issues such as personal health and well-being, safety and the preservation of the environment. These students will be able to appreciate that experimentation is not judged by success or failure, but by the knowledge, which is gained from the process.

The revised Primary Science Curriculum Guidelines grades 1-6 boasts several new features. The previous Primary Curriculum consisted of three stands; we introduced a fourth strand – "Environmental Science." More focus was given to the integration of technological skills in developing the basic concepts, skills and activities in the Life, Earth, Physical and Environmental Sciences. Also noteworthy in the document are the deliberate efforts to highlight skills and attitudes that we wish for our students to develop.

When the guidelines in this revised Primary Science Curriculum Guidelines are effectively implemented, they will ensure that our students have the foundation of basic scientificconcepts and principles that develop the attitudes, skills and knowledge necessary for them to successfully work and live in the 21st Century.

ACKNOWLEDGEMENTS

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

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Finally, we extend our appreciation to the contributions of Ms. Tymika Bowe for clerical support and the Primary Science Coordinators and Primary Science Professionals. The following persons are singled out for special commendations in bringing to fruition this curriculum revision exercise and their unwavering commitment and dedication to its completion:

- Mrs. Lakia Williamson-Brown, B.Ed. M.Sc. – Certified STEM Specialist, Workshop Facilitator and Science Coordinator at Sadie Curtis Primary School;
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- Mr. Corey Cole, B.Ed. - Workshop Coordinator, former Science Coordinator, presently at Martin Town Primary School;
- Mrs. Barbara Dorsett, B.Ed., M.Sc. - Education Officer for Primary Science – Chairperson of the Curriculum Production Team.

Workshop participants throughout The Bahamas.

MINISTRY OF EDUCATION

VISION

Our vision is for a Bahamian education system that will foster academic excellence and equip students with multiple literacies that will enable them to make meaningful contributions as nation builders who are globally competitive.

MISSION STATEMENT

The mission of the Department and Ministry of Education is to provide all persons in The Bahamas an opportunity to receive a quality education that will equip them with the necessary beliefs, knowledge, attitudes and skills required for life, both in a democratic society guided by Christian values and in an inter-dependent changing world.

BELIEF STATEMENTS

We believe that:

1. The learning environment should be student-centred;

2. At each grade level students should acquire specific skills to prepare them for the succeeding grade level;

3. All students should have equal opportunity to learn based on their needs, interests and abilities;

4. Students should have opportunities to question, analyse, reason and make decisions as well as to develop self-confidence and greater freedom of expression.

5. All students should acquire essential survival skills enabling them to function well in society;

6. Technology should be integrated into content and instruction;

7. Content should be culturally relevant while still allowing a global perspective;

8. The methods used for assessing achievement should reflect the teaching and learning strategies employed in the curriculum;

9. Student success is integrally linked to parental involvement and community support;

10. An understanding of science is essential for everyone. All students should have the opportunity to participate in scientific inquiry;

11. Students should be able to apply scientific knowledge and scientific method to issues and problems related to self and society.

PROFILE OF THE IDEAL GRADUATE

The principal objective of the Bahamian education system is to develop productive citizens capable of caring for themselves and contributing positively to the national development process. Based on its consultation with stakeholders, the Ministry of Education has developed a profile for the ideal graduate. Among other qualities, the ideal graduate should:

- possess relevant knowledge in core disciplines/learning areas to be functionally literate;
- think critically, be an innovative problem solver and show initiative;
- demonstrate creativity and innovation;
- communicate effectively and collaborate willingly;
- demonstrate flexibility and adaptability;
- use social skills effectively;
- appreciate Bahamian culture and utilize the appropriate cultural skills;
- work productively and diligently with high level competency;
- guide and inspire others to do their best;
- have an appropriate awareness of the forces that shape and influence his/her life and surroundings;
- exhibit civic responsibility and display behaviour that benefit the wider community;
- appreciate his/her role in and responsibility to the local community, The Bahamas, the Caribbean region, the Commonwealth of Nations and the world;
- demonstrate integrity and ethical behaviour at all times;
- possess digital literacy and appreciate the role of technology and innovation in national development;
- display skills and competencies that reflect career and college readiness;
- possess ability to work effectively in teams; and
- embrace his/her role as an environmental steward.

Adapted from the Ministry of Education's Shared Vision for Education

PRIMARY SCIENCE MISSION STATEMENT

The Primary Science Unit recognizes the place of science in everyday human affairs and aim for scientific literacy that is operational in understanding oneself. We seek to provide a level of understanding and scientific literacy that will prepare students to be informed and participative citizens who are able to make judgments and decisions regarding science applications that may have social, health or environmental impacts.

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 scientific 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

To provide opportunities that expose and engage students in The Bahamas in acquiring scientific knowledge, skills and attitudes 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.

OBJECTIVES

- Use materials and scientific equipment correctly and safely.
- Demonstrate critical thinking and problem solving.
- Make accurate observations and measurements.
- Engage in cooperative learning activities.
- Communicate information effectively.
- Utilize classification process and recognize scientific relationships.
- Apply scientific principles and concepts to create products.
- Make inferences and draw conclusions.
- Transfer and integrate relevant skills and content from other disciplines.
- Make informed, responsible and wise decisions.
- Design, conduct and evaluate scientific investigations.
- Demonstrate critical thinking by responding to “what if” scenarios (situation analysis).
- Appreciate and utilize environmental conservation strategies.
- Pursue new scientific knowledge.

DEFINITION OF TERMS

This document comprises several components. Below is a brief description of each.

Overarching Goal: defines the ultimate outcome of learning and outlines the intended purpose of the curriculum document.

Sub-Goals: form the major contextual framework for instruction.

Standards: show what students should be able to do at the end of schooling at a particular grade level.

Benchmarks: show the level of progression for students at each grade level upon the completion of the year of instruction.

Scope and Sequence: shows the content to be covered for each grade level and the order in which each should be covered. It also provides an indication of the level of proficiency at which students should be performing for each grade level.

Pacing Guide: shows the sequence of topics and estimated length of time that should be spent on each topic.

Scope of Work: provides the basic content that should be included in lessons along with suggested activities, assessments and resources.

OVERARCHING GOAL

To empower individuals to become critical thinkers, problem-solvers, innovators, visionaries, decision makers, scientifically and technologically literate citizens who will appreciate and embrace sustainability of the natural environment.

SUB-GOALS

- To encourage students to maintain and expand their sense of wonder and excitement for the natural world.
- To engage in scientific inquiry as a means of becoming problem solvers.
- To assist students in the application of scientific knowledge and principles to stimulate their creative expressions.
- To enable and encourage children to participate in actions that can make positive change in the world.
- To apply scientific knowledge and skills to stimulate innovations in technology.
- To enable students to participate in critical discussions as it pertains to their life.
- To promote an appreciation for the safe and sustainable use of resources.
- To obtain basic knowledge, skills and attitudes which provide a scientifically literate foundation for future learning.

STANDARDS AND BENCHMARKS

Strand: Life Science

Standard 1: KNOWS ABOUT THE DIVERSITY AND UNITY THAT CHARACTERIZE LIFE.

Benchmarks for Grade 1:

- Knows the basic needs of animals and plants.
- Investigates the characteristics and needs of animals and plants.
- Demonstrates awareness that animals and plants depend on their environment to meet their basic needs.
- Describes the requirements for good health for humans.

Standard 2: KNOWS THE GENERAL STRUCTURE, ORGANIZATION AND FUNCTIONS OF CELLS IN ORGANISMS.

Benchmarks for Grade 1:

- Knows the importance and functions of the eyes, ears, tongue, skin and nose as sense organs.
- Identifies the stages in the life cycle of plants, animals and human beings.

STANDARDS AND BENCHMARKS

Strand: Earth Science

Standard 1: UNDERSTANDS ESSENTIAL IDEAS ABOUT THE COMPOSITION AND STRUCTURE OF THE UNIVERSE AND THE EARTH'S PLACE IN IT.

Benchmarks for Grade 1:

- Knows the basic composition of the earth's atmosphere.
- Understand basic features of the earth describes some natural occurrences using observations.
- Describes some natural occurrences using observations.
- Describes local natural habitats.

Standard 2: UNDERSTANDS BASIC FEATURES OF THE EARTH

Benchmarks for Grade 1:

- Knows that earth has several landforms.
- Knows that earth has several bodies of water.
- Investigates changes that occur in a daily cycle and in a seasonal cycle.
- Knows the basic composition and structure of the universe (e.g. identifies the moon and stars as objects in the night time sky).

STANDARDS AND BENCHMARKS

Strand: Physical Science

Standard 1: UNDERSTANDS BASIC CONCEPTS ABOUT THE STRUCTURE AND PROPERTIES OF MATTER.

Benchmarks for Grade 1:

- Distinguishes between objects and materials and identifies and describes the properties of some materials.
- Investigates the properties of materials and makes appropriate use of materials when designing and making objects.
- Describes the function of specific materials in manufactured objects that can be use in daily life.

Standard 2: UNDERSTANDS ENERGY TYPES, SOURCES AND CONVERSIONS AND THEIR RELATIONSHIP TO HEAT AND TEMPERATURE.

Benchmarks for Grade 1:

- Demonstrates an understanding of ways in which energy is used in life daily.
- Describes different uses of energy at home, at school and in the community and suggests ways in which energy can be conserved.

Standard 3: UNDERSTANDS THE NATURE OF SCIENTIFIC KNOWLEDGE AND INQUIRY

Benchmarks for Grade 1:

- Identifies familiar technological items and describes their use in daily life.
- Uses familiar technology appropriately (e.g. telephone, tablets, computers).
- Makes things using a variety of tools and techniques (e.g. glue, stapler, hammer).

STANDARDS AND BENCHMARKS

Strand: Environmental Science

Standard 1: INVESTIGATES AND ARTICULATES WAYS TO CONSERVE AND MANAGE NATURAL RESOURCES.

Benchmarks for Grade 1:

- Understands how local resources are utilized in The Bahamas.
- Understands the importance of conservation and preservation (as it relates to plants and animals).
- Describes local natural habitats for animals.

STANDARDS AND BENCHMARKS

Strand: Life Science

Standard 1: KNOWS ABOUT THE DIVERSITY AND UNITY THAT CHARACTERIZE LIFE.

Benchmarks for Grade 2:

- Demonstrates an understanding of the similarities and differences among various types of animals and the ways in which animals adapt to differentenvironmental conditions.
- Investigates physical and behavioural characteristics and the process of growth of different types of animals.
- Knows that animals require air, water, food and shelter while plants require air, water, nutrients and light.
- Identifies ways in which humans can affect other animals.

Standard 2: KNOWS THE GENERAL STRUCTURE, ORGANIZATION AND FUNCTIONS OF CELLS IN ORGANISMS.

Benchmarks for Grade 2:

- Knows that plants and animals closely resemble their parents.
- Identifies constant traits and changing traits in animals and plants as they grow.
- Identifies the major parts of plants (e.g. seeds, stem pistil).

STANDARDS AND BENCHMARKS

Strand: Earth Science

Standard 1: UNDERSTANDS ESSENTIAL IDEAS ABOUT THE COMPOSITION AND STRUCTURE OF THE UNIVERSE AND THE EARTH'S PLACE IN IT.

Benchmarks for Grade 2:

- Knows that earth materials consist of solid rocks, soils, liquid water and the gases of the atmosphere.
- Explains how rocks are alike and different.
- Describes changes in the sky as related to the sun, moon and stars.

Standard 2: UNDERSTANDS BASIC FEATURES OF THE EARTH.

Benchmarks for 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).
- 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.

STANDARDS AND BENCHMARKS

Strand: Physical Science

Standard 1: UNDERSTANDS ENERGY TYPES, SOURCES AND CONVERSIONS AND THEIR RELATIONSHIP TO HEAT AND TEMPERATURE.

Benchmarks for Grade 2:

- Demonstrates an understanding of ways in which energy is used in daily life.
- Demonstrates an understanding of the movement of air and water as sources of energy.
- Design and construct devices that are propelled by moving air or moving water.
- Knows that the sun supplies heat and light to earth.
- Describes the position and movement of objects and demonstrates an understanding of how simple mechanisms enable an object to move.
- Knows that the position of an object can be changed by magnetic force.

Standard 2: UNDERSTANDS THE NATURE OF SCIENTIFIC KNOWLEDGE AND INQUIRY.

Benchmarks for Grade 2:

- Knows that learning can come from careful observations and simple experiments.
- Knows that tools can be used to gather information (e.g. thermometers, rulers, magnifiers, balances).
- Knows ways that technology is used at home and school.
- Knows that most things are made of parts, and they may not work if some parts are missing.
- Understands how some elements or components of simple systems work together (e.g. parts of a bicycle).

STANDARDS AND BENCHMARKS

Strand: Environmental Science

Standard 1: INVESTIGATES AND ARTICULATES WAYS TO CONSERVE AND MANAGE NATURAL RESOURCES.

Benchmarks for Grade 2:

- Understands the use of trees, sand and ground resources in The Bahamas.
- Describes ways we use local resources (e.g. sun, wind, ocean and forest).
- Understands the behaviours necessary to conserve natural resources.

STANDARDS AND BENCHMARKS

Strand: Life Science

Standard 1: KNOWS ABOUT THE DIVERSITY AND UNITY THAT CHARACTERIZE LIFE.

Benchmarks for Grade 3:

- Knows that plants and animals need certain resources for energy and growth (e.g. food, water, light and air).
- Demonstrates an understanding of the similarities and differences in the physical characteristics of different plant species.
- Knows that plants and animals have features that help them live in different environments.
- Identifies the major parts of plants and describes their basic functions.

Standard 2: KNOWS THE GENERAL STRUCTURE, ORGANIZATION AND FUNCTIONS OF CELLS IN ORGANISMS.

Benchmarks for Grade 3:

- Knows that dietary habits and behaviour are related to an organism's health.
- Knows that life processes of an organism are related to its use of nutrients, water and oxygen.
- Classifies different types of animals (e.g. distinguishes among vertebrate groups).
- Identifies major parts of plants.
- Identifies traits that remain constant in some plants as they grow.

STANDARDS AND BENCHMARKS

Strand: Earth Science

Standard 1: UNDERSTANDS ESSENTIAL IDEAS ABOUT THE COMPOSITION AND STRUCTURE OF THE UNIVERSE AND THE EARTH'S PLACE IN IT.

Benchmarks for Grade 3:

- Understands the sun's importance to living things on earth.
- Understands how the movements of the earth cause day, night and the seasons.
- Examine the relationship between the sun and the earth as it relates to position and motion.

Standard 2: UNDERSTANDS BASIC FEATURES OF THE EARTH

Benchmarks for Grade 3:

- Understands the concept of water (e.g. defines the terms weather, temperature and wind direction; describes weather conditions; classifies clouds according to how they look and the weather conditions with which they are associated).
- Knows that water is an important natural resource.
- Knows that water can be a liquid or a solid and can be change from one form to the other.
- Describes ways in which clean air and water are vital for meeting the needs of humans and other living thin.

STANDARDS AND BENCHMARKS

Strand: Physical Science

Standard 1: UNDERSTANDS BASIC CONCEPTS ABOUT THE STRUCTURE AND PROPERTIES OF MATTER.

Benchmarks for Grade 3:

- Knows that things can be done to materials to change some of their properties, but not all materials respond the same way to what is done to them.
- Investigates the physical properties of a variety of objects.

Standard 2: UNDERSTANDS THE NATURE OF SCIENTIFIC KNOWLEDGE AND INQUIRY.

Benchmarks for Grade 3:

- 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 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).

STANDARDS AND BENCHMARKS

Strand: Environmental Science

Standard 1: INVESTIGATES AND ARTICULATES WAYS TO CONSERVE AND MANAGE THE ENVIRONMENT.

Benchmarks for Grade 3:

- Examines the life cycle of insect vectors.
- Describes the process of proliferation and elimination of vectors in our environment.
- Understands the impacts of water and land pollution.
- Knows citizens responsibilities to the environment.

STANDARDS AND BENCHMARKS

Strand: Life Science

Standard 1: KNOWS ABOUT THE DIVERSITY AND UNITY THAT CHARACTERIZE LIFE.

Benchmarks for Grade 4:

- Distinguishes between animals that are vertebrates and invertebrates (e.g. state characteristics).
- Classifies different types of animals.
- Describes the changing requirements of plants as they grow.

Standard 2: KNOWS THE GENERAL STRUCTURE, ORGANIZATION AND FUNCTIONS OF CELLS IN ORGANISMS.

Benchmarks for Grade 4:

- Demonstrates an understanding of the structure and function of the respiratory system and the interaction of organs within it.
- Investigates the structure and function of the major organs of the respiratory system.
- Demonstrates an understanding of factors that contribute to good health.

STANDARDS AND BENCHMARKS

Strand: Earth Science

Standard 1: UNDERSTANDS ESSENTIAL IDEAS ABOUT THE COMPOSITION AND STRUCTURE OF THE UNIVERSE AND THE EARTH'S PLACE IN IT.

Benchmarks for Grade 4:

- Knows the basic composition and structure of the universe.
- Understand basic features of the inner and outer planets.

Standard 2: UNDERSTANDS BASIC FEATURES OF THE EARTH.

Benchmarks for Grade 4:

- Knows that earth has several layers.
- Knows that the movement of the ocean is affected by the moon.
- Investigates changes in weather patterns.

STANDARDS AND BENCHMARKS

Strand: Physical Science

Standard 1: UNDERSTANDS BASIC CONCEPTS ABOUT THE STRUCTURE AND PROPERTIES OF MATTER.

Benchmarks for Grade 4:

- Investigates the physical and chemical changes in matter.
- 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.

Standard 2: UNDERSTANDS THE NATURE OF SCIENTIFIC KNOWLEDGE AND INQUIRY.

Benchmarks for 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).
- 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.

STANDARDS AND BENCHMARKS

Strand: Environmental Science

Standard 1: INVESTIGATES AND ARTICULATES WAYS TO CONSERVE AND MANAGE NATURAL RESOURCES.

Benchmarks for Grade 4:

- Categorizes the differences among mangroves.
- Examine threats to mangroves and describe how the threats can be eliminated.
- Categorizes various types of native and medicinal plants and their use.
- Understands ways to conserve native plants.
- Knows citizens responsibilities to the environment.

STANDARDS AND BENCHMARKS

Strand: Life Science

Standard 1: KNOWS ABOUT THE DIVERSITY AND UNITY THAT CHARACTERIZE LIFE.

Benchmarks for Grade 5:

- Knows different ways in which living things can be grouped and the purposes of different groupings.
- Classifies different types of animals (e.g. distinguishes among invertebrates).
- Describes ways in which classification systems can be used in everyday life.

Standard 2: KNOWS THE GENERAL STRUCTURE, ORGANIZATION AND FUNCTIONS OF CELLS IN ORGANISMS.

Benchmarks for Grade 5:

- Demonstrates an understanding of the structure and function of the skeletal system and the interaction of organs within this system.
- Classifies different types of plants (e.g. identifies and compare monocots and dicots).
- Demonstrates an understanding of factors that contribute to good health.

STANDARDS AND BENCHMARKS

Strand: Earth Science

Standard 1: UNDERSTANDS ESSENTIAL IDEAS ABOUT THE COMPOSITION AND STRUCTURE OF THE UNIVERSE AND THE EARTH'S PLACE IN IT.

Benchmarks for Grade 5:

- Knows different ways in which living things can be grouped and the purposes of different groupings.
- Understands basic features of the earth.
- Describes some natural occurrences using observations.
- Knows the basic composition and structure of the universe.

Standard 2: UNDERSTANDS BASIC FEATURES OF THE EARTH.

Benchmarks for Grade 5:

- Understands that fossils are made up of the remains of living things.
- Investigates the major climatic factors associated with weather and designs; constructs and tests a variety of instruments for recording various features of the weather.
- Knows the basic composition and structure of the universe (e.g. identifies the moon and stars as objects in the night time sky).
- Examines how weather forecasts influence decisions concerning human activity and how humans have adapted to a variety of weather conditions.

STANDARDS AND BENCHMARKS

Strand: Physical Science

Standard 1: UNDERSTANDS BASIC CONCEPTS ABOUT THE STRUCTURE AND PROPERTIES OF MATTER.

Benchmarks for Grade 5:

- Investigates the physical and chemical changes in matter.
- 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.

Standard 2: UNDERSTANDS THE NATURE OF SCIENTIFIC KNOWLEDGE AND INQUIRY.

Benchmarks for Grade 5:

- 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).
- 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.

STANDARDS AND BENCHMARKS

Strand: Environmental Science

Standard 1: INVESTIGATES AND ARTICULATES WAYS TO CONSERVE AND MANAGE NATURAL RESOURCES.

Benchmarks for Grade 5:

- Examines threats to marine resources.
- Understands ways to conserve marine resource.
- Knows the major differences between conservation and preservation.
- Knows citizens responsibilities to the marine environment.

STANDARDS AND BENCHMARKS

Strand: Life Science

Standard 1: KNOWS ABOUT THE DIVERSITY AND UNITY THAT CHARACTERIZE LIFE.

Benchmarks for Grade 6:

- Understands that all living things are composed of cells.
- Knows that each plant or animal has different structures which serve different functions in growth and reproduction.
- Identifies the similarities and differences in plant and animal cells.
- Knows that plants and animals progress through life cycles of birth, growth and development; the details of these life cycles are different for different organisms.

Standard 2: KNOWS THE GENERAL STRUCTURE, ORGANIZATION AND FUNCTIONS OF CELLS IN ORGANISMS.

Benchmarks for Grade 6:

- Demonstrates an understanding of the structure and function of the digestive system and the interaction of organs within this system.
- Investigates the structure and function of the teeth.
- Demonstrates an understanding of factors that contribute to good oral hygiene.

STANDARDS AND BENCHMARKS

Strand: Earth Science

Standard 1: UNDERSTANDS ESSENTIAL IDEAS ABOUT THE COMPOSITION AND STRUCTURE OF THE UNIVERSE AND THE EARTH'S PLACE IN IT.

Benchmarks for 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 and of the physical characteristics of the different components of the solar system.
- Describes technological and scientific advances that enable humans to study space and explain how these advances have affected the quality of life on earth.
- Knows that astronomical objects in space are massive in size and are separated from one another by vast distances.

Standard 2: UNDERSTANDS BASIC FEATURES OF THE EARTH.

Benchmarks for Grade 6:

- Knows that fossils provide evidence about the plants and animals that lived long ago and the nature of the environment at that time.
- Investigates the major climatic factors associated with weather, and designs, constructs and tests a variety of instruments for recording various featuresof the weather.
- Knows how features on the earth's surface are constantly changed by a combination of slow and rapid processes.
- Examines how weather forecasts influence decisions concerning human activity and how humans have adapted to a variety of weather conditions.

STANDARDS AND BENCHMARKS

Strand: Physical Science

Standard 1: UNDERSTANDS BASIC CONCEPTS ABOUT THE STRUCTURE AND PROPERTIES OF MATTER.

Benchmarks for Grade 6:

- Knows that objects can be classified according to their properties (e.g. mass, density, volume, weight and gravity).
- Knows that properties such as length, weight, temperature and volume can be measured using appropriate tools.
- Knows that materials have different states, and some common materials such as water can be changed from one state to another by heating or cooling.
- Demonstrates an understanding of the properties of air and explain how these can be applied to the principles of flight.
- 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 2: UNDERSTANDS THE NATURE OF SCIENTIFIC KNOWLEDGE AND INQUIRY.

Benchmarks for Grade 6:

- Knows that scientific investigations involve asking and answering a question and comparing the answer to what scientists already know about the world.
- Plans and conducts simple investigations (e.g. makes systematic observations; conducts simple experiments to answer questions).
- Knows that tools can be used to observe, measure, make things and do things better or more easily.
- Knows that good scientific explanations are based on evidence, observations and scientific knowledge.

STANDARDS AND BENCHMARKS

Strand: Environmental Science

Standard 1: INVESTIGATES AND ARTICULATES WAYS TO CONSERVE THE ENVIRONMENT AND MANAGE NATURAL RESOURCES.

Benchmarks for Grade 6:

- Examines environmental threats which endanger the animals.
- Understands ways to conserve the environment.
- Explains ways in which people may live more sustainably.
- Knows that climate change affects natural disasters.
- Knows citizens responsibilities to the environment.

HOW TO USE THE PRIMARY SCIENCE CURRICULUM

Teachers know that a curriculum guide is the most important document available to them, and without one, it will be difficult to write lesson plans. Using the Primary Science Curriculum Guide will support teachers in creating effective lesson plans that are based on the goals and learner outcomes outlined in the document. This document is intended to provide facilitators with the overview of the outcomes framework for primary science education. It also includes suggestions to assist teachers in designing creative, critical thinking learning experiences and assessment tasks for primary school students.

Standards and Benchmarks can be split into two categories. The content standards are guidelines which dictate the crucial skills, knowledge and understanding that a student must learn in the specific science content area. Benchmarks point you to where the students should reach academically. Benchmarks also provide a structure for external assessment.

Scope and Sequence is a list of concepts, topics and materials to be observed and covered (where possible in this document). The Scope refers to topics and areas of developmentwithin the Primary Science Curriculum, and the Sequence is the order in which those skills are taught.

The **Pacing Guide** helps you to see the big picture for the school year. It provides an opportunity for facilitators/teachers to pace out and create an impetus for a certain period of time and to identify standards or units to be taught during that time. The Pacing Guide also ensures that grade level teams are concentrating on identical topics/lessons in a specified time period.

The **Scope of Work** encompasses the theory, planning, design, development, implementation and evaluation of units of Life, Earth, Physical and Environmental strands of the Primary Science Curriculum.

SCOPE AND SEQUENCE

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 behaviours and their relationship with the environment.

	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
LIFE SCIENCE	**Characteristics of Organisms**	**Characteristics of Organisms**	**Characteristics of Organisms**	**Characteristics of Organisms**	**Characteristics of Organisms**	**Characteristics of Organisms**
	1. A1 Observe human body models and identify external body parts and their use. **1. A2** Communicate names and function of sense organs in the human body (eyes, tongue, ears, nose and skin). **1. A3** Observe and compare physical growth development in humans (example: boys and girls). **1. A4** Experiment with manipulative to demonstrate habits which support good health. **1. A5** Infer results from poor health habits.	**1. A1** Conduct research about animals in the environment. **1. A2** Compare body coverings of animals. **1. A3** Observe animal parts to predict how they function and move. **1. A4** Predict and infer what animals need for survival. **1. A5** Compare animal habitats using virtual and physical field area.	**1. A1** Observe a variety of organisms to determine which are vertebrates. **1. A2** Observe and examine birds, mammals and fish to communicate why they are vertebrates. **1. A3** Compare mammals to birds and birds to fish.	**1. A1** Compare vertebrates and invertebrates. **1. A2** Investigate and record traits common to reptiles and amphibians. **1. A3** Investigate and record traits/ characteristics common to arthropods. **1. A4** Compare insects and spiders using live specimen and models. **1. A5** Infer how life cycles of mosquitoes and cockroaches differ.	**1. A1** Research and communicate traits/ characteristics common to all invertebrates. **1. A2** Compare traits of invertebrates and vertebrates. **1. A3** Observe models of mollusks and stinging cell animals and identify their characteristics. **1. A4** Compare traits of mollusks and stinging cell anmals.	**1. A1** Observe and describe the structure of a cell in organisms (plant/animal). **1. A2** Compare plant and animal cells. **1. A3** Identify sponges as invertebrates and describe traits/characteristics of sponges.

PRIMARY SCIENCE CURRICULUM

SCOPE AND SEQUENCE

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

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

	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
LIFE SCIENCE	**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 Describe the basic needs for living things (plants/animals). **1. B2** Compare characteristics/traits of living and non-living things. **1. B3** Research and explain use of plants and animals. **1. B4** Infer why body coverings are important for a variety of indigenous and international animals.	**1. B1** Observe models to identify the basic parts of the human skeleton. **1. B2** Communicate the importance of the human skeleton using models and visuals. **1. B3** Compare skeletons of various animals. **1. B4** Infer how poor health habits affect personal and family health. **1. B5** Predict the basic needs of plants for survival. **1. B6** Observe a live plant to record its parts. **1. B7** Classify and compare a variety of fruit and vegetable seeds.	**1. B1** Infer how proper nutrition is related to good health. **1. B2** Observe and predict appropriate exercises and food choice to develop a healthy lifestyle. **1. B3** Identify local and international health resources, and communicate their function. **1. B4** Observe plants to identify their parts. **1. B5** Experiment, observe and research to describe the function of plant parts.	**1. B1** Observe a model and diagram of the respiratory system and explain the function. **1. B2** Experiment and describe seed germination.	**1. B1** Observe diagrams and teaching models to identify parts of the skeletal system. **1. B2** Observe six main food groups, and explain the nutrients found in each group. **1. B3** Research to explain functions of the skeletal system. **1. B4** Compare seed and non–seed plants. **1. B5** Infer how proper nutrition is related to good health. **1. B6** Compare seed and non–seed plants. **1. B7** Compare monocots and dicots.	**1. B1** Observe and identify parts of the digestive system **1. B2** Analyse the process and function of the digestive system. **1. B3** Use models to identify the parts and function of the teeth. **1. B4** Observe and describe the type of teeth in human. **1. B5** Infer ways to develop good oral hygiene. **1. B6** Observe a varietyof flowers. Label their parts and explain their functions. **1. B7** Research to communicate the life cycle of a flowering plant. **1. B8** Experiment to explain the process of photosynthesis.

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.

	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
EARTH SCIENCE	**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 of what the earth'satmosphere is composed. **2. A2** Research and observe several bodies of water on earth (ponds, lakes, oceans). **2. A3** Observe and explain landforms found on earth. **2. A4** 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 and research to communicate some uses of rocks and minerals.	**2. A1** Investigate to identify earth's natural resources and their origin. **2. A2** Observe earth's natural resources and uses. **2. A3** Infer the importance of natural resources to the survival of people. **2. A4** Predict ways to care for earth's resources.	**2. A1** Research to identify and describe the three layersof the earth. **2. A2** Investigate the movement of the ocean and how it is affected by the moon. **2. A3** Experiment to describe three properties of air. **2. A4** Predict and identify the elements which contribute to weather. **2. A5** Compare weather and climate. **2. A6** Experiment with weather instruments to describe their use.	**2. A1** Infer what are fossils and compare types of fossils. **2. A2** Analyse the process of fossil formation. **2. A3** Hypothesize how scientists know which fossils are the oldest.	**2. A1** Compare coal, oil and natural gas. **2. A2** Analyse advantages and disadvantages of fossil fuels. **2. A3** Compare petroleum and natural gas.

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.

	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
EARTH SCIENCE	**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 Investigate how weather is the combination of factors (temperature, wind, precipitation, clouds and sunlight. **2. B2** Identify and explain types of weather (windy, sunny, cloudy, rainy, snowy). **2. B3** Examine weather tools and their function and predict weather conditions using these instruments (thermometer, rain gauge, wind vane, anemometer, barometer). **2. B4** Explain how seasons affect weather (spring, summer, fall and winter).	**2. B1** Predict factors which contribute to weather. **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** Observe and classify clouds according to their traits. **2. B4** Analyse weather conditions associated with different types of clouds.	**2. B1** Research the characteristics of the eight planets and classify them as inner and outer planets. **2. B2** Compare the inner and outer planets.	**2. B1** Analyse layers of the atmosphere. **2. B2** Observe and research conditions that change weather. **2. B3** Infer how weather changes affect people. **2. B4** Experiment with weather instruments to describe their functions.	**2. B1** Observe tools that measure factors of weather. **2. B2** Observe and describe factors that make up weather. **2. B3** Measure weather conditions using weather instruments. **2. B4** Observe the environment to compare weathering and erosion. **2. B5** Compare traits/characteristics of storms.

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.

	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
EARTH SCIENCE	**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 and communicate how the sun, moon and stars are visible in the sky at different times of the day. **2. C2** Distinguish between objects that are common to the daytime and nighttime sky.	**2. C1** Describe the differences between the moon and earth. **2. C2** Analyse changes in the moon. **2. C3** Identify and compare constellations.	**2. C1** Explain the sun's position in relation to the earth. **2. C2** Describe the motion of the earth around the sun. **2. C3** Investigate to explain seasonal changes.		**2. C1** Observe and communicate the make up of the solar system. **2. C2** Research to compare planets. **2. C3** Compare rotation and revolution. **2. B4** Communicate how the sun benefits the earth and other planets. **2.** B5 Compare and analyse objects in space (asteroids, comets, meteors and meteoroids).	**2. C1** Hypothesize which planets are susceptible to life. **2. C2** Observe and identify equipment used to study objects in space. **2. C3** Analyse distances between planets.

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

PHYSICAL SCIENCE

Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
Properties and Changes in Matter	Properties and Changes in Matter	Properties and Changes in Matter	Properties and Changes in Matter	Properties and Changes in Matter	Properties and Changes in Matter
3. A1 Classify objects according to their physical properties (size, colour and shape). **3. A2** Experiment to identify how matter changes state, size, colour and shape. **3. A3** Compare physical changes in matter.	**3. A1** Infer why the sun is the greatest source of energy on Earth. **3. A2** Identify other sources of light energy besides the sun. **3. A3** Infer why water is a source of energy and explain its use. **3. A4** Predict what would happen if there was no water on earth. **3. A5** Research and experiment to explain wind as a source of energy.	**3. A1** Experiment with materials to identify matter as solids, liquids and gases. **3. A2** Investigate how matter changes from one form to another. **3. A3** Examine objects to communicate the physical properties of matter. **3. A4** Experiment to discover the length, mass and volume of objects using metric units.	**3. A1** Observe 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 mass of objects. **3. A5** Experiment with graduates and measuring cylinders to measure the volume of matter.	**3. A1** Investigate energy and compare various forms of energy. **3. A2** Compare potential and kinetic energy. **3. A3** Investigate how energy changes **3. A4** Analyse the impact of technology on forms of energy. **3. A5** Investigate compound/ complex machines that use the lever and screw to help us do work.	**3. A1** Analyse physical properties and changes in matter. **4. A2** Experiment to explain physical changes in materials. **3. A3** Observe chemicals that will cause changes in matter. **3. A4** Compare physical and chemical changes in matter.

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.

PHYSICAL SCIENCE	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
	Properties and Changes in Matter	Properties and Changes in Matter	Properties and Changes in Matter	Properties and Changes in Matter	Properties and Changes in Matter	Properties and Changes in Matter
	3. B1 Investigate force as a push or pull. **3. B2** Compare pushes and pulls. **3. B3** Experiment to identify poles of a magnet. **3. B4** Experiment to find out which objects a magnet will attract/repel.	**3. B1** Experiment with magnets and explain what they do. **3. B2** Classify materials according to their magnetic force.		**3. B1** Experiment with materials to discover what is force and work. **3. B2** Measure and record pulls using a spring scale. **3. B3** Analyse work and infer how it is related to force. **3. B4** Demonstrate with household objects and tools to explain what a simple machine is. **3. B5** Observe and identify objects as wedges or inclined planes.		**3. B1** Experiment to explain relationships among mass, density, volume, weight and gravity. **3. B2** Examine and identify tools used to measure matter.

PRIMARY SCIENCE CURRICULUM

SCOPE AND SEQUENCE

STRAND 4: ENVIRONMENTAL SCIENCE **GRADES: 1-6**

Fundamental concepts and principles of Environmental Science include the investigation and articulation of ways to conserve and manage natural resources

ENVIRONMENTAL SCIENCE

Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
Use and Conservation of Environmental Resources	Use and Conservation of Environmental Resources	Use and Conservation of Environmental Resources	Use and Conservation of Environmental Resources	Use and Conservation of Environmental Resources	Use and Conservation of Environmental Resources
4. A1 Identify products we use from nature. **4. A2** Examine products that come from trees. **4. A3** Summarize actions that help conserve paper and keep the environment clean and litter-free. **4. A4** Investigate types of animals found in a school yard. **4. A5** Investigate how litter can harm plants and animals. **4. A6** Demonstrate how plants and animals should be protected.	**4. A1** Identify ways we use trees, sand and ground resources in The Bahamas. **4. A2** Infer ways we use the sun and wind in The Bahamas. **4. A3** Identify animals we use for food from the ocean and forest. **4. A3** Examine way in which help and harm the environment.	**4. A1** Explain what are vectors and identify some insect vectors in our community (mosquitoes, cockroaches, etc.). **4. A2** Compare the life cycle of mosquitoes and cockroaches. **4. A3** Suggest ways to decrease land pollution which contributes to insect vectors.	**4. A1** Identify 4 kinds of mangroves and their functions. **4. A2** Identify and suggest ways to eliminate threats to mangroves. **4. A3** Examine a variety of Bahamian native plants and their uses. **4. A4** Communicate ways in which native plant may be conserved.	**4. A1** Identify external features of a Spiny Lobster (crawfish) and research laws that govern its preservation and conservation. **4. A2** Identify external features of a conch and explain its importance to the Bahamian economy. **4. A3** Identify distinguishing external features and their function of a Nassau Grouper. **4. A4** Explain why the Nassau Grouper's population is endangered and suggest ways to conserve it. **4. A5** Infer ways in which our changing climate will affect our coral reef and investigate how coral nurseries are used to help conserve coral species. **4.A7** Explain the effects of pollution on marine resources and suggest ways to prevent ocean pollution.	**4.A1** Explain ways in which humans harm the environment. **4.A2** Describe effects of climate change and explain how climate change affects natural disasters and sea level rise. **4.A3** Suggest ways we may live more sustainably. **4. A4** Investigate alternative source of energy that do not require the burning of fossil fuels.

PACING GUIDE

GRADE 4 PACING GUIDE

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1/60 minute period	Vertebrates: Common Traits of Amphibians	56
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1/60 minute period	Invertebrates: Characteristics/Traits of Invertebrates: Arthropods	58
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GRADE 5 PACING GUIDE

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1/60 minute period	The Human Body: The Skeletal System	116
1/60 minute period	The Human Body: Nutrition	118
2/60 minute periods	The Human Body: Nutrition (Food Pyramid)	119
2/60 minute periods	Plants: Seeds and Non-Seed Plants	121
1/60 minute period	Plants: Monocotyledons (Monocots) and Dicotyledons (Dicots)	123
2/60 minute periods	Fossils: Fossil Formation	125
1/60 minute period	Layers of the Atmosphere	127
1/60 minute period	Weather and Climate	129
1/60 minute period	Revolution & Rotation	132
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1/60 minute period	Other Objects in Space: Space Bodies	135
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GRADE 5 PACING GUIDE

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1/60 minute period	Simple Machines: Wheels and Axles	147
1/60 minute period	Conservation of Marine Resources: Spiny Lobster	149
1/60 minute period	Conservation of Marine Resources: Queen Conch	151
1/60 minute period	Conservation of Marine Resources: Nassau Grouper	153
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2/60 minute periods	Marine Debris: Ways to Eliminate Ocean Pollution	157

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1/60 minute period	The Teeth: Types of Teeth	166
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1/60 minute period	Plants: Photosynthesis	171
1/60 minute period	Compare Coal, Oil and Natural Gas	173
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SCOPE OF WORK

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

CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Vertebrates - Reptiles **Strand 1: Characteristics of Organisms**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE	1. Identify the traits of reptiles.	• A **vertebrate** is an animal with a backbone. • Reptiles are vertebrates with dry scaly skin. • Reptiles live mostly on land. They breathe with their lungs. • Reptiles are cold blooded animals. • They lay eggs with thick leathery shells. • Most young reptiles are able to meet their needs as soon as they are born. They are able to eat and move around on their own. • Examples of reptiles are snakes, lizards, turtles, alligators and crocodiles.	• Pursue new knowledge • Communicate information effectively • Make inferences and draw conclusions	• Curiosity • Flexibility/ adaptability	**1a. All about Vertebrates** Createa K-W-L chart on Vertebrates/ Reptiles. **1b. Cracking Open Facts!** Have students go on a scavenger hunt for "eggs" around the classroom (Easter eggs are most ideal). Students who find and collect the eggs will read each trait/fact about reptiles hidden inside. Discuss the term **trait.** **1c. Leaping Lizards!** Have a volunteer bring in a yard lizard contained in a clear plastic container with breathing holes. Observe and discuss their traits. Then use a Venn diagram to compare and contrast lizards and snakes. **1d. Recyclable Reptiles** Use reusable items to create a model of a reptile. Discuss their body covering.	Simple Science Text/workbook 4 Science Horizon Bk. 4 Harcourt Science Bk. 3 YouTube video on Vertebrates https://www.youtube.com/watch?v=HQdiSMUZEDA https://www.dltk-kids.com/animals/reptiles.html http://www.biology4kids.com/map.html	Write the definition a vertebrate. Draw or paste pictures to create a mural of vertebrates. Draw and label a picture of a reptile. Write at least three traits about reptiles under the picture. Choose one of the three groups of reptiles. Name and describe the two animals that belong to that group. Compare and contrast the animals.

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

CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Reptiles **Strand 1: Characteristics of Organisms**

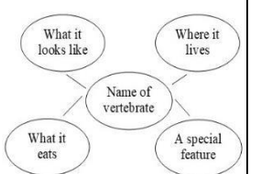
	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE	2. Investigate the three main groups of reptiles.	• There are three main groups of reptiles. • Lizards and snakes are in one group. Their bodies have rows of scales that overlap. • Alligators and crocodiles are another group. They live in water most of the time. They come out of the water to sunbathe themselves. • Tortoises and turtles make up the third group of reptiles. They are the only reptiles with shells. Tortoises live on land and turtles live in the water.	• Utilize classification process and recognize relationships	• Scepticism	**2a. Reptile Posters** Make a poster about reptile groups. Draw three columns. Under each heading, paste pictures of the two animals found in each group. a. Reptiles with scales that overlap. b. Reptiles with shells. c. Reptiles that live in or near the water. **2b. Scaly Bookmarks!** Assign eachstudent a number 1-3. Students will create a bookmark about the group of reptiles that corresponds with their number. Students can be creative and draw pictures or use cut outs from old magazines or textures from household items. However, they must include the correct information about the group of animals and list two reptiles in that group.	Simple Science Text/workbook 4 Live Worksheet on Reptiles https://www.liveworksheets.com/worksheets/en/Science/Animal_Groups/Animals-Reptiles_bq2584922og	Match the animals to their group names. Research assignment: Identify one of the three groups of reptiles, write a short paragraph about the animals in this group. Include pictures of the animals. Complete a live worksheet on reptiles (resources).

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

CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Amphibians **Strand 1: Characteristics of Organisms**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE	1. Identify traits of amphibians.	• **Amphibians** are vertebrates with smooth moist skin. • Amphibians lay eggs in water where their young hatch and remain until they are adults. • Young amphibians do not look like their parents. As they grow their bodies change. For example, tadpoles live in water and look very different from adult frogs who live on land. • Young amphibians breathe through their gills while living in the water. As they **develop** into adults, they grow lungs to breathe. • Amphibians can also breathe through their skin.	• Communicate information effectively. • Make inferences and draw conclusions • Open to new ideas	• Cooperation • Flexibility/ adaptability • Scepticism	**1a. All about Amphibians** Observe a video on the Life Cycle of a Frog. **1b. Leaping Patterns** Have students unscramble the life cycle of a frog (cut outs) using a circular pattern. Discuss various traits of amphibians (e.g. where they layeggs and the distinction between their young and the adults). **1c. Creating Amphibians** Work in small groups to create a model of various amphibians.	Simple Science Text/workbook 4 Amphibians Educational video https://www.youtube.com/watch?v=XI8GPsf6TAc Life Cycle of a Frog https://www.youtube.com/watch?v=gmlaclb3K2o Matching/True of False Live Worksheet on Amphibians https://www.liveworksheets.com/worksheets/en/Natural_Science/Amphibians/Amphibians_za626382jd	Complete a live worksheet on amphibians. Complete a Venn Diagram to compare reptiles to amphibians. Complete an animal web. 

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

CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Amphibians **Strand 1: Characteristics of Organisms**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE	2. Compare and contrast reptiles and amphibians.	• Amphibians are **cold blooded** animals. They depend on sunlight to be warm. To cool down, amphibians may go underground in muddy areas. • Examples of amphibians are frogs, salamanders and newts. • Amphibians and reptiles share some similarities and differences.	• Recognize relationships	• Thinking independently	**2a. Amphibians and Reptiles Among Us!** Observe tadpoles collected. Discuss the stages ofgrowth over a period of time. Observe a classroom pet turtle also. Discuss similarities and differences. **2b. Reptiles versus Amphibians** Utilize notes on reptiles and amphibians to complete a T chart. Highlight their similarities and differences. 1-2. **Exploring Ardastra Gardens!** Take a fieldtrip to Ardastra Gardens, Adventure Learning Centre, or a local animal farm to observe vertebrates in their environment.	https://www.dltk-kids.com/animals/reptiles.html https://kiddyhouse.com/themes/frogs/ Science Horizon Bk. 4 Harcourt Science Bk. 3 Live worksheet https://www.liveworksheets.com/hk1831013yg	Utilize key words and phrases to complete a Venn diagram on reptiles and amphibians, including: • dry, scaly skin • lays eggs • cold-blooded • lives on land • young live in water • goes through changes (metamorphosis) • snake • frog • salamander • lizard • smooth moist skin

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

CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Invertebrates- Arthropods **Strand 1: Characteristics of Organisms**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE	1. Define invertebrates. 2. Identify the main traits common to all arthropods	• **Invertebrates** are animals without a backbone**.** • Examples of invertebrates are grasshoppers, worms, honeybees, corals, jellyfish, conch, sponges and starfish. • There are six (6) groups of invertebrates. • **Arthropods** are the largest group of invertebrates. • Butterflies, beetles, flies, lady bugs, wasps, grasshoppers, mosquitoes, ticks and spiders are all arthropods. • All arthropods have **jointed legs**, a **segmented body** and an **exoskeleton**.	• Make accurate observations • Utilize classification process and recognize relationships • Communicate information effectively	• Flexibility/ adaptability • Curiosity • Open to new ideas	**1a. Junior Scientists on the Go!** Take a nature walk for about 5-10 minutes near the school's garden. Have students observe animals in their natural habit. Capture vivid pictures along the way. Upload and project to the board for a dynamic discussion on invertebrates. Caution students not to touch the insects. **1b. Vertebrate or Invertebrate** Display several pictures or stuffed animals. Have students use a paddle labelled "V" for vertebrates and "I" for invertebrates. Point to an animal and students will classify the animal by showing "V" or "I". **2a. "Mash Di Roach"** With Bahamian music playing in the background, have students take turns mashing roaches made of foil with their shoe. Through	Simple Science Text/workbook 4 Harcourt Science Bk. 4 Science Horizons Bk. 3 Live worksheet https://www.liveworksheets.com/worksheets/en/Natural_Science/arthropods/arthropods_kv5477gi Colouring page- grasshopper https://colournimbus.com/grasshopper-picture-colouring-page/	Provide six (6) animal picture cards on the board and then have students record only the animals that are arthropods. Write at least two (2) traits of all arthropods. Colour the pictureof a grasshopper. A grasshopper has an exoskeleton. What is an exoskeleton?' Describe the grasshopper's legs. Circle the insect's head.

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Arthropods **Strand 1: Characteristics of Organisms**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE		• An **exoskeleton** is a hard outer covering that protects an animal's body and gives it support.			probing, compare the foil to the exoskeleton of insects. Discuss the role of the exoskeleton.		

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Insects and Spiders (Arthropods) **Strand 1: Characteristics of Organisms**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE	1. Distinguish the main differences between insects and spiders.	• Insects and spiders are invertebrates that belong to the group called **arthropods**. • Insects have three main **body segments** or parts which are the head, **thorax** and **abdomen** . • Insects have six legs. • Insects can fly because they have wings. • Bees, wasps, flies, roaches and grasshoppers are examples of insects. • Spiders are NOT insects. They belong to a group called **arachnids.** • Spiders only have two body segments:	• Utilize classification process and recognize relationships • Communicate information effectively	• Curiosity • Cooperation • Open to new ideas	**1a. Nature Walk** Go on a nature walk around the school. Identify and observe insects and spiders. In small groups, use a hand lens and a checklist of theirtraits. Compare and contrast them (exercise extreme caution while observing the animals in the environment). **1b. Recyclable Arthropods** Make models of insects and spiders using reusable materials. Write three sentences to describe your animal/model. **1c. Insects vs Spiders** Working in small groups, students will utilize sentence strips to complete a T- Chart on the board about insects and spiders.	Simple Science Text/workbook 4 Harcourt Science Bk. 2 Live worksheet- Labelling https://www.liveworksheets.com/lc1280612kc	Label the basic parts of an insect and spider given. Below a drawing of an insect and spider, write two sentences to tell how insects and spiders are alike and three sentences to tell how they are different.

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Insects & Spiders **Strand 1: Characteristics of Organisms**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE		head (**cephalothorax**) and abdomen. • Spiders have eight legs and most have eight eyes. • Spiders do not have wings. • Spiders spin webs. • A black widow spider is a type of spider that is **poisonous**. Wolf spiders, tarantulas and cellar spiders are also examples of spiders.					

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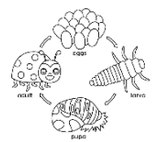
CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Life Cycles **Strand 1: Characteristics of Organisms**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE	1. Describe the life cycle of mosquitoes and cockroaches.	• A **life cycle** is the order of the stages in an animal's growth. • There are two kinds of life cycles: **complete metamorphosis** and **incomplete metamorphosis**. • **Metamorphosis** is the changes an animal goes through to become an adult. • **Incomplete metamorphosis** only has three stages: **egg, nymph** and **adult**. • Insects like cockroaches and grasshoppers go through incomplete metamorphosis.	• Pursue new knowledge • Utilize classification process and recognize relationships • Formulate models	• Cooperation • Curiosity • Scepticism	**1a. Insect Phases** Distribute pictures or models of an insect's life cycle. Sequence them in the correct order and discuss each stage. Determine if the example is complete or incomplete metamorphosis. **1b. Dangling Insect Development** i. Using paper plates, create a mobile of the life cycle of the mosquito or cockroach. ii.. Work in small groups to colour and cut out pictures of the stages of development in each life cycle. iii. Glue them on a paper plate provided. iv. Use string to hang the mobiles of various life cycles around the classroom. 	Simple Science Text/workbook 4 Science Horizons Bk. 2 Life cycle of a butterfly colouring page http://www.supercolouring.com/sites/default/files/styles/colouring_full/public/cif/2015/07/life-cycle-of-a-butterfly-colouring- page.png	Write words from the box to fill in the stages of complete and incomplete metamorphosis. Have students label the stages of the life cycle of a mosquito or butterfly. Then write complete or incomplete metamorphosis below.

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Life Cycles **Strand 1: Characteristics of Organisms**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE		• **Complete metamorphosis** has four stages: **egg, larva, pupa** and **adult**. • Insects like butterflies, mosquitoes and houseflies go through complete metamorphosis. • All insects begin as an egg.					

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Animal Adaptations- Camouflage and Mimicry **Strand 1: Characteristics of Organisms**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE	1. Infer the importance of animal adaptations. 2. Investigate how insects use camouflage and mimicry in their environment.	• Animals have special features called **adaptations** that allow them to live where they do. • An **animal adaptation** is a body part, a body covering or an action (behaviour) that helps the animal to survive in its environment. • **Camouflage** and **mimicry** are animal adaptations. Many small animals use these adaptations to avoid being eaten by other animals. • **Mimic**ry is an adaption in which an animal looks and sounds like another animal. For example, some harmless animals look and behave like poisonous animals that are distasteful to predators who avoid eating them.	• Demonstrate critical thinking • Make inferences and draw conclusions • Pursue new knowledge	• Flexibility/ adaptability • Curiosity • Cooperation • Scepticism	1. **Adapting to Survive** Set up a display of animals (toys/figures). Have students volunteer to choose an animal from the display. Each student will be asked a question related to an adaptation the animal has. E.g. Why does the giraffe have a long neck? Draw conclusions and discuss. 2. **Blending In** a. Design and draw a new kind of insect. b. Look around your classroom for different colours, shapes, and patterns that your insect could blend with and not be seen easily. c. Then, cut out your drawing. d. Predict where your insect will be hardest to find. Put your insect in that place. See if others can find it.	Simple Science Text/workbook 4 Harcourt Science Bk. 4 Silver Burdett Science Bk. 4 Houghton Mifflin Science Discovery Works Bk. 3 Free worksheet downloads Teaching Resources & Lesson Plans | Teachers Pay Teachers 	Have students observe pictures of four organisms in the environment. On a folder sheet name, each organism. Write an adaptation it has and how it uses it to meet its needs. Tell if the organism used camouflage or mimicry.

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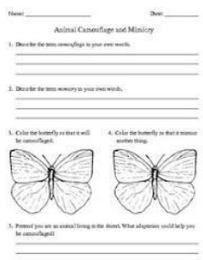
CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Animal Adaptations (Camouflage and Mimicry) **Strand 1: Characteristics of Organisms**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE		• Some insets mimic bees and butterflies. Some harmless snakes also tend to mimic deadly snakes like coral snakes. • **Camouflage** is when an animal's colour, shape or pattern blends in with its environment.			**A call for survival!** Adaptation – mimicry Students work in pairs. Blindfold about six students. Provide the students with instruments to make a sound (each in the pair will have the same instrument sound). Place students at strategic places around the classroom or outside. Each child will make the sound with their instrument until they find their partner who is also making the same sound. This is to show how babies and their parents have adapted to each other's sounds.	Camouflage and Mimicry Worksheet by Lanni | Teachers Pay Teachers  https://www.education.com/worksheet/article/animal-patterns/	Complete a worksheet on camouflage and mimicry

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: The Respiratory System **Strand 1: Structure and Function in Living Things**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE	1. Discuss the definition of the Respiratory System. 2. Investigate the main parts of the Respiratory System and discuss how air is transported throughout the human body.	• The **respiratory system** is a group of organs that transports air into the body. • When we breathe, air moves through the nose or mouth and goes down the windpipe, also known as the **trachea**. • The trachea divides into two tubes called the **bronchial tubes.** The bronchial tubes carry air into our **lungs**. • The human body has two lungs. In the lungs the bronchial tubes divide into smaller tubes. • Tiny air sacs called **alveoli** are found at the end of the smallest tubes.	• Communicate information effectively • Make inferences • Engage in collaborative activities • Formulate a model	• Open to new ideas • Scepticism • Thinking independently	**1a. All about the RespiratorySystem** Use sentence strips to create a K-L-W chart. Distribute post it cards and have the learners write at least one idea in the "know" and "want to know" section on their cards. Attach them to the KWL chart and have a few volunteers share their ideas. **2a. Air on the Inside!** The teacher will make an apron showing the outline of the respiratory system. One student will wear the apron. Other students will be given the parts (cut-outs) of the respiratory system. The students will come up one at a time and attach the part correctly on the apron.	Simple Science Text/workbook 4 Silver Burdett & Ginn Bk 4 https://www.youtube.com/watch?v=mOKmjYwfDGU Respiratory System diagram worksheet https://betterlesson.com/community/document/1719723/diagram-worksheet-docx Diagram of Respiratory System on a child http://getdrawings.com/images/respiratory-system-drawing-20.jpg	Unscramble and write the definition of the respiratory system. Write one reason why the respiratory system is important. Each student will be given a list of the parts of the respiratory system and a diagram of the respiratory system. Use the words from the list to correctly label the parts of the respiratory system.

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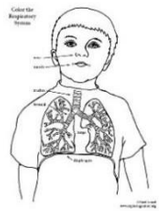
CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: The Respiratory System **Strand 1: Structure and Function in Living Things**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE		• When air enters the lungs, it fills the air sacs. Oxygen moves from the air sacs into the lungs. • At the same time, **carbon dioxide** moves from the blood to the air sacs. When you breathe out**,** carbon dioxide leaves the body. • The **diaphragm** is a dome-shaped muscle used in breathing. It is at the bottom of the lungs. • The diaphragm flattens or tightens (contracts) when we breathe air in (**inhale**). This action pulls air into the lungs. • To breathe out or **exhale**, the diaphragm goes back to its normal shape and pushes air out of your lungs.			**2b. Oxygen Intake**! Conduct a breathing exercise. Sit in a chair and count how many breaths you take in 30 seconds. Exercise for two minutes. Stop and count how many breaths you take in 30 seconds. List two reasons why breathing is important. **3. Our Air Transport System** Using a 2-liter plastic bottle, straws, balloons, tape, elastic bands and other materials, create a model of the respiratory system. 		Give students a key to colour the different parts of the respiratory system. E.g. Colour the lungs blue  Use words from the list provided to correctly label the parts of the respiratory system Complete a worksheet on the vocabulary terms of the Respiratory System.

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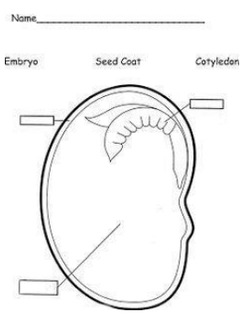
CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Seed Germination **Strand 1: Structure and Function in Living Things**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE	1. Identify seed parts and their function. 2. Define germination. 3. Analyze the process of germination in a seed plant.	• A **seed** is a part of a plant from which a new plant can grow. • There are three parts of a seed: cotyledon, embryo and seed coat. • The cotyledon provides food for the baby plant or seedling. • The seed coat protects the seed from insects, disease and damage. • The embryo will germinate into a baby plant or seedling. • A plant that can form new plants from seeds is called a **seed plant**. Examples of seed plants are hibiscus, dandelions, and pine trees.	• Hypothesis/ Predicting • Observation • Draw conclusions using prior knowledge • Experimenting	• Flexibility/ adaptability • Curiosity	**1. Planting Seeds** Using recycled egg cartons, create a garden to grow seed plants (lima beans). **2. Germination Experiment** Please collect the following supplies: • 3-5 Seeds • 1 Paper Towel • 1 Plastic Bag • 1 spray bottle (you may need to share) • 1 label or piece of masking tape and a marker Please follow these steps when setting up your germination experiment: 1. Label the plastic bag with your name, the date, and the seed name.	Simple Science Text/Workbook 4 Science Horizons BK. 3 Harcourt Science Bk. 3 Silver Burdett Science Bk. 4 https://study.com/academy/practice/quiz-worksheet-flowering-nonflowering-plants-facts-for-kids.html	Complete a worksheet.  https://www.liveworksheets.com/mz2403239xh https://www.liveworksheets.com/uc1902874ha Match the parts of a seed to their functions.

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Seed Germination **Strand 1: Structure and Function in Living Things**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE		• Germination is defined as the beginning of growth. The term is most commonly associated with plants, describing the process of a seed sprouting into a seedling. The term germination can also be applied to spores or buds. • When seeds are dry and hard, they are dormant. • When a seed is moistened, it will absorb water, breaking the seed coat and initiating the food supply in the cotyledon. • Temperatures must fall between a specific range for seeds to germinate. • Sunlight supports the germination process as it provides warmth to the soil.			2. Fold a paper towel, make sure it will fit in your plastic bag. 3. Spray or dampen your paper towel with water. 4. Place 3-5 seeds in the folds of your paper towel. 5. Carefully insert your paper towel (with seeds) into your plastic bag, seal, and label. **Define Germination** Germination is.. **Create Hypothesis** When my seed germinate it will look like this: **Germination Results** Sketch what you see. Describe your observations. Was your hypothesis correct? **Reflections:** To germinate seeds need…		

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Seed Germination **Strand 1: Structure and Function in Living Things**

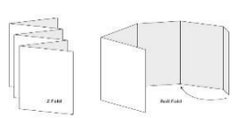
	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE		• Sunlight warms the soil to help initiate germination and once leaves have sprouted, it is also the primary energy source for plant growth through the process of photosynthesis. • The developing stem will bring the cotyledon along, which appears as the first two sprouting leaves, which looks different than the true leaves of the plant that grow once the stem and roots are established. 					

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
SCOPE OF WORK

GRADE 4

Topic: Earth's Layers **Strand 2: Properties and Structure of Earth**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE	1. Identify the layers of the Earth. 2. Describe Earth's three main Layers.	• Earth is made up of three layers. These layers are the **crust, mantle**, and the **core**. • The **crust** is the outer layer of Earth. It is the surface of planet Earth. • The crust is the layer we live on. It is rough and uneven with hills and valleys and has a layer of **bedrock** at its base. • The crust is Earth's thinnest layer. • Below the crust is the **mantle**. The mantle is Earth's thickest layer. The mantle is made up of lighter rock material than the crust. • The **core** is the inner most layer of Earth.	• Make inferences and draw conclusions • Communicate information effectively • Pursue new knowledge • Formulate models	• Flexibility/ adaptability • Open to new ideas • Curiosity • Scepticism	**1. A Journey to the Core!** Investigate Earth's layers. Dissect an apple. Give each student half of an apple and a ruler. Draw a picture showing its layers. Measure the thickness of the peel, the thick white part and the core. Explain which parts of the apple are like the crust, mantle, and core of Earth. **2a. Fact Finder Foldable**! Small group assignment: create a foldable to draw and write facts about each layer of the Earth.  **2b. Creating Earth** Make a model of the Earth using a small gum ball and modelling clay. Describe each layer.	Simple Science Text/Workbook 4 Harcourt Science Bk. 3 YouTube Video https://www.youtube.com/watch?v=WjXSCumeqxo Worksheet https://www.superteacherworksheets.com/rocks-earth/earthlayers-article_WMWBZ.pdf http://www.ecofriendlykids.co.uk/Natural	Give each student a hard-boiled egg. Have each student tell which material or part represents the crust, the mantle and the core. Write two facts about each layer of Earth. Complete a Reading Comprehension worksheet on Earth's layers Have students conduct additional research on layers of Earth. Write a short story on "A journey to the centre of the Earth." Explain what they would encounter while traveling through a tunnel from where they live straight through the Earth.

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Earth's Layers **Strand 2: Properties and Structure of Earth**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE		• The core consists of two parts: the **outer core** and the inner core. The core is made of very hot iron and nickel. • The **inner core** is solid because of the pressure and weight of the other layers around it.					They will locate on a globe or map where they would exit the tunnel.

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
SCOPE OF WORK

GRADE 4

Topic: Movements of the Ocean **Strand 2: Changes in Earth and Sky**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE	1. Determine the amount of ocean water that covers Earth's surface. 2. Describe the movement of ocean water.	• Water covers almost three quarters (3/4) of the earth's surface. There is fresh water and salt water on Earth. • About one tenth (1/10) of water on the earth is fresh water (e.g. rivers and lakes). • Nine tenths (9/10) of water on Earth is saltwater. Most of the saltwater is found in the **oceans**. • Ocean water is never still. **Waves, tides** and **currents** cause the ocean to move constantly. • An **ocean current** is the continuous movement of ocean water from one place to another.	• Make inferences • Integrate math skills using fractions • Communicate information effectively • Design, conduct and evaluate scientific investigations	• Thinking independently • Questioning and posing problems • Flexibility/ adaptability • Curiosity	**1a. Fraction Fun** Have students work in small groups to use moulding clay or drawings to depict three quarters. Have students write the percentage for three quarters (75%) under their model or drawing. Refer to a globe and discuss how that amount of water is on planet Earth. **1b. Fraction Bars** Provide each student with a bar graph in 10ths. Have students shade in nine tenths only. Students can paste their fraction into their notebooks. Discuss the difference in the amount of salt water versus fresh water on Earth. **2a. Water World!** Take a field trip to the beach and observe wave, current and tidal action.	Simple Science Text/Workbook 4 Science Horizons Bk. 4 Harcourt Science Bk. 4 Explaining sea waves-video https://www.youtube.com/watch?v=9M6eWK4VG1g	Match each term with the description of the type of water movement. Write a fraction that best represents the: a. the amount of water that covers the Earth b. the amount of fresh water on Earth c. the amount of salt water on Earth. Have the students watch a video of wave action. Count the frequency (how often waves occur in a given time) of the waves on different parts of the beach. Record your findings.

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
SCOPE OF WORK

GRADE 4

Topic: Movements of the Ocean **Strand 2: Changes in Earth and Sky**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE		• **Waves** are the **alternating** rising and falling of water. • Waves are caused by the **wind.** Wind blowing over the surface of the ocean transfers energy to the water and causes waves to form. • **Tides** are the **alternate** rise and fall of the oceans and seas and bodies of water connected to them. • Tides are caused by the **gravitational force** of the moon acting on the oceans and seas. • Ocean water **tilts** back and forth because of the gravitational pull of the moon, which causes a **high tide** and a **low tide** each day.			**2b. Wave action** Design and conduct an investigation on waves, tides and currents. In a metal pan, pour blue coloured water halfway in the pan. Discuss the term "surface." With the use of a fan, create movement on the water's surface to depict waves and current. Observe carefully and discuss the terms waves, tides and current. **2c. High Tide vs. Low Tide** Draw an illustration of high tide and an illustration of low tide. Write each definition below. Name the body in space responsible for high tides and low tides.	Simple Science Text/Workbook 4 Reading passage on Ocean Tides https://www.easyteacherworksheets.com/pages/pdf/science/answer/singlepages/oceans/9.html	True/ False - The sun's gravity is the main cause of Earth's tides. - Waves are caused by the wind. - Waves are the rising and falling of the whole sea level. - Ocean water is still at night time. - Tides cause water levels to rise and fall once per day. [F,T,F,F,T]

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
SCOPE OF WORK

GRADE 4

Topic: Properties of Air **Strand 2: Properties and Structure of Earth**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE	1. Describe the components of air.	• Air is a mixture of **gases** that surrounds Earth. The blanket of air that surrounds Earth is called the **atmosphere**. • The air we breathe is made up mostly of nitrogen and oxygen. It consists of 78% nitrogen and 21% oxygen. • Oxygen is a very important part of the air because humans and animals need it to **survive.** • Smaller amounts of other gases found in the air are carbon dioxide (0.4%), water vapor (0.6%} and traces of other gases like ozone, helium and hydrogen.	• Pursue new knowledge about the atmosphere. • Integrate math skills using fractions and decimals	• Curiosity • Flexibility/ adaptability	**1. Charting the Components of Air** Create a chart about the composition of air. Write the names of the four main gases that make up air on different colour chart paper. Assemble them in no particular order. Have volunteers place them in order from greatest to least on the board. Afterwards, volunteers can come up and write the percentage underneath the type of gas as a bonus. Discuss how carbon dioxide and water vapor make up even less than 1% of air, compared to nitrogen and oxygen. **2a. Taking up Space** Have each student inflate a balloon. Discuss how 'air takes up space.'	Simple Science Text/Workbook 4 Harcourt Science Bk. 3 Science Horizons Bk. 5 https://www.youtube.com/watch?v=h7rhOM2dXtE	1. Use a paper plate to create a pie chart on the components of air. Write the 4 elements of air. On the back of the paper plate, list three properties of air.

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Properties of Air **Strand 2: Properties and Structure of Earth**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE	2. Investigate the properties of air.	• Air has certain **properties**. Properties are things about matter that can be measured or observed. • Properties of air include: a. Air takes up space b. Air has weight c. Air presses on things (air pressure). • The atmosphere has different layers. **Weather** takes place in the lowest layer that is closest to Earth called the **troposphere**.	• Design, conduct and evaluate scientific investigations.	• Scepticism • Open to new ideas	**2b. Understanding Air Pressure** Conduct an experiment to investigate properties of air. Materials: jars, 2 rubber bands,string, plastic bags Procedure: 1. Students will fill a plastic bag with air by blowing them up. 2. Tie the air-filled bags, upside down to each jar with its mouth over the opening of the jar. 3. Wind a string very tightly around the bag and jar and tie it. 4. Press down on the bag, rest objects on top of them. What happens? **2c. Hopscotch through the Atmosphere** Create a hopscotch mat starting with Earth and then the layers of the atmosphere. Have students hop on each layer. Identify the Troposphere.	Simple Science Text/Workbook 4 Properties of air video and live worksheet https://www.liveworksheets.com/mp1208655ax https://www.youtube.com/watch?v=h7rhOM2dXtE	Watch a brief video and complete a live worksheet on the properties of air. a. Define atmosphere. b. Explain what the troposphere is. c. Tell what happens in the troposphere.

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
SCOPE OF WORK

GRADE 4

Topic: Meteorology & Weather **Strand 2: Changes in Earth and Sky**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE	1. Define meteorology. 2. Explain what a meteorologist does. 3. Define weather.	• Meteorology is the study of **weather** and the **atmosphere**. • A **meteorologist** is a scientist who studies and measures **weather conditions**. • Weather conditions include temperature, rain fall (**precipitation**), wind speed, wind direction and air pressure. • Meteorologists use special tools called **weather instruments** to study and predict the weather. • **Weather** is the condition of the atmosphere at a certain time and place.	• Communicate information effectively • Demonstrate critical thinking • Engage in collaborative activities • Collect process and interpret data/ information • Make predications based on reasoning and prior knowledge. • Pursue new knowledge	• Open to new ideas • Questioning and Posing Problems • Flexibility/ adaptability	**1a. Meet the Meteorologist!** Visit the meteorological office to observe how they predict weather. **2-3. Interpreting Weather Forecasts** Watch a video or weather forecast on television or radio and compare these weather predictions to the actual weather for that week.	Simple Science Text/Workbook 4 Science Horizons Bk. 5 Science Horizons Bk. 4 Harcourt Science Bk. 3 https://www.youtube.com/watch?v=vH298zSCQzY	Take on the role of a meteorologist. Observe and record current weather conditions. Then predict the weather for the next day and write your own forecast. Provide students with a template of a family island to trace. Record today's weather on one side of your island. Write a temperature, describe the wind, and tell if it is raining on your island. On the opposite side of the island, drawa picture of how your island would look for most of the year. Write a short description.

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Meteorology & Weather **Strand 2: Changes in Earth and Sky**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE	4. Describe the elements of weather. 5. Identify weather instruments and explain their use.	• **Temperature** is a measure of how hot or cold something is. • **Wind** is the movement of air. • **Precipitation** is any kind of water that falls from the atmosphere to the ground. For example: rain, snow, hail or sleet. • The pressing force of air is called **air pressure.** • A **thermometer, wind vane, rain gauge, barometer** are **weather instruments.** • A **thermometer** measures temperature. • Most thermometers are made of a glass tube with	• Make inferences and draw conclusions • Make informed, responsible and wise decisions • Formulate hypothesis • Use materials and scientific equipment correctly and safely • Formulate models	• Thinking independently • Cooperation • Scepticism	**4-5a. Junior Meteorologist at Work** a. Make a chart to record data. b. Write the dates in the first column. c. Use a thermometer to measure the temperature outside. Write this in the second column. d. Use a wind vane to determine the wind direction in the third column. e. Use the fourth column to record precipitation. **5b. Meteorologists in Action!** Conduct an experiment to measure temperature with a thermometer. **5c. Campus Heat** i. Discuss and record the temperature inside of the classroom. ii. Then place the thermometer at a different location on campus (e.g. inside the office). Leave it	Simple Science Text/Workbook 4 Science Horizons Bk. 34	Vocabulary quiz. Select a few vocabulary words from the lesson. Have students complete a fill in the blank worksheet. Have students observe four drawings of a wind vane (and a compass) with the arrow on each wind vane pointing in a different direction. Write the direction shown on each drawing. Have the students observe a table which shows different times and temperatures for

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Topic: Meteorology & Weather **Strand 2: Changes in Earth and Sky**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE		coloured alcohol inside. • When the air gets hotter, the level of the liquid in the tube rises. When the air cools, the liquid level falls. • The thermometer has two scales for measuring temperature: Fahrenheit and Celsius. • **Wind vanes** show the direction the wind is blowing. • The arrow of the wind vane points into the wind. When wind is blowing from the south, it is called a south wind. When the arrow of the wind vane points between two directions the directions are combined (e.g. north and west is called a northwest wind).		• Positive attitude to failure (investigations)	there for 10 minutes. iii. Record the temperature at the new location. Iv. Chart the changes and discuss what happened to the temperature at the different locations? **5c. Thermometer Fun!** Make a model of a simple thermometer. Draw and label a chart about freezing point and boiling point in Fahrenheit and Celsius. **5b. Meteorologists in Action II** Make a model of a wind vane to show wind direction. i. Take your wind vane and a compass outside to find north. Point the plates "north" in that direction. ii. In what direction did the arrow point? **5c. Recoding Rainfall** Present a short fiction story on		one day. Interpret the data. Then have the students observe four drawings of a wind vane with the arrow pointing in different directions. Write the direction shown on each drawing. Take the wind vane that you made outside and place it in an open area. Use a compass to make sure the "N" or your direction is pointing north. When the wind blows, observe which direction the wind is blowing from. Record this data or your Weather Data Sheet.

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Meteorology & Weather **Strand 2: Changes in Earth and Sky**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE	6. Distinguish between weather and climate.	• A **rain gauge** measures rainfall or precipitation. • A rain gauge has a cylinder with measurement marks on the side (**graduate**) and a funnel on top. When rain falls, it goes into the funnel and collects in the graduate cylinder. • A **barometer** is used to measure air pressure. • In one type of barometer, air presses down on the instrument, causing the needle to move. The needle points to a number that tells how much air is pressing down on it. • **Weather** describes the atmosphere at a given time and place. For example, it is a rainy afternoon.	• Demonstrate critical thinking	• Thinking independently	**5d. The Rainiest Week in Nassau!** Students will record data from the story and then create a bar chart on the rainfall for each day mentioned in the story. Make graphs to show rainfall. 6. **Weather vs Climate** Give students data of weather that was recorded over several weeks/months. a. Have the students determine what the weather was for one particular day for the area given. b. Interpret the data to tell what the climate is for the area given.	Weather vs climate NASA video for kids https://youtu.be/vH298zSCQzY Live worksheet – https://www.liveworksheets.com/worksheets/en/English_as_a_Second_Language_(ESL)/Clothes/Clothes_and_weather_iy8417ja Simple Science Text/Workbook 4	Write the difference between weather and climate. Complete a live worksheet on clothes & weather (Resources)

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Meteorology & Weather **Strand 2: Changes in Earth and Sky**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE		These conditions can last a few hours, days or weeks. • However, **climate** is the average weather conditions in a place for a long period of time (e.g. over 30 years or more).					

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
SCOPE OF WORK

GRADE 4

Topic: Inner Planets & Outer Planets **Strand 2: Universe and the Solar System**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE	1. Describe the solar system. 2. Identify the planets in the solar system 3.Classify the planets as inner and outer planets	• The **solar system** is a group of objects in space that **orbit** or move around the sun. • The **sun** is a star at the centre of the solar system. It is a huge glowing ball of hot gases. • A **planet** is a large body of rock or gas that **orbits** the sun. • There are eight (8) planets in the solar system, • The planets in order from the sun to outer space are Mercury, Venus, Earth Mars, Jupiter, Saturn, Uranus and Neptune. • There are two groups of planets in the solar system- inner planets and outer planets.	• Make inferences and draw conclusions • Communicate information effectively • Utilize classification process and recognize relationships	• Curiosity • Skepticism • Thinking independently • Skepticism	**1. The Ultimate Star!** Take a brief nature walk. Discuss the impact of the sun on Earth. Caution students not to look directly at the sun. **1b. Planet Fun** Have students bring in a small ball. Show students a beach ball and compare it to the sun. Have a group of eight students line up with their balls and compare them to the various planets. Discuss and demonstrate how planets orbit around the sun **2. Your Place in Space!** Have students chant the acronym **M**y **V**ery **E**ducated **M**other **J**ust **S**erved **U**s **N**oodles Discuss the order of the planets from the sun.	Simple Science Text/Workbook 4 Harcourt Science Bk. 3 Silver Burdett Science Bk. 4 Harcourt Bk. 4, D70 https://kids.britannica.com/kids/article/solar-system/353789 Solar system song https://www.youtube.com/watch?v=pUZ2tfr1bsU https://www.youtube.com/watch?v=Qd6nLM2QlWw&t=408s	Give students a copy of the planets and their names. Have students cut and paste the planets in order. Label the planets in order on a live worksheet. Give each student an orange circle to represent the sun. Have the student place it in the centre of a blank paper. Give each student coloured circles to represent each planet. Write the name of each planet on a circle. Place each named circle in the correct position around the sun.

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
SCOPE OF WORK

GRADE 4

Topic: Inner Planets & Outer Planets **Strand 2: Universe and the Solar System**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE	4. Distinguish between inner and outer planets	• Inner planets are the four planets closest to the sun: Mercury, Venus, Earth, and Mars • Inner planets: a. Have a rocky surface b. Are smaller than outer planets. c. Warmer than outer planets d. Do not have rings e. Do not have more than two (2 moons). • Jupiter, Saturn, Uranus and Neptune are the outer planets. They are farthest from the sun. • Outer planets are sometimes referred to as gas giants. They are: a. Made mostly of frozen gases	• Pursue new knowledge	• Cooperation	**3. Exploring Inner & Outer Planets** Have students cut out circles from different coloured paper. These circles represent the inner planets – Mercury Venus, Earth and Mars. Fasten the circles to the wall alongside the model of the sun Label each circle with the appropriate planet name. Attach a large sheet of paper below each circle. Have the students tell what they know about each inner planet. List these things on the sheets of paper. Repeat the same procedure for theouter planets. **1-4. Adventure into Outer Space!** Visit the planetarium at the Adventure Learning Centre.	Simple Science Text/Workbook 4 Live worksheet- Inner & Outer Planets https://www.liveworksheets.com/worksheets/en/Science/Planets/Inner_and_Outer_Planets_dr1394278ql	**Mini Project:** Assign each student a planet. Students will: a. conduct research on the planet b. label the planet as inner or outer planet c. make a model of the planet Complete a live worksheet on Inner & Outer Planets (resources)

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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GRADE 4

Topic: Inner Planets & Outer Planets **Strand 2: Universe and the Solar System**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE		b. Larger than inner planets c. Have colder surfaces d. Have many moons e. Have rings of ice and dust around them. • Separating inner and outer planets is the **asteroid belt**. The asteroid belt is a group of millions of rocks and small chunks of metals that orbit the sun. It is found between Mars and Jupiter.					Have the students make two tables. The first table should be labelled “Inner Planets”. "The table should be labelled “Outer Planets”. Have the students list each inner planet in the first column of the first table and each outer planet in the first column of the second table. In the second column of both tables, have them list three characteristics of the inner planets and three characteristics ofthe outer planets.

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
SCOPE OF WORK

GRADE 4

Topic: Physical Properties and Changes in Matter **Strand 3: Properties and Changes in Matter**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE	1. State the definition of matter. 2. Observe and identify properties of matter.	• **Matter** is anything that has **mass** and takes up space. • **Mass** is the measure of the amount of matter in an object. • Things that contain more matter have more mass. A bag that contains 10 marbles contains twice as much mass as a bag with 5. • Matter is made up very small bits called **particles of matter.** • A **property** is a characteristic that is used to describe matter.	• Demonstrate critical thinking • Engage in collaborative activities • Communicate information effectively	• Curiosity • Skepticism • Questioning and posing problems • Open to new ideas	**1a. Show and Tell** Have students bring in a simple toy (no electronic gadgets). Explain what it is made out of. Tell why it is matter. **1b. Packed to Capacity** Place an inflated balloon, a cuboid and glass of coloured water on the table. Students will discuss how the particles of matter move around or are packed differently for each state of matter. **2a. Scavenger Hunt** Present a list of properties (e.g. green, shiny, hard, etc.). Have students work in small groups to find items with those properties around the classroom or in a selected area outdoor. Discuss the term property of matter.	Simple Science Text/Workbook 4 Video on matter https://www.youtube.com/watch?v=68QDZAl29oE Harcourt Science Bk. 4 Silver Burdett & Ginn Bk. 4 Harcourt Science Workbook 3 WB 221-222, WB 225 http://www.nyu.edu/pages/mathmol/textbook/whatismatter.html	Observe a picture of a lost object. Complete a "report" by listing at least 5 properties of the object. Observe three different objects. Give students three circles to make a Venn diagram to compare the properties of each type of matter.

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
SCOPE OF WORK

GRADE 4

Topic: Physical Properties and Changes in Matter **Strand 3: Properties and Changes in Matter**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE		• Colour, shape, smell, feel and the state of matter are physical properties of matter. They are observed with our five senses.	• Pursue new knowledge	• Curiosity	**2b. All about properties** Createa graphic organizer and list the properties of the toy from "showand tell". Record the properties (shape, colour(s), texture/feel, state of matter, *smell- if applicable). Discuss with the class.	Simple Science Text/Workbook 4 Silver Burdett Ginn Science Horizons Bk. 4 Compare the Properties of Matter Interactive Game https://www.ixl.com/science/grade-4/compare-properties-of-objects Change of State of Matter https://www.ixl.com/science/grade-3/change-of-state-diagrams-solid-liquid-and-gas	List three (3) physical properties of matter. Observe a lemon and a hai brush. Describe two (2) physical properties of each. Write a list of four kinds of matter on the chalkboard. Give each student a sheet of paper. Have each student list one physical property of each matter. Then write one way it can be changed physically. Draw a picture to show each physical property and physical change. Draw the pictures side by side each kind of matter.
	3. Compare the physical properties of matter.	• A **physical property** is one that can be **observed** or measured without changing the matter.	• Collect, process and interpret data	• Flexibility/ adaptability	**3. Properties game** Project and have students play an interactivegame on properties of matter (resources).		
	4. Investigate physical changes in matter.	• A **physical change** in matter is a change in the size, shape or state of matter. The particles of which matter is made remains unchanged after a physical change.	• Conduct and evaluate scientific investigations	• Questioning and posing problems • Open to new ideas	**4a. A Change Without a Change** Empty a bag of assorted materials on your work surface. Observe each material with a hand lens. Talk with a partner to decide how you might change each of the materials. Record the name of each material and how it was changed.		

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
SCOPE OF WORK

GRADE 4

Topic: Physical Properties and Changes in Matter **Strand 3: Properties and Changes in Matter**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE		• For example, an ice cube left on the kitchen counter will melt into water. The solid changes into a liquid, butthe frozen or melted ice is still water. This change in the state of matter is s a physical change.			**4b. Experiment Change in matter** a. Place the plastic cup on the paper towel. Put the ice cubes in the cup. b. Predict what the ice cubes will look like after 45 minutes. Use your past observations of ice cubes to predict what will happen this time. Record your prediction. c. Observe what's in the cup after 45 minutes. Record what you see. Was your prediction correct? Discuss the physical change observed. Display an electric water kettle. Boil a cup of water. Students will observe the process and visualize the changes of water (e.g. steam). Discuss terms like **boiling point**, **evaporation** and **condensation.**	Silver Burdett Ginn Science Horizon Bk. 4, pg. 186	Give each student a coloured sheet of paper. On a separate sheet of paper have each student make a table. In column one, list the physical properties the paper. In column two, list the physical changes that can be made to the paper. Write the letter of the term that best matches the definition. 1. Solid, liquid, gas 2. Amount of matter in a given space. 3. Anything that has mass and volume.

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Physical Properties and Changes in Matter **Strand 3: Properties and Changes in Matter**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE							4. Small bits in all matter. 5. The measure of the amount of matter in something 6. Water can change from a liquid to a gas. This is an example of a_change. [a. volume, b. physical change c.matter, d. states of matter, e. mass, f. grams]

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
SCOPE OF WORK

GRADE 4

Topic: Measuring Matter (Mass & Volume) **Strand 3: Properties and Changes in Matter**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE	1. Measure the mass of objects.	• **Mass** is the amount of matter in an object. • A **balance** is a tool used to measure mass. • If objects with the same mass are placed on each pan, the pans will be level. • If the objects have different masses, the pan with more mass will be lower. • Mass is measured in grams and kilograms.	• Make accurate observations and measurements. • Use materials and scientific equipment correctly and safely.	• Cooperation • Questioning and posing problems • Thinking independently	**1a. Measuring Mass** Use a hanger,string and 2 plastic cups to make a balance. Predict which small items will havemore mass. Record your findings. b. Place a coin in one of the cups. What happens to the balance? c. Add paper clips to the other cup one at a time until the cups balance. How many paper clips are needed to balance the cups? What is the mass of the coin to the nearest paper clip? d. Find the masses of other objects. **1b. Mass Matters!** Give each group a bag with several objects in it. Open the bag and remove the objects. Infer the mass of each object. Make a chart to record the name of each object and its mass. Using a balance, measure the mass of each object in grams.	Simple Science Text/Workbook 4 Silver Burdett Science Bk. 4	Use complete sentences to answer the following on a folder sheet. a. Pretend that you are trying to follow a recipe. You need to measure out 10g of salt. What do you need to do to measure out the correct amount? b. Tell which items are measured by volume and which by mass: flour, vinegar, juice, milk and sugar.

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
SCOPE OF WORK

GRADE 4

Topic: Measuring Matter (Mass & Volume) **Strand 3: Properties and Changes in Matter**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE	2. Measure the volume of different matter.	• **Volume** is the amount of space that matter takes up. • The volume of a liquid can be measured using a special container called a **graduate.** • Small volumes of liquid are measured in **millilitres** while a large volume of liquid is measure in **litres.**	• Design, conduct and evaluate scientific investigations.	• Cooperation • Positive attitude to failure (during investigations)	**2a. Measuring Liquids** Display a graduate and a measuring cup. Discuss how they are different and alike. **2b. Rock 'n' Volumes** Set a graduate on a table. Fill it partly with coloured water (about 60ml). Tape where the water settles. Then place a rock in the water. Look at the water level. What is the new volume? How much did the rock increase the volume? The volume of the displaced water is equal to the volume of the rock. What is the volume of the rock?	Simple Science Text/Workbook 4 Silver Burdett Ginn Science Horizons Bk. 4 p.164	**Using Science Skills** Give each group of students a fourth cup and a graduate. On a separate sheet write how many millilitres of water you think a fourth cup holds. How can you find out?

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
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GRADE 4

Topic: Measuring Matter (Mass & Volume) **Strand 3: Properties and Changes in Matter**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE					**2c. Higher or Lower - Measuring Volume** i. Fill a cup of water halfway. Use a piece of tape to mark how high the water is in the cup. Predict how high the water will be in three clear containers of different sizes if you pour the water into each one. Mark each prediction with a piece of tape. Write "P" (for prediction) on the tape. ii. Pour the water into the next container. Mark the height of the water with a piece of tape. Write "A" (for actual) on the tape. Repeat Step Two for each of the containers.		

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
SCOPE OF WORK

GRADE 4

Topic: Force & Work **Strand 3: Forces and Energy**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE	1. Define force, work and motion.	• A **force** is a push or pull. • Objects stay in place unless a force starts moving them - for example, pictures on a wall or books on your desk are **motionless**. • **Motion** is a change in position. For example, the force put out by a car's engine turns the wheels to push the car down the road. • In science, **work** has a special meaning. • **Work** is the measure of force it takes to move an object a certain **distance.**	• Communicate information effectively • Formulate models • Demonstrate critical thinking and problem-solving	• Curiosity • Open to new ideas	**1. Forces with Sling Shots** Observe how a sling shot works. Under close supervision, have volunteers take turns using an elastic band and a small firm piece of paper to target small stacks of lightweight objects. Discuss how pulling the elastic band back will cause it to push the piece of paper when it is released. Draw conclusions. **2a. Roll On!** a. Work on the floor in an open area. Have two members of your group each hold a pencil. Stretch a rubber band around the pencils. The pencils should be held just far enough apart to hold the rubber band in place without stretching it. b. Place six washers in a toy truck and tape them in place. c. Place the back of the toy truck against the rubber band. Pull the truck backwards to stretch the rubber band.	Simple Science Text/Workbook 4 Harcourt Science Bk. 4 Interactive Game on Forces https://www.ixl.com/science/grade-3/identify-pushes-and-pulls How Mass Affect Force and Work https://www.ixl.com/science/grade-3/how-do-mass-and-force-affect-motion	On a sheet have the students observe four drawings. Each drawing shows a force being used. Which drawing shows a push or pull? Which drawing shows work being done? Write push or pull and work or no work on the lines provided near each drawing.

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
SCOPE OF WORK

GRADE 4

Topic: Force & Work **Strand 3: Forces and Energy**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE	2. Compare the force of pushing and pulling.	• Forces transfer energy. • When you throw a ball, force from your muscles moves your arm to push the ball into the air. • The force of a magnet pulls it to the refrigerator. • The strength of the force may cause objects to move faster or slower. • Scientists use a tool called a **spring scale** to measure pulls. • The numbers on a spring scale show you the size of the force in units called **newtons** (N).	• Formulate models • Design, conduct and evaluate scientific investigations. • Use materials and scientific equipment correctly and safely.	• Questioning and posing problems • Positive attitude to failure (investigations)	Place a small piece of masking tape on the floor to mark the exact spot where the front of the truck stops. d. Release the truck and observe its motion. Use a meter stick to measure how far the truck rolled from the piece of masking tape. Be sure to measure the front of the truck. Record this measurement. e. Remove the washers from the truck. Place the empty truck against the rubber band. Repeat step D. **2b. Measuring Pulls** a. Make a table to record your observations. b. Put the hook of the spring scale through the two openings on the end of the box. Place several boxes books in the box. c. Use the spring scale to slowly drag the box across the top of a desk. Be sure to pull with the spring scale straight from the	Harcourt Science Bk. 4, F51- F54	Have the students read the following paragraph: *Mark put a small stone in a cloth bag. Then he tied the bag to a spring scale and let it hang down. The scale measured 2 newtons pulling the stone down. In a second test, Mark added another stone to the bag. It measured 4 newtons. As a third test, Mark took out both stones and put a smaller one in the bag. This measured only 1 newton.* 1. Arrange the data in a table. 2. How many newtons pulled the stone down the first time? 3. In which test did the scale measure the

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Topic: Force & Work **Strand 3: Forces and Energy**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE	3. Analyze work and infer how work is related to force.	• **Work** is done when an object moves through a distance. • Shooting a marble on the ground is doing work. • Just holding a marble is not doing work. • We can determine (calculate) the amount work on an object by multiplying the amount of force used to move the object by the distance that the object moves. • Work = Force x Distance	• Transfer and integrate relevant skills and content from other disciplines (e.g. physical education)	• Thinking independently • Flexibility/ adaptability	side of the box. Practice this step several times until you can pull the box at a steady, slow speed. d. Then, measure the force of your pullsas you drag the box. Record the force measurement (**newtons** from spring scale) and the surface on which you dragged the box. Observe the texture of the surface. e. Repeat steps 3 and 4, dragging the box across other surfaces like a rug, tile and cement. Predict the force needed to drag the box on each surface. **2b. Spring Scale Fun!** a. Make a table with four columns: object, distance, force and work. b. Hook a mug onto the spring scale. Work with a partner. Hold a meterstick on a table with the 1 cm mark toward the bottom. Rest the mug on the table next to the meterstick. c. Gently lift the scale and pull the mug off the table. Record the		most newtons? 4. What do you think Mark learned from his experiments?

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CURRICULUM GUIDELINES
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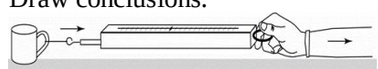
GRADE 4

Topic: Force & Work **Strand 3: Forces and Energy**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE					height. d. Read the number of newtons on the spring scale. Record the number. e. Multiply the number of newtons you used times the distance you moved the object (mug). Record this number on the table under the heading "work". f. Repeat steps b through e, using other objects (hat, stapler). Record data on the table. Draw conclusions.  **3. Work it Out!** From a bag of simple tasks, choose a card and do the action. Analyse if work was done or not. Discuss the strength or direction of forces in the various scenarios. Make inferences. E.g. Kick a soccer ball into the air (work). Play a game of tug-of-war with equal force applied on both ends		

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Topic: Force & Work **Strand 3: Forces and Energy**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE					(no work if the rope does not move). Shoot a marble in the sand (work). You and a partner apply equal force on a heavy box in opposite directions (if the box does not move, no work). Infer how mass is related to force.		

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Simple Machines **Strand 3: Forces and Energy**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE	1. Conclude what a simple machine is. 2. Define a wedge, lever and inclined pane.	• People use machines to do **work**. Machines make tasks easier and faster to do. • A **simple machine** is a device that has few or no moving parts. • The six kinds of simple machines are the **lever, pulley, screw, wheel and axle, wedge** and **inclined plane.** • An **inclined plane** is a flat surface that is higher on one end than the other. It is a simple machine - for example, a ramp, a slide, a slanted road, and a step. • An inclined plane is used to lift an object while using less force.	• Pursue new knowledge • Demonstrate critical thinking and problem solving • Formulate models • Conduct and evaluate scientific investigations	• Flexibility/ adaptability • Questioning and posing problems • Skepticism	**1. Exploring Simple Machines** Working in pairs, use string to attach a toy car or other object to a spring scale. Make a ramp by propping up one end of a smooth board on the seat of a chair. Place the toy car at the bottom of the board. Slowly pull the car to the board at a steady rate. As one person pulls, the other person can read the force on the spring scale. Record it. Measure the distance the car was pulled up the board. Record it. **2a. Simple Machines around the Kitchen** Set up a kitchen scene with various simple machines such as plastic knives, stairs, sink, etc. Have volunteers find and identify the simple machines discussed. Make a list of all the simple machines found.	Simple Science Text/Workbook 4 Harcourt Science Bk. 4 Video on Simple Machines https://www.youtube.com/watch?v=fvOmaf2GfCY Video on Levers https://www.youtube.com/watch?v=lueqE0lxLyc Activities on Simple Machines https://andrewazzopardi.org/	Write the name of the correct simple machine [wedges, lever or inclined plane] on the line. Draw a picture of each below. 1. A_____is made up of two inclined planes and is very useful for separating objects. 2. A_____ has a fulcrum which can be found in the middle or at other positions. This simple machine is used to lift heavy weight. 3. When a heavy load needs to be moved to a height but it takes too much effort to take it straight

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GRADE 4

Topic: Simple Machines (Wedges, Levers & Inclined Planes) **Strand 3: Forces and Energy**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE		• A **wedge** is a simple machine used to push (split) two objects apart. A wedge is made up of two inclined planes placed back-to-back. • These planes meet and form a sharp edge. • Most blades of cutting tools such as knives, axes and chisels are wedges. Nails and doorstops are also wedges. • A **lever** is a bar that turns on a fixed point that does not move. Only the bar moves. The point that does not move is called a **fulcrum**. • When you apply force to one side of the bar, the other side turns on the	• Communicate information effectively • Engage in collaborative activities	• Open to new ideas	**2b. Experimenting with Inclined Planes** Materials: Large books, ruler, onecup of rice inside a small plastic bag (closed with a twist tie) rubber band strip tied to the top of the bag. Procedure: 1. Stack the books in one pile. 2. Lean one book against the other to create an inclined plane. 3. Place the bag of rice on the table. 4. While holding the rubber band, lift the rubber band and lift the bag of rice straight up to the top of your book stack. 5. Use the ruler to measure the length of the rubber band. 6. Now put the bag of rice at the bottom of the inclined plane and drag it to the top of the stack of books by pulling on the rubber band. When it is almost at the top, measure the length of the rubber band.		upwards, an _____may be used. It takes longer but it is easier. A wedge is a special example of an inclined plane. Draw a picture of a wedge and show where the inclined planes are. Describe when you might use a wedge to help you.

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GRADE 4

Topic: Simple Machines (Wedges, Levers & Inclined Planes) **Strand 3: Forces and Energy**

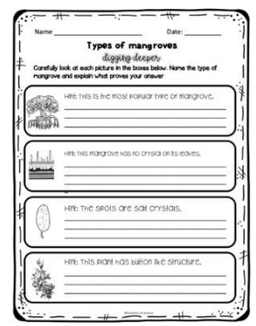
	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE	3. Communicate how wedges are related to inclined planes.	fulcrum. • This is exactly what happens on a seesaw. The seesaw is a type of lever. • The main difference between an inclined plane and a wedge is the way they are used. The inclined plane is used to lift, while a wedge is used to push objects apart.	• Formulate models	• Scepticism	**3. Inclined Planes Turned Wedges** Distribute materials and cut outs (shapes) of inclined planes. Have each student use the materials and cut outs to make two wedges.		

Fundamental concepts and principles of environmental science include the investigation and articulation of ways to conserve and manage natural resources.

CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Mangroves

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
ENVIRONMENTAL SCIENCE	• Identify 4 kinds of mangroves. • Explain the function of wetlands.	**Mangroves** are ecosystems found along the coast and in wetlands. They live in brackish and salt water. The four common types of mangroves found locally are red mangroves, black mangroves, white mangroves and buttonwood. Each type of mangrove has a special role play in the ecosystem. **Red Mangroves** grow in water along the shoreline. They have thick prop roots that trap debris and mud. They help to prevent waves from flowing too far inland, which reduces flooding in coastal communities and further inland. **Black Mangroves** grow in shallower salty water. They are surrounded by thin breathing roots.	• Observation • Evaluation • Synthesis	• Curiosity • Cooperation • Creativity	**Multimedia** Show video/specimens/fact cards of four types of mangroves. Have students identify and describe each one. **Song** Share the mangrove song by BREEF Teachers. **Fieldtrip** Take students on a fieldtrip to a mangrove ecosystem. Have them record and illustrate the types of plants and animals that they observed. **Model.** In groups, have students make 3-D models of a mangrove ecosystem. **Poster** Have students use pictures/2-D models to design a poster that tells about the importance of mangroves.	Simple Science Text/Workbook 4 https://bnt.bs/wp-content/uploads/2019/06/mangroves.pdf https://bnt.bs/wp-content/uploads/2019/06/wetlandplantguide.pdf http://www.friendsoftheenvironment.org/wp-content/uploads/2014/03/Mangroves-Lesson.pdf Grade 4 Resource Pack https://bnt.bs/curriculumhub/	**Exit Ticket** **https://bnt.bs/curriculumhub/**  Types of mangroves Function of Mangroves THE CAY, THE STORM & THE MANGROVE TANGLE

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CURRICULUM GUIDELINES
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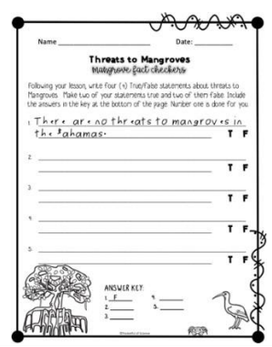
GRADE 4

Topic: Mangroves

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
ENVIRONMENTAL SCIENCE		**White mangroves** usually live in brackish water. They have thick, knobby breathing roots. **Buttonwoods** live near the sea on rocks and beaches. They have no prop or breathing roots. Wetlands provide nutrients and serve as nurseries for young marine life and species such and white land crabs			They should label/describe distinguishing traits such as roots, leaf appearance/position flowers and fruits of the four types of mangroves and tell of organisms that may be found there. **Story** Have students write a story entitled "A day in the life of a black, white or red mangrove tree".		**Exit Ticket** **https://bnt.bs/curriculumhub/**
	Identify at least two threats to Mangroves	**Mass land clearing, cutting down of hills, filling in of mangroves and digging canals and marinas** are threats to mangroves and wetland ecosystems. Mangroves are important natural defenses against storm surges.	• Observation • Evaluation • Synthesis • Communication	• Curiosity • Critical thinking • Cooperation • Thinking independently	**Interview** Have students interview someone from a local environmental non-profit or someone from the NationalWetlands committee.		

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CU**RRICULUM GUIDELINES**
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GRADE 4

Topic: Mangroves

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
ENVIRONMENTAL SCIENCE	Suggest ways we may eliminate threats to Mangroves				**Outreach** Have students create an inventory of businesses on your island that are currently negatively impacting mangroves. Have them plan and talk to them about what you have learned and how they can help. **Video** Have students watch a video on Mangrove from the BNT YouTube channel or on its website. **Puppet Show** Have students work in groups to write a puppet show script or short skit involving different **resource users** that informs about how human activities can negatively affect mangroves and to ways to restore and save the environment.		

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Native Plants of Bahamas

ENVIRONMENTAL SCIENCE

LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
Identify at least 10 Bahamian native plants species	Indigenous or native plants are plants that grow naturally in an area (they were not brought in by anyone). The Bahamas has over 1400 native plants. The Levy Native on Eleuthera has 400 different native Bahamian plants. To learn about the plant found there, you may visit their website at www.levypreserve.org. Common native plants in The Bahamas include: • *Pigeon Plum*—produces fruits that supports bird and iguana species. •*Poison Wood*—popularly known for causing severe skin irritations; however, its fruits are a vital part of the diet of many birds such as the White Crown Pigeon and the Bahama Parrot. •*Gum Elemi* (or Gumbo Limbo) — known as a natural cure for Poison Wood skin irritation.	• Observation • Communication	• Curiosity • Critical thinking	**Fieldtrip** Arrange a field trip to a natural area, local plant nursery or a national park (contact Bahamas National Trust to visit a national park) **Crossword Puzzle** Have the students use details and description of native plants as clues to create cross word puzzles similar to the one above.	Simple Science Text/Workbook 4 www.levypreserve.org Local Plant Nurseries	**Exit Ticket** **https://bnt.bs/curriculumhub/** Name _____ Date: _____ **Native Plants** matching riddles Draw a line to match the plant names on the left to the riddles on the right. Poison Wood — I have dark green shinny leaves and purple edible fruits Blue Flowers — I have five leaflets which give me my name. I am often used for tea Gum Elemi — People like to leave autographs on me, because you can write on my leaves Strong Bark — I make a great bush tea, but also heal fevers, pain and skin infections Sea Grape — I am the most abundant plant in the pine forest, and I may be used as a "Christmas tree" Wild Coffee — Had I not been wild, I would make a delicious black beverage that people usually have for breakfast. Caribbean Pine — Although I can give humans a nasty rash, I provide great food for White Crown Pigeons Pigeon Plum — My scaly skin is easy to see and I am the cure for poison wood Five Finger — I usually grow along the coast. I have broad leaves and produce a medium purple fruit. Autograph tree

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GRADE 4

Topic: Native Plants of Bahamas

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
ENVIRONMENTAL SCIENCE		Its bark and leaves are also used as bush medicine and for making tea. •*Caribbean Pine*—fire tolerant tree that was used in the past to make cardboard pulp for shipping for the Owens Illinois glass company that operated in the Bahamas. •*Sea Grape*—produces an edible fruit and has leaves that have been known to stop headaches. •*Coco Plum*—produces an edible fruit and can be found usually along the coasts or near wetlands. •*Five Finger*—serves as the symbol for The Leon Levy Native Plant Preserve and is used for bush medicine and teas. •*Pitch Apple*—This is also known as the Autograph Tree and was used as playing cards by sailors and messaging cards in historical times. You may scratch words on its leaves which will remain there until the leaf falls off the tree.			All students are to switch and solve each other's puzzles or have them share with other classes. They may use Excel, the website below or another free site http://puzzlemaker.discoveryeducation.com/CrissCrossSetupForm.asp		

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GRADE 4

Topic: Native Plants of Bahamas

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
ENVIRONMENTAL SCIENCE		•*Strong Back*—used as a bush medicine to treat illnesses such as fevers, pain, and skin infections. The fruits are a great source of food for birds. •*Wild Coffee*—a native species that is related to true coffee plants; however, it does not have the same amount of caffeine. •*Sea oats*—a monocot that grows along the coast. •*Black Ink Berry*—grows near the sea and related to the invasive Scaevola. •*Bahama Century Plant*—produces a huge cluster of flowers only once in its lifetime before it dies. •*West Indian Mahogany*—very dense wood that is used for wood carving and furniture making. •*Silver Thatch Palm*—may be found in the Coppice further inland and used in the straw craft industry.					

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CURRICULUM GUIDELINES
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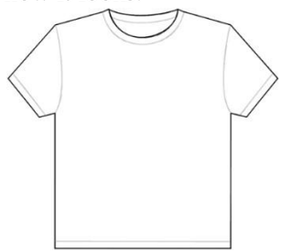
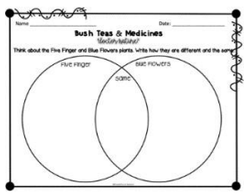
GRADE 4

Topic: Medicinal Plants of Bahamas

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
ENVIRONMENTAL SCIENCE	Identify at least 5 plants used as medicines in the Bahamas. Explain the significance of them medicinally.	A variety of plants found in the Bahamas has 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.	• Observation • Evaluation • Synthesis • Communication	• Critical thinking • Creativity • Thinking independently • Cooperation	**T-shirt** Have students choose one medicinal plant and design a T-shirt to advertise its useful and teach people how it looks.  **Scavenger Hunt** Have students do a native plant scavenger hunt for 10 native plants. E.g. (clue) 1. A native plant whose fruit you have tasted 2. A native plant with prickles 3. A native plant whose leaves alternate along the stem.	Simple Science Text/Workbook 4 www.levypreserve.org "Tasty Teas" Tea company - for tea samples Resource Pack **https://bnt.bs/curriculumhub/**	**Exit Ticket** **https://bnt.bs/curriculumhub/** 

Fundamental concepts and principles of environmental science include the investigation and articulation of ways to conserve and manage natural resources.

CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Medicinal Plants of Bahamas

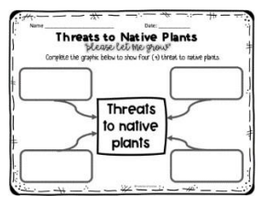
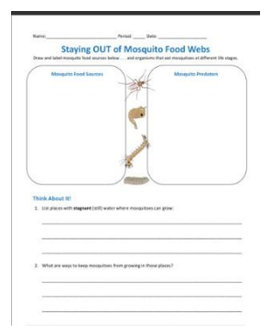
	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
ENVIRONMENTAL SCIENCE					**Recipe Cards** Have students create recipe cards for bush teas and medicines and distribute at PTA meeting or a special assembly. Alternately, they may exchange cards with each other or combine their recipes to make a "Book of Natural Bahamian Recipes".		

Fundamental concepts and principles of environmental science include the investigation and articulation of ways to conserve and manage natural resources.

CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Plant Conservation

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
ENVIRONMENTAL SCIENCE	Explain at least two threats to native plants. Identify ways in which native plant may be conserved.	• There are several threats to native plants. These include: • **Habitat Loss:** the removal of plants for farms development and housing. • **Overexploitation:** when too many trees are removed or when they are harvested in an unsustainable manner. • **Invasive Species**: alien or non-native species that are brought from other country.They grow faster and outcompete the native plants. • **Air pollution:** pollutants in the air impact the growth and variety of plants. • **Climate Change:** studies suggest most plants will have difficulty adapting to the rise in temperature and extreme drought that we will experience as a result of our changing climate.	• Observation • Evaluation • Synthesis • Communication	• Critical thinking • Creativity • Open to new ideas • Questioning and posing problems	**Class Discussion** Provide scenarios to lead discussions on threats native plants face (e.g. Last week Jimmy's dad commented that the native plants that once grew on the beautiful beach opposite their home were slowly being replaced by thousands of casaurina trees). **Flyer** Have students design a flyer for a public meeting on threats to native plants. Remind them that the flyer should be exciting to make people want to attend. It should also highlight how the threats are a problem and why it is important for people to come out and participate.	Simple Science Text/Workbook 4 www.levypreserve.org	**Exit Ticket** **https://bnt.bs/curriculumhub/**  

Fundamental concepts and principles of environmental science include the investigation and articulation of ways to conserve and manage natural resources.

CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 4

Topic: Plant Conservation

ENVIRONMENTAL SCIENCE	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
		We may help by: • Removing invasive species such as casaurina. • Promoting the planting of native species. • Reducing our use of fossil fuels. • Creating laws to prevent the collections of endemic species.			**Classification** Project a collection of images that show threats and non-threats to native plants. Allow students to work in group and class them as threats or nonthreat with supporting details for their choices.		

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

CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Invertebrates **Strand 1: Characteristics of Organisms**

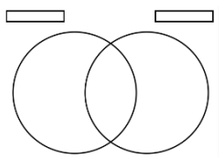
	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE	1. Describe traits common to invertebrates 2. Compare the difference between vertebrates and invertebrates 3. Identify examples of invertebrates	To study animals more easily, scientists have divided them into **two** (2) major groups. An animal with a backbone is called a **vertebrate**, and an animal without a backbone is called an **invertebrate**. Invertebrates live almost everywhere on Earth. Invertebrates make up 97% of all animals and are classified into several smaller groups. The largest group of invertebrates are called **arthropods**. 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. There are 6 groups of invertebrates. They are arthropods, stinging cells, mollusks, sponges, echinoderms and worms.	• Observations • Classification	• Curiosity	Examine pictures of a variety of animals. Classify them as vertebrates and invertebrates and name all the animals in the invertebrate group. _____ Use different animal toys and have students group them as vertebrates and invertebrates	Simple Science Text/Workbook 5	Classify animals as invertebrates from a selection of pictures, photos or PowerPoint presentation. Have students work in groups of 3-4 to place pictures or names of animals in the correct column. Give each students a web graphic organizer. Instruct students to choose an invertebrate from a given list. Then have them write one fact about their chosen invertebrate. Have students complete a Venn Diagram identifying 2 similarities and 2 difference between invertebrates and vertebrates.

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

CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Invertebrates **Strand 1: Characteristics of Organisms**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE							 Have students complete an assessment using Kahoot/Plicker Cards. The following questions can be asked: a. What are invertebrates? b. Which of the following animals is not an example of an invertebrate? c. How are vertebrates different from invertebrates? • Students complete worksheet in Simple Science workbook

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Mollusks **Strand 1: Characteristics of Organisms**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE	1. Describe the traits of mollusks. 2. Identify invertebrates that are mollusks.	A **mollusk** is an invertebrate that has a soft body. One trait or characteristic that most mollusks share is a body that has **three** (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.	• Pursue new knowledge • Communicate information effectively • Classification	• Curiosity • Thinking independently	1. Examine a conch specimen or scan the QR code of a conch and identify its characteristics and body parts. 2. 1-2. Create a fact box on mollusks (individually or group work). Make a list of facts on mollusks (10-12). Use 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.	Treasures in the Sea Simple Science Text/Workbook 5 www. scilinks.org/Harcourt www.enchantedlearning.com/subjects/.../conchprintout.shtml	Use Kahoot/Plicker Cards to assess students' knowledge on the traits of mollusks. a. The parts of the conch are foot, head and _____. (body) b. How would you describe the texture of the conch's body? (Soft) c. What is the function of the mantle? (protection & to make shells) • Classify a variety of mollusk pictures. Have the students create a 3 three column chart labelled no shell, one shell and two shells.

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Mollusks **Strand 1: Characteristics of Organisms**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
3. Classify 3 groups of mollusks.	**There are 3 types/groups of mollusks:** • **<u>No shell/cephalopods</u>**: These mollusks have no shell covering the outside of its body (e.g. slug, octopus, squid) • **<u>One shell/gastropods</u>**: These mollusks have one shell. The shell has a "trapdoor" covering the opening. The animal can pull its head back into the opening and the trap door closes. In this way, the animal is protected from enemies. The queen conch is an example of a mollusk that is used in many Bahamian dishes. Other examples of mollusks include, snails, curds, whelks. • **<u>Two shells/bivalves</u>**: These mollusks have a double shell that is hinged. They get their food by filtering it from the water. Tube like parts are usedfor feeding (e.g. oyster, clam, mussel, scallops).			Place the circle inside the 5-gallon cover. Decorate a box and label it "Facts on Mollusks" to store coversin (if bottle caps are notavailable, use cardboard). 4. Design a Conch recipe card. 5. Listen to the song "We Love We Conch So" by Phil Stubbs and answer six to ten questions related to it. 6. https://www.youtube.com/watch?v=TrhvjM1Av3U 7. Classify given pictures of mollusks into the different groups.		• Instruct students to paste the pictures under the correct heading. • Complete a worksheet on Mollusks. a. Why are mollusks classified as invertebrates? b. Other than moving, what else do mollusks use their feet for? c. Give an example of a mollusk that would be classified under each category. No shell _____ One shell _____ Two shells _____ No shell / One shell / Two shell (/ /)

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Stinging Cell Animals **Strand 1: Characteristics of Organisms**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE	1. Examine characteristics of stinging cell animals. 2. Compare stinging cell animals to mollusks 3. Identify invertebrates that arestinging 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.	• Demonstrate critical thinking • Collect, process and interpret data	• Curiosity • Cooperation • Questioni ngand posing problems	1. Observe a video/power point presentation illustrating the feeding behaviour of stinging-cell animals. Discuss its content. https://www.youtube.com/watch?v=Dgre5EBQLaMhttp://linapoint.com/wp-content/uploads/2017/12/maxresdefault.jpg 2. Create and play a game emphasizing the content of stinging cell animals.	Simple Science Text/Workbook 5	• Complete a worksheet related to the characteristics and identification of stinging-cell animals. a. Describe the body of a stinging cell. b. Name two examples of stinging cells. c. What are tentacles? d. Explain what stinging cell animals use their tentacles for. e. How does the poison affect the animal/prey? • Complete a Venn Diagram to show comparisons among stinging cell animals and mollusks.

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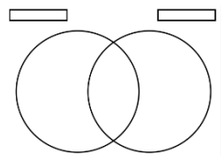
CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Stinging Cells **Strand 1: Characteristics of Organisms**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE					3. Visit "The Dig" at Atlantis. 4. Have students create a song/rap/poem about stinging cells.		 • Create a poster exhibiting stinging-cell animals in their natural habitat. • Have students write a paragraph explaining how stinging cells catch their prey.

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Skeletal System **Strand 1: Structure and Function in Living Systems**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE	1. Identify parts of the skeletal system. 2. Explain the functions of the skeletal system.	The **skeleton** is made up of all the bones in the body. The outer bones are made up of hard bone tissue. There are about 206 bones in the body of an adult human. **The skeleton has 3 functions.** • It supports the weight of the body. • It enables the body to move. • It protects vital organs. **The skull** protects the brain and forms the shape of the face.	• Pursue new knowledge • Formulate models • Communicate information effectively	• Cooperation • Think independently • Curiosity	1. Identify the bones ofthe skeleton. 2. Create a 3D model ofthe skeleton. 3. Compare the x-ray picture of a baby's bones, bones of someone about yourage and bones of anadult. Discuss findings. 	Simple Science Text/Workbook 5	Assemble a skeletal puzzle. Label the skeleton. 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. Create a brochure about the skeleton system and its function. Create a poster.

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Skeletal System **Strand 1: Structure and Function in Living Systems**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE		The **spine** is made up of the vertebrae that supports and protects the spinal cord. **The ribs** protect the heart, lungs and other organs in the chest cavity. We take care of our skeletal system by exercising, resting, eating healthy and food rich in calcium. **Calcium** is a mineral that helps bones grow strong and healthy. Dairy products like milk, cheese and yogurt contain calcium. Dark green vegetables like spinach, broccoli and collard greens also contain calcium. 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.			 4. Have students use a tablet to scan the QR code to find out facts about the skeleton. 		showing ways to take care of the skeletal system. • Complete the worksheet in the Simple Science workbook on the Skeletal System. • Create questions for students to answer via Kahoot /Plicker Cards. • Make a 3D model of the skeletal system.

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Nutrition **Strand 1: Structure and Function in Living Systems**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE	1. Explain how eating disorders affect health. 2. Infer how proper nutrition is related to good health.	• **Nutrition** is providing the body with chemicals called nutrients that the body needs to stay healthy and to carry out its functions (do work). • **Nutrients** are materials the body uses for making new tissue, protecting our systems and giving us energy. • There are many different nutrients that the body needs. **Proteins**, **vitamins**, **minerals, fibre** and **carbohydrates** are nutrients. **A nutritional deficiency** is the lack of a certain nutrient in the diet. These deficiencies can cause the blood to carry less oxygen than the body needs or can cause anaemia, which is a lack of iron.	• Engage in collaborative activities • Make inferences and draw conclusions • Make predictions	• Cooperation • Thinking independently	1. Collect pictures of food and paste them on a t-chart under “healthy choices” or “unhealthy choices”. 2. Make a poster to persuade others to eat healthy. 3. Bring in a variety of popular snack items (or students’ snacks can be used). Allow students to guess which of the nutrients might be in the snack. Read the labels to find which nutrients the snack contain.	Simple Science Workbook 5 www.nutritionforkids.com www.nutritionexploration.org	Complete worksheet from Simple Science workbook. **Complete a worksheet:** Put an X on the picture that is not a healthy food choice. Cut out pictures showing healthy habits. Display on a poster board or chart paper.

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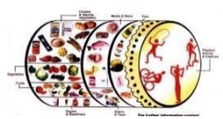
CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Nutrition **Strand 1: Structure and Function in Living Systems**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE	3. Identify the main food groups. 4. Explain the importance of a balanced diet.	• To get the correct amount of nutrients, we need to eat a wide variety of foods. • Foods are divided into groups according to the nutrients they contain. • The main food groups are: 1. fats/oils; 2. meats, fish & alternative; 3. milk, cheese and diary; 4. fruits & vegetables; 5. bread and cereal. • All the foods we eat make up our diet. • A **balanced diet** includes all the nutrients the body needs to function. To eat a balanced diet, we should eat foods from each of the food groups every day.	• Engage in collaborative activities • Collect, process and interpret data • Utilize classification process • Demonstrate critical thinking and problem solving	• Skepticism • Tolerance of other's views • Open to new ideas	4. On a paper plate, draw/paste pictures of food to create a balanced meal. 5. On a chart, draw a 5-column table and label it with the five food groups. Cut out pictures of food from magazines and paste them under the appropriate groups. 6. **Make a Menu** Plan a week-long menu including breakfast, lunch and dinner with balanced meals.	Simple Science Workbook 5 www.eatforhealth.gov.au Food Drum Image Source: www.iris.paho.org	Complete worksheet from Simple Science Workbook. Create a food drum using pictures and construction paper. 

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Nutrition **Strand 1: Structure and Function in Living Systems**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE	5. Explain how good eating and drinking habits help with growth development.	**Obesity:** 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 **Water:** Your body also needs water. You should drink 6 to 8 glasses of water a day. Water helps to: • transport nutrients to the cells; • build new cells; • keep body temperature stable; • carry waste out of the body; • keeps joints moving smoothly. Fiber is a nutrient helps food move through the digestive system and prevents some forms of cancer.	• Engage in collaborative activities • Collect, process and interpret data • Demonstrate critical thinking and problem solving	• Tolerance of other's views • Open to new ideas	7. Play music and have students go through an aerobics routine to encourage exercise. 8. Watch and discuss video on obesity. Causes of Childhood Obesity -YouTube	Simple Science Workbook 5	Complete worksheet from Simple Science workbook. Have students write a paragraph explaining the importance of drinking sufficient water. Use Plicker cards to review concepts taught.

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Seed and Non Seed Plants **Strand 1: Structure and Function in Living Systems**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE	1. Investigate plants with seeds and plants without seed.	• Plants are living things that need water, air, sunlight and soil to grow. • There are two main groups of plants. They are seed plants and non-seed plants. **Seed Plants** • Plants that grow new plants from their seeds. • A seed is a part of a plant from which a new plant can grow. • Some examples of seed plants are hibiscus, mango trees, peas trees, and pine trees. • Many seed plants have flowers, like the hibiscus. They are called flowering plants (angiosperms).	• Communicate new information • Observation	• Cooperation • Think independently • Curiosity	1. Have students examine samplesof seed and non-seed plants. Then make a list of differences and similarities. 2. Have students categorize different pictures of plants as seed or non-seed plants.	Simple Science Text/Workbook 5	Complete worksheetin Simple Science Workbook. Assess students using Kahoot or Plicker Cards. Have students createa poster showing drawings of seed and non-seed plants. Have students create a T chart to write two facts on seed and non-seed plants.

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Seed and Non Seed Plants **Strand 1: Structure and Function in Living Systems**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE		• Pine trees do not have flowers, but they have cones. The seeds are found inside of the cones. **Non Seed Plants** • Not every plant grows from a seed. Some plants like ferns and mosses grow from spores. These plants are called non-seed plants. • The spores are especially made to survive drought (very little rain/water) and other harsh conditions.					

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Monocotyledons (Monocots) & Dicotyledon (Dicots) **Strand 1: Structure and Function in Living Systems**

LIFE SCIENCE

LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Differentiate between monocots and dicots	• Seed plants with flowers are called flowering plants (angiosperms). • There are two groups of flowering plants. They are monocotyledons (monocot) and dicotyledons (dicots). • Flowering plants are classified (grouped) aseither monocots or dicots because of the number of seed leavesthey produce. • A seed leaf is found inside of the seed. It is also called a cotyledon. Cotyledons are the first leaves to appear when the plant begins to grow. **Monocots** • Monocots are flowering plants with the following traits or characteristics: • One seed leaf	• Communicate new information • Observation	• Cooperation • Think independently • Curiosity	1. Have students arrange different pictures of flowers as monocot or dicots. 2. Have students colour and label the parts of a monocot and dicot plant 3. Distribute a monocot and dicot leaf in a group of 4-6 students. Instruct students to place a blank sheet of paper on the top of each type of leaf and shade them using a pencil, crayon or coloured pencils. Have students discuss the patterns of both leaves and identify them as monocot or dicot.	Simple Science Text/Workbook 5	• Have students complete the chart of monocots and dicots. **monocots** | **dicots** 3 flowers | | network veins Tap root | • Have students complete a Venn Diagram showing 2 similarities and difference between monocots and dicots. • Instruct students to complete a worksheet on the topic. 1. What are seed plants with flowers called? 2. Name the two groups of flowering plants. 3. What are cotyledons 4. Explain one difference between a monocot and dicot

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Monocotyledons (Monocots) & Dicotyledon (Dicots) **Strand 1: Structure and Function in Living Systems**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE		• Narrow shape leaves • Parallel veins • Flowers in threes • Have a tap root system Examples of monocot plants include corn, grasses, banana trees, orchids, rice, onions. **Dicots** • Two seed leaves • Broad shaped leaves • Network of veins • Flowers in fours or fives • Have a fibrous root system Examples of dicot plants are hibiscus, apple trees, cabbage, roses, mango trees, peas trees.					flower/root/leaves. 5. Create a monocot and dicot collage. Have students print or cut out pictures of flowering plants and make a collage.

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
SCOPE OF WORK

GRADE 5

Topic: Fossils **Strand 2: Properties and Structure of Earth's Systems**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE	1. Define fossil 2. Describe the process of fossil formation	**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 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 was, and it might have eaten.	• Communicate new information • Observation	• Cooperation • Think independently • Curiosity	**2a.** Investigate how fossils form. **2b.** Make models of fossils by making prints with leaves, bones, insects, etc. in clay or sand mixed with glue. **2c.** Fossil activities for kids 25 Fun Fossil Ideas For Kids (playideas.com)	Simple Science Text/Workbook 5	• Complete a definition crossword puzzle. • Use Plicker Cards to have students answer various questions about fossils • Create 3D models of fossils. • Complete a sequence exercise on the formation of fossils. • Write a paragraph explaining how fossils are formed. • Complete a worksheet on fossils.

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Fossils **Strand 2: Properties and Structure of Earth's Systems**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE		A **mold** is an imprint made by the outside of a deadplant or animal. A mould forms when water washes animal or plant remains out of rocks. Sometimes sediments or minerals fill a mould 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 or dug out** and studied.					.

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
SCOPE OF WORK

GRADE 5

Topic: Layers of the Atmosphere **Strand 2: Properties and Structure of Earth's Systems**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE	1. Define atmosphere and its function. 2. Describe the layers of the 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 several layers:** • **Troposphere:** the layer that is closest to the Earth. This is the air we play, work, live in and breathe. Most weather conditions happen here. • **Stratosphere:** the second layer. It contains **ozone,** a special gas that protects Earth from ultraviolet rays from the sun.	• Communicate new information • Observation	• Cooperation • Think independently • Curiosity	1. Watch and discuss video presentation on the atmosphere. (525) The Atmosphere for kids - Layers of the Earth - Science for Kids -YouTube 2. Create an atmosphere booklet describing each layer of the atmosphere.	Simple Science Text/Workbook 5	• Have students label the different layers of the atmosphere. • Use the Plicker Cards to have students respond to questions. • Create a brochure showing the importance of protecting the atmosphere from being destroyed. • Complete worksheet on layersof the atmosphere. • Make a model of the layers of the atmosphere. • Create a flipchart describing the layers of the atmosphere.

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
SCOPE OF WORK

GRADE 5

Topic: Layers of the Atmosphere **Strand 2: Properties and Structure of Earth's Systems**

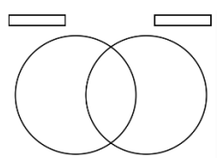
	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE		• **Mesosphere:** the third layer and is the coldest layer where meteoroids (shooting stars) blow up. • **Thermosphere:** the fourth layer and is the hottest layer. • **Ionosphere:** the layer that begins in themesosphere 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. • **Exosphere:** the sixth layer. It is also known as outer space. In this layer the planets, moons, stars and other celestial objects are found.					

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
SCOPE OF WORK

GRADE 5

Topic: Weather **Strand 2: Properties and Structure of Earth's Systems**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE	1. Identify the difference between weather and climate. 2. Identify ways in which the weather affects people.	**Weather** is the condition ofthe atmosphere at a specific time and place. Conditions that affect weather are temperature, air pressure, wind, humidity and precipitation. **Climate** is the average weather conditions over a period of time. Weather conditions affect people in many ways, including: • the food they eat; • the clothing they wear; • housing; • transportation; • the length of day/night; • storms and other natural disasters.	• Communicate new information • Observation	• Cooperation • Think independently • Curiosity	1. In cooperative groups, create given weather instruments. 2. **Play a Matching Game** Match up the weather instrument to its correct weather condition. 3. Watch and discuss the YouTube video on the local reporting of the weather report. https://www.youtube.com/watch?v=OgzYifpaz1c 4. Students play charade to guess the weather instrument/condition.	Simple Science Text/Workbook 5	• Ask the whole class questions and have students use Plicker Cards to answer. • Complete worksheet on weather. • Have students complete the Venn diagram to compare and contrast weather and climate. 

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
SCOPE OF WORK

GRADE 5

Topic: Weather **Strand 2: Properties and Structure of Earth's Systems**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE	3. Identify and explain the uses of specific weather instruments.	The amount of heat in a substance or how hot or cold something might be 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. Measurements made on the Celsius scale are shown as ^{O}C and on the Fahrenheit scale as ^{O}F.			5. In groups, create a song or poem about weather and climate.		

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
SCOPE OF WORK

GRADE 5

Topic: Weather **Strand 2: Properties and Structure of Earth's Systems**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE		On the Celsius scale, water freezes at 0^{O}C and boils at 100^{O}C. On the Fahrenheit scale water freezes at 32^{O}F and boils at 212^{O}F. The human body temperature measures at 37^{o}C and between 98.2^{o}F- 98.6^{o}F Wind speed is how fast the wind is moving, and the direction of the wind is measured using an anemometeror a wind sock Precipitation (rain, hail, sleet, snow) is any form of water that falls from the sky and is measured using a rain gauge.					

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Revolution, Rotation and the Sun **Strand 2: Universe and the Solar System**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE	**1.** Tell the difference between rotation and revolution. **2.** Explain the importance of the sun to living things.	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.	• Communicate new information • Observation	• Cooperation • Think independently • Curiosity	1. Have students watch the video on rotation and revolution. https://www.youtube.com/watch?v=l64YwNl1wr0 2. Create a model of the solar system.	Simple Science Text/Workbook 5	• Review the lesson by playing Kahoot. • Complete a worksheet on topic. • Write a paragraph explaining the difference between rotation and revolution. • Create a poster showing the suns effect on earth. • Write and sing a song to your favourite tune abouthow the sun benefits the earth and other planets.

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Revolution, Rotation and the Sun **Strand 2: Universe and the Solar System**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE		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. It takes planet Earth 365 1/4 days to revolve around the sun. The seasons are a result of revolution. 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**. The time it takes a planet to rotate once on its axis is a planet's day. The time of rotation differs from planet to planet, so the length of a day also differs. Night and day are the result of rotation.					

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Revolution, Rotation and the Sun **Strand 2: Universe and the Solar System**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE		**The Sun** 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 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. 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 (photosynthesis). 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.					

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
SCOPE OF WORK

GRADE 5

Topic: Other Objects in Space **Strand 2: Universe and the Solar System**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE	1. Identify and describe other objects in space. 2. Differentiate between meteoroid, meteor and meteorite	People who study the stars are called **Astronomers**. Astronomers classify stars by their surface temperatures, colour and brightness. There are several well-known 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 calleda **constellation**. Some common constellations are the Southern Cross, Great Dipper, Little Dipper, Orion and the Twelve Signs of the Zodiac.	• Communicate new information • Observation	• Cooperation • Think independently • Curiosity	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. Visit the planetarium at the Adventure Learning Centre.	Simple Science Text/Workbook 5	• Ask whole class questions and have students use Plicker Cards to answer. • Complete worksheet on topic. • Write a poem describing what makes up the solar system. • Identify and describe meteoroids, meteors, meteorites, asteroids and comets from a group of pictures.

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Other Objects in Space **Strand 2: Universe and the Solar System**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE		• Another object in space 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 up 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.					

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Other Objects in Space **Strand 2: Universe and the Solar System**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE		**Meteoroids, Meteors & Meteorites** • 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** or a shooting star. • If any part of a meteor survives and reaches the Earth, it is called a **meteorite**.					

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
SCOPE OF WORK

GRADE 5

Topic: Mixtures & Solutions **Strand 3: Properties and Changes in Matter**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE	1. Differentiate between substances and mixtures. 2. Explain how solute can be dissolved. 3. Distinguish between solute and solvent.	**Matter** is anything that takes up space and has mass. There are **three (3)** states of matter. They are **solid**, **liquid** and **gas**. Matter can be classified as a mixture or as a substance. A **substance** is something made up of only one kind of matter. A **mixture** is made up of two or more different substances. The substances do not change by being mixed. (E.g. conch salad, birdseed, cheeseburger, tossed salad, air). Mixtures can be separated easily using our fingers, a sieve, rake, shaking or filtering. A **solution** is a special mixture. It is made up of **two (2)** different substances. One substance is dissolved or melted in the other substance.	• Observations • Classification	• Curiosity • Thinking independently	1. Have students conduct an experiment on changingwater from its solid state to liquid state to the gas state by adding heat 2. In groups have students create different kinds of mixtures and list several ways the mixtures can be separated. 3. Watch video on mixtures and solutions.	Simple Science Text/Workbook 5	• Complete a worksheet on mixtures and solution in Simple Science Workbook. • Complete a fill in the blank exercise. • A _____ is made up of two or more _____. However, a solution is a _____mixture that has two parts called the_____and the _____. • Have students observe pictures and have them say whether the picture is of a mixture or a solution. • Have students demonstrate different ways to dissolve solute faster.

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Mixtures & Solutions **Strand 3: Properties and Changes in Matter**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE		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 into smaller crystals then mixed in but does not combine with the water particles. 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.			https://www.youtube.com/watch?v=7Vh_tL67FLY		

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Mixtures & Solutions **Strand 3: Properties and Changes in Matter**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE		**Several factors affect the rate at which a solute dissolve:** • An equal volume of solute and solvent; • Heating the solvent can also speed up dissolving; • Stirring, mixing and shaking are other factors that affect the rate at which a solute dissolves.					

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Energy **Strand 3: Forces and Energy**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE	1. Define energy. 2. Distinguish between potential and kinetic energy. 3. Explain how energy can be changed into other forms.	**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, soun**d and **electrical energy** are some forms of energy. Each form of energy can exist as energy in motion or energy at rest (stored energy).	• Observations • Classification	• Curiosity	1. Create objects to show potential and kinetic energy. 2. Have students categorize given pictures into the right source of energy. 3. In groups of four, have students play a game. Each player chooses a card and read the clues to guess if the clue is describing potential or kinetic energy. If answered correctly, the player keeps the card. The winner is the player who has the most cards at the end.	Simple Science textbook/workbook 5	• Have students complete worksheet on topic. • Have students write a paragraph explaining the difference between potential and kinetic energy. • Create a T-chart and label one column “potential energy” and the other “kinetic energy”. Write the definition andtwo examples of each under the correct heading/column.

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Energy **Strand 3: Forces and Energy**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE		**Potential Energy** One form of energy is **potential energy**. It is the energy of position or condition. It is stored energy. • A rock at the top of a hill has potential energy because ofits position. • Water stored behind a dam haspotential energy because of its condition. • A stretched rubber band has potential energy because ofits condition. **Kinetic Energy** Potential energy can be changedto **kinetic energy**. This is the energy of motion. • If a rock rolls down a hill, the			4. Place a card label potential energy on one side of the room and kinetic energy on the other side. Teacher reads clues and students move to stand beneath the correct label. 5. Watch and discuss video on potential and kinetic energy. Potential and Kinetic Energy | #aumsum #kids #science #education #children – YouTube		• Have students observe different pictures to determine if potential of kinetic energy is being shown. • Have students complete charts showing energy transfer.

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Energy **Strand 3: Forces and Energy**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE		potential energy of the rock ischanged 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. **Energy Transfer** Many times, potential energy is changed to kinetic energy. When a form of energychanges into another form of energy, it is called an **energy transfer**.					• 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.

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Energy **Strand 3: Forces and Energy**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE		POTENTIAL ENERGY ↓ KINETIC ENERGY ↓ WORK IS DONE **Examples of Energy Transfer** • A light bulb can change from electrical energy to light energy and then to heat energy. • A moving car can change from mechanical energy to kinetic energy and then to sound energy and later heat energy.					

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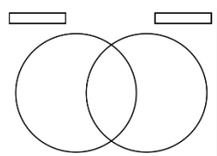
CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Simple Machines (Screws, Pulleys and Wheel & Axles) **Strand 3: Forces and Energy**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE	**1.** Define simple machines. **2.** Identify types of simple machines	People use machines to do work. A **simple machine** is a tool that has little or no moving parts. 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 six (6) kinds of simple machines.** They are **wedges, screws, inclined planes, levers, wheel and axles** and **pulleys.** Examples of simple machines include a hammer, pliers, scissors, nutcracker, wrench, can opener, egg-beater, fishing rod, piano keys, paddle, scooter, broom, seesaw and a wheelbarrow.	• Observations • Classification	• Curiosity	1. Video on simple machines https://www.youtube.com/watch?v=LSfNYpCprw4 2. Collect pictures from a variety of resources showing compound machines. Identify those that use the lever and screw to help us do work. 3. Simple Machine Rap https://www.youtube.com/watch?v=_NTCToqZ_3Q	Simple Science Text/Workbook 5	• Ask whole class questions and have students use Plicker Cards to answer questions. • Complete worksheet on simple machines. • Have students complete the Venn diagram to compare and contrast wheel & axle and pulley. 

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
SCOPE OF WORK

GRADE 5

Topic: Simple Machines (Pulley, Wheel & Axle and Screw) **Strand 3: Forces and Energy**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE		**Screws** are inclined planes wrapped around a pole. Examples of screws include jar lids, screws and spiral staircase. A **pulley** is a type of simple 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.			 4. Have students use and examine different types of simple machines		• 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). • Build a toy with moving parts using the following materials: egg carton/milk carton paperclips string plastic lids (juice/water lids) paper fasteners rubber bands straws paper plate Test models and identify the use of the screw, wheel & axle and pulleys.

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
SCOPE OF WORK

GRADE 5

Topic: Simple Machines (Pulley, Wheel & Axle and Screw) **Strand 3: Forces and Energy**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE	3. Distinguish between simple and compound machines 4. Compare and contrast the six simple machines.	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 a simple machine that 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.	• Observations • Classification	• Curiosity • Think independently			

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Simple Machines (Pulley, Wheel & Axle and Screw) **Strand 3: Forces and Energy**

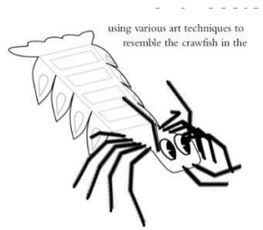
	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE		A **compound machine** is a machine made up of **two** (2) or more simple machines. Some examples of a compound machine include a **can opener,** a **wheelbarrow,** a **clock,** a **fishing pole** and a **bicycle.**					• Collect pictures from a variety of resources showing compound machines. Identify those that use the wheel & axle, pulley and screw to help us do work.

Fundamental concepts and principles of environmental science include the investigation and articulation of ways to conserve and manage natural resources.

CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Conservation of Marine Resources- Spiny Lobster

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
ENVIRONMENTAL SCIENCE	1. Identify external features of a Spiny Lobster (crawfish). 2. Categorize lobster as crustaceans. 3. Research laws that govern the preservation and conservation of the Spiny Lobster. 4. Suggest ways in which Spiny Lobster may be conserved in The Bahamas.	The Spiny Lobsters, better known as crawfish in The Bahamas, is one in a family of over 45 species of achelate **crustaceans**. They reproduce in the clean, clear tropical waters of the Bahamas from August 1st through March 31st. Lobsters live in crevices of rocks and coral reefs where they hide during the day. At night, they forage for snails, clams, crabs, and sea urchins. Lobsters are known to migrate in masses across the sea floor. Up to 50 lobsters migrate in one line. They use their antennae to stay together. Potential **predators** may be deterred because of the loud screech made as the antennae (whip) of one lobster rubs against a smooth part of the exoskeleton of another. When disturbed, they can swim backwards rapidly using the powerful strokes of their tails. Lobsters navigate by using the smell and taste of natural substances in the water.	• Comprehension • Application • Inference • Research • Communication	• Gratitude • Empathy	**Discussion** Lead class discussion on the laws that govern the catching of the spiny lobster. **3-D model** Have students create and label a mode using local materials.  **Discussion** Lead class discussion on how the crawfish protection laws affect its price and what effect that can have on populations.	Simple Science Text/Workbook 5 http://laws.bahamas.gov.bs/cms/images/LEGISLATION/SUBORDINATE/1986/1986-0010/FisheriesResourcesJurisdictionandConservationRegulations_1.pdf https://www.tropicseafood.com/about-bahamian-lobster/ Have a crawfish specimen or model for discussion and display. Invite a Fisheries Officer as a guest speaker.	• .**Exit Ticket** https://bnt.bs/curriculumhub/

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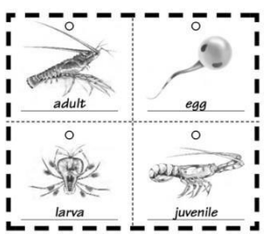
CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Conservation of Marine Resources- Spiny Lobster

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
ENVIRONMENTAL SCIENCE		Male lobsters have a padded opening at the base of each last leg. Female lobsters have two extra claws or "spurs" at the tip of each last leg which are used to scrape and release the sperm to fertilize the eggs. The protection of **marine resources** may take the form of habitat protection and restoration, regulations and the enforcement of fisheries laws or a public education and awareness campaign to emphasize the importance of marine **biodiversity** and foster a **conservation** effort.  			**Essay:** Have each student pretend their father was a commercial fisherman whom has been given an opportunity to address Bahamians from the House of Assembly. Have each student write a speech explaining a little about what they have learnt about the life the crawfish (Spiny Lobster), why it is important to the Bahamas' economy, threats it faces and why it is protected in The Bahamas **Social Media Post** Have students create an Instagram post to encourage Bahamians to respect the lobster closed season April 1- July 31st and protect lobsters.	Display photos and other visuals that illustrate how the crawfish is legally and illegally harvested. Lobster lifecycle Poster from the BNT or TNC Resource Pack https://bnt.bs/curriculumhub/	

Fundamental concepts and principles of environmental science include the investigation and articulation of ways to conserve and manage natural resources.

CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Conservation of Marine Resources- The Queen Conch

ENVIRONMENTAL SCIENCE

LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Identify external features of a conch. 2. Categorize conch at mollusks. 3. Identify the stages in the life cycle of a conch. 4. Explain the importance of Queen Cconch to the Bahamian economy. 5. Analyse ways in which the Queen Conch can be preserved and conserved.	In The Bahamas, Queen Conch, a large shelled **mollusk**, has an important cultural and economic role. However, it is vulnerable to **overfishing** because it a huge food source for Bahamians and it matures and moves slowly. It has a large orangish shell exterior with a shiny, rosy, pink interior shell. The mollusk has a mottled gray head with a large proboscis (like a nose or beak) and long eye stalks with eyes at the end. Beneath the shell is a strong foot with a claw-like pointed toenail. Conchs are either male or female. The male has a black arm over his right eye. The female conch has a groove that runs down the right side of her foot.	• Communication • Analysis • Application • Comprehension	• Gratitude • Empathy	**Discussion** Lead class discussion on whether or not it is important to conserve the queen conch and whether or not a closed season is needed. **Observation** Have class examine various stages of the conch lifecycle using live specimen or pictures. **Graphing** Have students survey students in the school and graph results to investigate how widely conch is used by families in the school population. **Meme** Have students create memes to share on the school's social media to help conserve conch.	Simple Science Text/Workbook 5 Present a live specimen or pictures of conch life cycle. Resource Pack https://bnt.bs/curriculumhub/ • www.breef.org • Queen Conch life cycle poster • Science Horizon Bk 5 • Harcourt Science Bk 6 • http://142.93.73.144/wp-content/uploads/2020/02/Breef-QConchGuideforSchools.pdf • Phil Stubbs' Song: The Conch • Eddie Minnis' Song No More Conch • Conch Gone Song (https://www.youtube.com/watch?v=IYCsTSjc4N8)	**Exit Ticket** https://bnt.bs/curriculumhub/ Queen Conch

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Conservation of Marine Resources- The Queen Conch

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
ENVIRONMENTAL SCIENCE					**Debate:** Have teams argue for or against restrictions on conch. **3-D Model** Have class create a 3-D conch lifecycle model from recyclable materials. **Worksheets** 		

Fundamental concepts and principles of environmental science include the investigation and articulation of ways to conserve and manage natural resources.

CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Conservation of Marine Resources- The Nassau Grouper

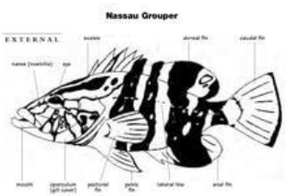
	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
ENVIRONMENTAL SCIENCE	1. Explain why the Nassau Grouper population is endangered. 2. Describe the life cycle of the grouper. 3. Identify distinguishing external features of a Nassau Grouper. 4. Suggest ways to conserve the Nassau Grouper.	The Nassau Grouper belongs to the seabass family of fish. All seabass have strong, stout bodies and large mouths. Five dark brown bands, a black saddle-like spot near the tail fin and a dark streak running from its nose through its eyes are features that distinguish the Nassau Grouper from other groupers. The Nassau Grouper can change colour from pale to almost black to match its surroundings. It can grow to 1 to 2 feet long and can reach a maximum of 4 feet and weigh fifteen pounds or more. Nassau Groupers may live for more than 25 years. The Nassau Grouper is a valuable fisheries resource and an important part of the coral reef community. The grouper is usually found in caves, crevices and cracks of the reef. It is rarely found deeper than 90 feet. This fish often rests on the sea bottom, blending with its surroundings. Nassau Groupers are found throughout the Caribbean Sea.	• Communication • Synthesis • Inference	• Cooperation • Tolerance of other's views	**Group work** Have students work in groups to design a grouper trapping devise that won't capture juvenile groupers. Have them draw a picture of their design. **Dramatization** Have class host a radio show to discuss the grouper closed Season. **Worksheets**	Simple Science Text/Workbook 5 Resource Pack https://bnt.bs/curriculumhub/ www.breef.org Have a Fisheries Officer from the Department of Marine Resources as a guest speaker.	**Exit Ticket** https://bnt.bs/curriculumhub/

Fundamental concepts and principles of environmental science include the investigation and articulation of ways to conserve and manage natural resources.

CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 5

Topic: Conservation of Marine Resources- The Nassau Grouper

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
ENVIRONMENTAL SCIENCE		Fisheries are an essential resource. About 75% of the world's fish catch is 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 organisms. The ocean provides goods, services, 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 like Nassau Grouper, jack, snappers and grunts and deep-water scale fish like red snapper. Fisheries are threatened by habitat loss, overfishing, pollution, introduction of invasive species and climate change.			 		

Fundamental concepts and principles of environmental science include the investigation and articulation of ways to conserve and manage natural resources.

CU**RRICULUM GUIDELINES**
SCOPE OF WORK

GRADE 5

Topic: Marine Debris

ENVIRONMENTAL SCIENCE

LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Infer way in which our changing climate will affect our coral reef. 2. Investigate how coral nurseries are used to help conserve coral species.	In addition to the large amounts of coral bleaching, climate change**, illegal harvesting**, coastal development, destructive fishing practices, and **ocean pollution** have been driving the world's wild coral populations to the brink of extinction. With 75 percent of reefs under the threat of damage or death, there often seem like there is not much that anyone can do to save coral. However, scientists in different parts of the world, including in The Bahamas, are experimenting with growing corals. Many projects have been successful. They start with a live piece of coral which is cut into many smaller pieces. Those coral fragments are either glued onto round cement platforms roughly the size of drink coasters or tied to a PVC frame and allowed to hang in the water column.	• Inference • Investigate • Analysis	• Open to new ideas • Curiosity • Tolerance of other's views	**3-D Model** Have students use straw, clay and construction paper to create a 3-D model of a coral nursery. **Discussion** Lead class discussion on signs the fishermen and scientists are seeing to suggest how our changing climate is negatively affecting our coral reef. **Letter Writing** Have students write a letter to a friend on another family island to tell them what every Bahamian, including children, can do to help save the coral reef. They should explain why it is important for everyone to join the fight to save the reef.	Simple Science Text/Workbook 5 www.bnt.bs http://www.perryinstitute.org/ https://seaworld.org/animals/all-about/coral-and-coral-reefs/	**Exit Ticket** https://bnt.bs/curriculumhub/

CU**RRICULUM GUIDELINES**
SCOPE OF WORK

GRADE 5

Topic: Marine Debris

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
ENVIRONMENTAL SCIENCE		While a few projects utilize large aquarium tanks where scientists must maintain the correct temperature, the amount of sunlight and mineral conditions, most coral are farmed in the ocean. Many coral propagation units exist in the Bahamas. In the Bahamas **marine protected areas** such as national parks are one of the main ways coral reef and fisheries are managed and protected.					

CU**RRICULUM GUIDELINES**
SCOPE OF WORK

GRADE 5

Topic: Marine Debris

ENVIRONMENTAL SCIENCE

LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Explain the effects of pollution on marine resources. 2. Suggest ways to prevent ocean pollution. 3. Define the term marine debris.	• Oceans are polluted by human and natural means. People dump waste material into the ocean. **Marine debris** is waste that litters the ocean. Often such waste consists of non- biodegradable substances likeplastics. Marine life eat the plastic which blocks their digestive tracts and causes starvation. Animals may also get trapped in marine debris and suffocate. • Oil spills are another source of pollution. • Chemical products such as fertilizers and detergents contain phosphorus. Phosphorus causes algae to grow very quickly and smother coral reefs. • Scientists are working to develop new kinds of plastics that are biodegradable and not harmful to marine life. However, ocean pollution can be reduced in the following ways:	• Research • Communication • Synthesis	• Tolerance of other's views	**Simulation** Have students pretend the Bahamian government began issuing licenses for oil drilling. As a result, a huge oil spill has occurred on the Little Bahama Bank which threatens immense damage to 10 national parks in the area. The spill will also greatly affect tourism, our main industry in the Bahamas, because reefs and beaches will no longer be usable. Have them research to see what other countries have done in similar circumstances. Then, simulate a clean-up and education campaign to address the problem. **Class Discussion** Project the Facebook page of the Bahamas Plastic Movement project and discuss what has been done.	Simple Science Text/Workbook 5 Have a Science Officer from the BahamasNational Trust as a guest speaker. The BEST Commission The Ministry of the Environment	**Exit Ticket** https://bnt.bs/curriculumhub/ Marine Debris

CU**RRICULUM GUIDELINES**
SCOPE OF WORK

GRADE 5

Topic: Marine Debris

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
ENVIRONMENTAL SCIENCE		• Water can be treated before it flows into the ocean; • More people can use septic tanks rather than soak aways; • Industries can be more careful about how and where they discard waste; • More substances can be recycled so that they avoid going to the landfill; • We should keep our surroundings clean so that garbage is not carried by the wind into the ocean.			**Presentation** Have students create Prezi presentations in groups to address the ocean pollution problem.		

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

CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: Cells **Strand 1: Characteristics of Organism**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE	1. Identify and describe parts and function of the cell. 2. Investigate plant and animal cell parts and record their functions. 3. Compare plant and animal cells.	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.	• Make predictions based on reasoning and prior knowledge • Formulate models • Engage in collaborative activities	• Curiosity • Cooperation • Thinking independently	1. Using balloons, place labels of cell parts inside the balloons. Each balloon should have a different part inside. Once the part is inside the balloon, the balloon should be blown up. Chairs should be set up with five rows of three. Students who are starting will have the starter sheets and a pencil. The starter sheet and the pencil will be passed until it reaches the end. Students will have to match their part to its function. The team that finishes first are the winners. 2. Make information cards with the parts of the cells and the function of each part.	Simple Science Text/Workbook 6 https://www.neok12.com/Cell-Structures.htm https://www.helpteaching.com/questions/Cell_Theory/Grade_5 https://quizizz.com/admin/quiz/5af38788bfeece0019afcde3/5th-grade-animal-and-plant-cells https://www.khanacademy.org/science/high-school-biology/hs-cells/hs-plant-vs-animal-cells/a/hs-plant-vs-animal-cells-review	Create a worksheet Match cell parts to its function. Use a Venn diagram to compare and contrast plant and animal cells. https://quizizz.com/admin/quiz/5eaa1e6081143e001bc36517/plant- and-animal-cells

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: Cells **Strand 1: Characteristics of Organism**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE		The **nucleus** controls the activities of the cell. It is also known as the control and the brain of the cell. The **cell membrane** holds the parts of the cell together. It also separates the cell from its surroundings and controls what material enters and leaves the cell. The cell membrane lets, food, oxygen, and water flow into the cell when they are needed, and it lets the cells waste flow out. **Cytoplasm** is a colourless, 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. Without chlorophyll, the plant will die and would not be able to make its own food.			3. Using large Venn diagrams, have students compare and contrast each cell part. 4. Create a cell matching game where students have to match the part it represents. Use a long chart paper. Place the parts on one side (side A) and the description (side B) on the other side. Attach Velcro onto the paper next to the description for it to hold the answers from side A.	https://www.cellsalive.com/cells/cell_model.htm https://quizizz.com/admin/quiz/5eaa1e6081143e001bc36517/plant- and-animal-cells	

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: Sponges **Strand 1: Characteristics of Organism**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE	1. Identify the characteristics of sponges. 2. Compare the traits of sponges to other invertebrates (mollusk, stinging cell). 3. Investigate and explain the reproduction process of 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 pump 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.	• Engages in collaborative activities • Make predictions based on reasoning and prior knowledge • Make inferences and draw conclusions • Measuring	• Curiosity • Cooperation • Questioning and posing problems • Think independently	1. Give students large cut outs of sponges. Have students write a few characteristics about the sponge. 2. Experiment to compare the amount of water different types of sponges can hold. 3. Create a sponge flyer fact sheet highlighting basic facts about the sponge and its reproduction process. 4. Using the tutorials on YouTube, create games using Kahoot, Ed puzzles, and Plickers to highlight important details from the lesson. 5. Facts about sponges! It's all about sponges. Let's play!	Simple Science Text/Workbook 6 www.commonsense.org/ https://www.teachercreated.com/blog/2009/03/sponge-activities/ http://www.spongelab.com/landing/ https://www.purposegames.com/game/2fb7e915 https://oceanservice.noaa.gov/facts/sponge.html	Complete a table by inserting the missing traits of sponges. https://quizizz.com/admin/presentation/5f9effd5068566001be36fb6/sponges

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: Sponges **Strand 1: Characteristics of Organism**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE		• Sponges reproduce by **budding**, where they grow a new sponge on them. Once the new sponfe grows big enough, it falls off. • Some sponges reproduce sexually, forming egg and sperm cells. A fertilized egg forms a larva that leaves the parent sponge and travels through the water to another part of the ocean floor. There, it attaches itself to a hard surface where it develops into an adult sponge. • Different species of sponges have different colours, 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. The sponging industry was started by the Greeks. At that time, the sponging industry was the most important economic activity in The Bahamas.			https://quizizz.com/admin/presentation/5f9effd5068566001be36fb6/sponges		

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: The Digestive System **Strand 1: Structure and Functions in Living Systems**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE	1. Identify the parts of the digestive system. 2. Experiment to examine how the food is broken down. 3. Investigate to explain the functions of the digestive system. 4. Investigate practices that are helpful and harmful to the digestive system.	• Our body needs to break down the food we eat to absorb the nutrients it needs. This process is called **digestion**. • Digestion happens in the digestive system, which begins in the mouth and ends at the rectum. 1. Digestion begins in our **mouth**. Our teeth cut and chew our food. We use our tongues to taste and to mix food with **saliva**. 2. The food travels down the **esophagus** to the stomach. 3. In the stomach, the food mixes with **gastric juices**. Gastric juices break the food down. 4. The mixture of food and gastric juices travels through the **small intestine**. Nutrients from the food are absorbed into our blood to be transported to all the cells of our bodies. 5. The parts of the food our bodies do not need continue into the **large intestine**. 6. Finally, the parts of the food our body does notneed leave our body through the **rectum**.	• Make predictions based on reasoning and prior knowledge • Formulate models • Pursue new knowledge • Engaged in collaborative activities • Communicate information effectively	• Curiosity • Cooperation • Thinking independently	1. Use a diagram to observe the parts of the digestive system. 2. Observe a video/DVD on digestion to see the process. Complete a worksheet on this. 2a. Use puzzle pieces to construct the digestive system. 2b. Match the name label to each part of the digestive system. 3. Concentration, word search, flashcards on digestive system 4. https://quizizz.com/admin/quiz/5fc55af594f574001b97776b/digestive-system https://interactivehuman.blogspot.com/2008/10/digestion-game-for-kids.html http://www.stemgamecrew.org/category/digestive-system/	Simple Science Text/Workbook 6 • http://www.curriculumbahamas.com/grade-3.html • https://www.youtube.com/watch?v=eKaBQrFdNtw • https://www.youtube.com/watch?v=Og5xAdC8EUI • https://www.ducksters.com/science/digestive_system.php	Label the digestive system. Complete a paragraph using vocabulary words to describe the process of the digestive system. In cooperative groups, have students create a travel brochure identifying the major parts of the digestive system by showing the path food takes through the digestive system. https://quizizz.com/admin/quiz/5fc55af594f574001b97776b/digestive-system

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: The Teeth **Strand 1: Structure and Functions in Living Systems**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE		• **Caring for the Digestive System** - eat right and on time; - consume protein and carbohydrates in right amount; - drink plenty of water; - exercise; - avoid sugary drinks, and less drink less alcohol; - avoid foods that contains high fat or you will develop **constipation** problems; - quit smoking, for it contributes to digestive problems such as heartburn, ulcers and gallstones.					

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: The Teeth **Strand 1: Structure and Functions in Living Systems**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE	1. Identify and label the different types of teeth in Humans. 2. Examine and state the functions of the different types of teeth in humans. 3. Differentiate between the different types of teeth. 4. Investigate caring for the teeth.	• Our teeth help us chew food, which their main job. Our teeth also help us to digest food, to speak, give shape to the face, smile, and effect our health overall. The doctor that studies the teeth is called a **dentist**. Since your teeth help break down the food you eat, they are part of your **digestive system**. • The part of the tooth that can be seen whichis not covered by the **gum** (the pink, fleshy part) is called the **crown**. The crown of each tooth is covered with **enamel.** Enamel is a very tough substance that is hard and shiny and protects the tooth. Beneath the enamel is **dentin**, which is the final protective layer before reaching the pulp. The **pulp** cavity is where the nerves and blood vessels are located. • Since teeth are such important tools, humans get two sets. Our first teeth start to grow when we are just 6 months old. They are called **primary teeth** (milk teeth). These are the teeth that falls out when we grow. This first set contains 20 primary teeth.	• Make predictions based on reasoning and prior knowledge • Formulate models • Engaged in collaborative activities • Pursue new knowledge	• Curiosity • Tolerance of others view • Cooperation • Questioning and posing problems • Thinking independently	1. Have students draw pictures of the teeth and label it. 2. Provide clay or allow students to bring clay to make moulds of the types of teeth. Write the function of each type. 3. Have students sort out pictures of things that are good for the teeth and bad for the teeth. 4. Teeth games: https://sciencetrek.org/sciencetrek/topics/teeth/games.cfm https://teachingmama.org/15-activities-about-teeth/	Simple Science bk 6 https://www.youtube.com/watch?v=ZE-TtFhZlDw https://www.youtube.com/watch?v=rnIny_riefs https://www.healthline.com/health/teeth-names	Label a diagram to show the different types of teeth. Match the function to its type of teeth. https://quizizz.com/admin/quiz/5e56d48e65ccd3001b676431/teeth

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: The Teeth **Strand 1: Structure and Functions in Living Systems**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE		• By the time you turn 12 or 13 years old, all your primary teeth will have fallen out. The second set of teeth that replace the primary teeth is called permanent teeth. • Adult humans have 32 **permanent teeth**, which are 12 more than the first set of primary teeth. If an adult loses a permanent tooth, it will not grow back. **Types of teeth** • **Incisors** are shaped like tiny chisels with flat ends that are somewhat sharp. These teeth are used for cutting and chopping food. • The pointy teeth beside your incisors are called **canine** teeth. There are four of them: two on top and two on the bottom. Because these teeth are pointy and sharp, they help tear food. • Next to your canine teeth are your **premolars**, which are also called bicuspid teeth. You have eight premolars in all: four on top and four on the bottom. Premolars are bigger and stronger, and have ridges, which make			http://files.havefunteaching.com/activities/science/dental-hygeine-activity.pdf https://www.colgate.com/en-us/bright-smiles-right-futures/program-materials/for- kids/games		

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: The Teeth **Strand 1: Structure and Functions in Living Systems**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE		make them perfect for crushing andgrinding food. • If you open your mouth wide, you'll see your **molars**. You have eight of these: four on top and four on the bottom. Molars are the toughest of the bunch. They are even wider and stronger than premolars, and they have more ridges. Molars work closely with your tongue to help you swallow food. The tongue sweeps chewed-up food to the back of your mouth, where the molars grind it until it's mashed up and ready to be swallowed. • The last teeth a person gets are **wisdom teeth**. These are also called third molars. They are all the way in the back of the mouth, one in each corner.					

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: The Teeth

Strand 1: Structure and Functions in Living Systems

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE		**Caring for your teeth:** - Brush and floss your teeth regularly. - Use fluoride toothpaste. Eat a healthy diet. - Visit your dentist regularly for dental cleanings and check-ups - Do not smoke. - Avoid eating sugary foods. Sugar can hurt your teeth, causing tooth decay and cavities. - Brush your teeth to avoid bad breath, gum disease (gingivitis), and tooth infection and loss of teeth. If you do not brush your teeth, bacteria will develop, clumping together to form a sticky substance called **dental plaque. Antibacterial** mouth rinses also can help reduce bacteria.					

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: From Flower to Fruit **Strand 1: Structure and Functions in Living Systems**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
NCE	1. Define the terms pollinators, pollination, angiosperm, petals, stamen, pistol and seed Coat. 2. Identify flowers to observe parts of a flower, and explain its function. 3. Investigate and explain the life cycle of a flower.	• 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 **stamen** are the male partof the flower. The female part of the flower produces the fruit and seeds, and the male part produces pollen. • 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.**	• Make predictions based on reasoning and prior knowledge • Make inferences and draw conclusion • Communicate information effectively • Engage in collaborative activities	• Curiosity • Cooperation • Questioning and posing problems	1. Create a domino game using the terms for students to match it with its definition. Students will place the term over its definition. The group that finishes connecting all are the winners and will receive a prize. 2. Draw or print out a large parts of the flower for students to attach the parts (suggestion: laminate the large flower and use Velcro to hold the parts). 3. Sequence pictures to show the life cycle of a flower (plant).	Simple Science Text/Workbook 6 https://web.extension.illinois.edu/gpe/case4/c4facts1a.html\ Harcourt Science book 6 https://byjus.com/biology/flower/\	Label the picture of a flower to show the four main parts. Create a Venn diagram to explain the function of plant parts. Teacher-made worksheet https://quizizz.com/admin/quiz/5eb84e0d052f2a001e3bd786/parts-of-a-plant-flowers-and-fruits

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: From Flower to Fruit **Strand 1: Structure and Functions in Living Systems**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE		• Pollination is the first important step in seed formation. A **pollinator** is an organism that transfers pollen from the male part of the flower to the female. • Seeds have very tiny plants inside them **(seedlings)**. 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**.**			4. https://www.toppr.com/guides /biology/anatomy-of-flowering-plants/flower/ **5. Flower Power** Can you label this flower? Let's try! https://www.greatschools.org /library/cms/78/25778.pdf 6. https://www.turtlediary.com/game/parts-of-a-flower-labeling.html 7. Play a plant life cycle game: https://www.sciencekids.co.nz/gamesactivities/lifecycles.html 8. Write 5 facts about flowering plants.		

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: Photosynthesis **Strand 1: Structure and Functions in Living Systems**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE	1. Define the terms photosynthesis, chlorophyll, and stomata. 2. Explain how the plant makes food. 3. Examine and describe the process of photosynthesis.	• Plants make their own food by a process called **photosynthesis**. During this process, plants use light energy to change water and carbon 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 transports chloroplasts 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.	• Formulate hypotheses • Make predictions • Recognize and control variables • Communicate information effectively.	• Curiosity • Positive attitude and failure • Tolerance of other's views • Cooperation • Questions and posing problems • Thinking independently	1a. Experiment to show that sunlight affects photosynthesis. Have students in groups. Place a plant in sunlight and one in a dark place and record the findings after a week. 2a. Investigate how the plant use leaves. 3a. Draw a diagram of a plant receiving sunlight. Have students write and explain this process and its importance. 3b. Have the students scan QR codes or use YouTube and listen to the song about photosynthesis. 3c. Facts about Photosynthesis! Let's play! https://quizizz.com/admin/quiz/587cdbc3c55da99c284cbd9b/photosynthesis	Simple Science Text/Workbook 6 https://www.youtube.com/watch?v=UPBMG5EYydo https://www.britannica.com/science/photosynthesis https://betterlesson.com/lesson/633012/photosynthesis https://www.ducksters.com/science/photosynthesis.php Harcourt Science book 5 https://www.youtube.com/watch?v=UPBMG5EYydo	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. Complete a worksheet on photosynthesis a. Define the term photosynthesis. b. Explain how photosynthesis help human beings. https://quizizz.com/admin/quiz/587cdbc3c55da99c284cbd9b/photosynthesis

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

CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: Photosynthesis **Strand 1: Structure and Functions in Living Systems**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
LIFE SCIENCE					https://biomanbio.com/HTML5GamesandLabs/PhotoRespgames/photointeractivehtml5page.html https://www.legendsoflearning.com/learningobjectives/photosynthesis/		

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
SCOPE OF WORK

GRADE 6

Topic: Oil, Coal, and Natural Gas **STRAND 2: Properties and Structure Of Earth**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE	1. Define the terms fuel, fossil fuels, coal, methane, and natural gas. 2. Explain how coal, oil and natural gas are formed. 3. Explain advantages and disadvantages of fossil fuels. 4. Examine products that are made from oil. 5. Investigate and compare coal, oil and natural gas.	• **Coal, oil** and **natural gas** are some of the most important fuels. • A **fuel** is 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 (the remains of plants). However, they were formed from the remains of simple animals and plants.	• Communicate information effectively • Make inform responsible and wise decision • Make inferences and draw conclusion	• Curiosity • Open to new ideas • Questioning and posing problems • Thinking independently	**1. Talk Show: Fossil Fuels** Discuss the methods that were used long ago to light a fire. 2. Make a poster that shows items made from oil. 3. Watch video of how oil is taken from the ground. 4. **Game**: https://climatekids.nasa.gov/menu/play/ 5. https://wonderville.org/asset/save-the-world	Simple Science Text/Workbook 6 https://www.nrdc.org/stories/fossil-fuels-dirty-facts https://www.eesi.org/topics/fossil-fuels/description https://www.youtube.com/watch?v=BYpfOKwlYS8 https://www.youtube.com/watch?v=8YHsxXEVB1M	Students answer questions about the formation of coal, oil and natural gas. Dramatize “The Importance of the Careful Use of Gasoline and Diesel”. Cut out magazine pictures for a collage that illustrates the formation of coal, oil and natural gas.

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
SCOPE OF WORK

GRADE 6

Topic: Oil, Coal, and Natural Gas **STRAND 2: Properties and Structure Of Earth**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE		These tiny organisms lived on the earthmany 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. • 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 non-renewable resources.			6. Invite a spokesperson from a local service station on your island to share some information on fuel. Have a 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 to New Providence.		Teacher-made worksheet https://quizizz.com/admin/quiz/5f6020eed469d5001dfc777c/fossil-fuels https://quizizz.com/admin/quiz/5ba2791f423f7b001d33ed09/renewable-and-non-renewable-resources

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
SCOPE OF WORK

GRADE 6

Topic: Petroleum **STRAND 2: Properties and Structure Of Earth**

EARTH SCIENCE

LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Define the term Petroleum. 2. Identify and list products made from petroleum. 3. Explain why compressed natural gas is environmentally friendly. 4. Examine and sequence the stages of how oil is processed.	• **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 non-renewable resource. Petroleum has to be drilled from small pockets in rocks.	• Formulate hypotheses • Engage in collaborative activities • Make inference and draw conclusion • Design, conduct and evaluate scientific investigation • Pursue new knowledge	• Open to new ideas • Cooperation • Curiosity • Positive attitude to failure	1. Watch video which shows how oil is taken from the ground. **2.** Experiment to show how oil floats on water. 3. https://adventuresinenergy.org/Natural-Gas-Processing/index.html 4. Play a sorting game using recyclable bags. Use two bags and label them as “petroleum” and “not petroleum”. Give students an item or printed pictures and have them sort the items into the correct bag. 5. https://www.shell.us/sustainability/energize-your-future-with-shell/stem-classroom-activities.html	Simple Science Text/Workbook 6 https://www.investopedia.com/terms/p/petroleum.asp https://www.bpcplc.com/ https://www.youtube.com/watch?v=pWW6bSSaPZk	Students answer questions about advantages and disadvantages of fossil fuels. **Research:** Use the internet or product mapto 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.

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
SCOPE OF WORK

GRADE 6

Topic: Petroleum **STRAND 2: Properties and Structure Of Earth**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE		• **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 it is 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.			https://games.legendsoflearning.com/game/the-story-of-natural-resources/561?partner=legends-public&media=gam		

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
SCOPE OF WORK

GRADE 6

Topic: Predicting Weather **STRAND 2: Properties and Structure of Earth**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE	1. Define the terms weather, troposphere, meteorologist, and Climate. 2. Examine pictures of models of weather instruments to identify them and explain how they work. 3. Differentiate between weather and climate.	• **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 **hygrometer** (psychrometer) is used to measure relative humidity. **Humidity** is the amount of water vapor in the air.	• Formulate hypotheses • Make predictions based on reasoning and prior knowledge • Infer and draw conclusion • Formulate models • Make accurate observation and measurement	• Curiosity • Positive attitude to failure • Cooperation	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. 2. Make models of some weather instruments such as: a. Anemometer b. Barometer c. Hygrometer/ psychrometer. 3. Listen to a guest speaker from the Meteorological Office.	Simple Science Text/Workbook 6 Science Horizons Bk. 5 Harcourt Science Bk. 6 McGraw Hill Science Bk. 3 World Map Resource Person https://www.youtube.com/watch?v=dqpFU5SRPgY&t=111s	Teacher-made worksheet Label weather instruments. List the factors of weather on cards to write descriptive sentences. Match the weather instrument to the factor of weather it measures. Rainfall– rain gauge (precipitation). Research and write five facts that state how Bahamians benefit from the type of climate we experience in The Bahamas.

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: Predicting Weather **STRAND 2: Properties and Structure Of Earth**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE		• **Temperature** is measured with a thermometer and the amount of rain fall is measured with a rain gauge. • The conditions that make up weather and are measured are rain, air, humidity, air pressure, temperature, wind and water vapor. • **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.**			4. 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.	https://www.youtube.com/watch?v=_LZChlsROwA	Online Worksheet: https://quizizz.com/admin/quiz/5e98965cd0fe40001b743f93/predicting-the-weather

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
SCOPE OF WORK

GRADE 6

Topic: Storms **STRAND 2: Changes In Earth and Sky**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE	1. Identify the three types of storms. 2. Compare the traits/characteristics of storms. 3. Investigate and record safety precautions during a storm. 4. Differentiate between the different types 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.	• Make predictions based on reasoning and prior knowledge • Collect, process and interpret data/information • Make inferences and draw conclusion • Pursue new knowledge	• Curiosity • Open to new ideas • Thinking independently	1. Discuss what damages storms/hurricanes usually do (Katrina and others). 2. 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. 3. Take students on a nature walk around the community to record damages that could of happen from a storm. 4. https://www.learninggamesforkids.com/weather-games.html	Simple Science Text/Workbook 6 McGraw Hill Science Bk. 3 Science Horizon Bk. 5 Harcourt Science Bk. 6 https://betterlesson.com/lesson/632262/7-forecasting-weather https://www.uen.org/core/displayLessonPlans.do?courseNumber=3040&standardId=1206&objectiveId=1209	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. Research to find out how storms are named. Teacher-made worksheet

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: Storms **STRAND 2: Changes In Earth and Sky**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE		**Safety Precautions During a Storm:** 1. Remain indoors. Avoid small building 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.			5. Have students make a flyer electronically or manually to inform people about how to prepare for a storm. 6. Select magazine pictures to compile a storm safety booklet. 7. https://scijinks.gov/menu/games/hurricanes-and-storms/ 8. https://www.nationalgeographic.org/interactive/extreme-weather/ 9. https://www.brainpop.com/games/	https://study.com/academy/lesson/weather-forecasting-lesson-for-kids.html https://www.getprepared.gc.ca/cnt/hzd/svrstrms-en.aspx https://sciencestruck.com/which-are-different-types-of-storms https://www.youtube.com/watch?v=IXiNa4vJOHc https://www.youtube.com/watch?v=XfPONxDMrMg	Research at least five years prior to find the names of the worst hurricanes for each year. Use a map to mark the route each one travelled. Students can also describe the damage caused by those hurricanes.

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
SCOPE OF WORK

GRADE 6

Topic: Weathering and Erosion **STRAND 2: Properties and Structure Of Earth**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE	1.Define the terms weathering, erosion, deposition, earthquake, fault, volcano, magma and lava 2.Identify the forces that cause weathering and erosion. 3. 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**.	• Formulate hypotheses • Make inference and draw conclusion • Pursue new knowledge	• Curiosity • Open to new ideas • Thinking independently	1. Watch videotape on effects of erosion. 2. Go on field trips to rocky shore, beach or hills to observe different stages of erosion. 3. 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 4. Students study pictures. Under each picture, write the force that is responsible for the weathering.	Simple Science Text/Workbook 6 Science Horizon Bk. 5 McGraw Hill Bk. 5 Harcourt/Brace Bk. 6 Harcourt Science Bk. 4 https://www.nationalgeographic.org/encyclopedia/weathering/#:~:text=Weathering%20is%20the%20breaking%20down,agents%20of%20weathering%20and%20erosion.	Fold a sheet of paper in half. 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. Teacher-made worksheet 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.

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
SCOPE OF WORK

GRADE 6

Topic: Weathering and Erosion **STRAND 2: Properties and Structure Of Earth**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE		• 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. Rocks 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.			a. Use a fan to represent wind and place it near soil to show soil being blown to another area. b. Pour water slowly through a straw over soil to show the movement of soil by water. https://nearpod.com/t/science/8th-grade/weathering-and-erosion-L36251997 5. https://www.nationalgeographic.org/interactive/walters-travels-weathering-and-erosion/ 6. https://thesciencepenguin.com/2016/02/erosion.html 7. https://www.legendsoflearning.com/learning-objectives/weathering-and-erosion/	https://www.generationgenius.com/weathering-erosion-and-deposition-for-kids/ http://www.onegeology.org/extra/kids/earthProcesses/weathering.html https://www.uen.org/core/displayLessonPlans.do?courseNumber=3050&standardId=1227&objectiveId=1228 https://www.education.com/worksheets/weathering+and+erosion/ https://www.youtube.com/watch?v=R-Iak3Wvh9c https://www.siemensstemday.com/sites/default/files/Five%20Minute%20Refreshers/Weathering_andosion_5-minute.pdf	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 eruptions.

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
SCOPE OF WORK

GRADE 6

Topic: Planets **Strand 2: Universe and The Solar System**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE	1. Sequence the order of the planets from the sun. 2. Classify the planets as inner and outer planets. 3. Compare and contrast the inner and outer planets.	• A **planet** is a large body of rock or gas that orbits the sun. The planet closest to the sun is Mercury, followed by Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. The inner planets Mercury, Venus, Earth, and Mars lie between the sun and the asteroid belt. They all have rocky surfaces. They are also smaller than most of the outer planets. None of them has more than two moons. • **Mercury** is the closest planet to the sun. It is covered with craters. It is about the size of the Earth's moon and has a thin atmosphere. • **Venus**, the second planet from the sun, is about the same size as Earth. It is dry and has a thick atmosphere that traps heat.	• Formulating models • Engage in collaborative activities	• Open to new ideas • Thinking independently	1. Create a model of the planets in the solar system. Have the students learn the acronym to remember the order of the planets: "My Very Educated Mother Just Served Us Noodles." 2. Have students cut out circles from different coloured paper. These circles represent the inner planets – Mercury Venus, Earth and Mars. Fasten the circles to the wall alongside the model of the sun. Label each circle with the appropriate planet name. Attach a large sheet of paper below each circle. Have the students tell what they know about each inner planet. List these things on the sheets of paper. Repeat the same procedure for the outer planets.	Simple Science Text/Workbook 6 Harcourt Science Bk. 3 Silver Burdett Science Bk. 4 http://kids.nineplanets.org/ (The Eight Planets) https://mrnussbaum.com/science/solar-system-and-space https://www.youtube.com/watch?v=libKVRa01L8&t=69s https://www.youtube.com/watch?v=GoW8Tf7hTGA	Give each student an orange circle to represent the sun. Have the student place it in the centre of a blank paper. Give each student coloured circles to represent each planet. Write the name of each planet on a circle. Place each named circle in the correct position around the sun. II & III. Have the students make two tables. The first table should be labelled "Inner Planets". The second table should be labelled "Outer 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
SCOPE OF WORK

GRADE 6

Topic: Planets **Strand 2: Universe and the Solar System**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE	4.Explain traits about each planet	• **Earth** is the third planet from the sun. It is the largest ofthe inner planets. It has one natural satellite, the moon. It is the only planet that has liquid water. It is the only known planet to support life. • **Mars**, the fourth planet from the sun, is sometimes called the **red planet**. Its atmosphere is thin and consists mainly of carbon dioxide. The gas freezes, forming ice caps in winter. Mars has volcanoes, canyons craters and sand dunes. On the other side of the **asteroid belt (which separates the inner and outer planets**) are the outer planets – Jupiter, Uranus and Neptune. These planets are large spheres made up mostly of gases and are often referred to as gas giants.			• On a separate sheet of paper, use the information recorded on the sheets from the previous activity to compare/distinguish between the inner and outer planets. • Create a scale model of the distances between the planets. a. Get paper models of the planets and the sun from the teacher. Tape the model of the sun to the wall. b. Measure 58 mm from the sun. Tape the model of Mercury at this point. c. Measure 50 mm from Mercury. Tape the model of Venus at this point. Tape the model of Earth 42 mm from Venus. Tape the model of Mars 78 mm from Earth.	https://ewnews.com/category/hurricane-tracker https://solarsystem.nasa.gov/planets/overview/ https://www.msnucleus.org/membership/html/k-6/uc/solar_system/2/ucss2_1a.html https://quizizz.com/admin/quiz/563c036185dc95c877e0870a/the-inner-outer-planets	Have the students list each inner planet in the first column of the first table and each outer planet in the first column of the second table. In the second column of both tables, have them list three characteristics of the inner planets and three characteristics of the outer planets. Teacher-made worksheet

CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: Planets **Strand 2: Universe and the Solar System**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
EARTH SCIENCE		• **Jupiter**, the fifth planet from the sun, is the largest planet in our solar system. At least 16 moons orbit around it. It is twice the size of Earth. Its energy causes a circular storm known as the **Great Red Spot**. It is surrounded by a system of thin, dark rings. • **Saturn** is the sixth planet from the sun. It is the second largest planet in the solar system. It has at least 18 named moons. The many bright rings that surround the planet are Saturn's most famous features. • **Uranus**, the seventh planet from the sun, is a blue-green ball of gas and liquid. It is the third largest planet in the solar system and has at least 15 moons. • **Neptune**, eight planet from the sun. It has at least 8 moons including Triton. It also has a faint ring.			d. Measure 55.1 cm from Mars. Tape the model of Saturn 65.1 cm from Jupiter. **https://spaceplace.nasa.gov/menu/play/** **https://sciencetrek.org/sciencetrek/topics/planets/games.cfm**		Give the students a chart showing the average distance of each planet from the sun and the scale distance. Give each student a string. At the end of the string, tie three or four knots at the same point to make one large knot. This large knot will stand for the sun. Use the scale distances on the chart to mark and measure the position of each planet on the string (use different coloured markers). On a folder sheet, explain how it helped to make a scale model instead of trying to show actual distances between planets.

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
SCOPE OF WORK

GRADE 6

Topic: Physical Properties & Changes of Matter **Strand 3: Properties and Changes in Matter**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE	1.Identify physical properties. 2.Predict and experiment to explain physical changes in objects. 3.Investigate 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, lustre 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.	• Formulate hypotheses • Make predictions based on reasoning and prior knowledge • Recognize and control variables • Pursue new knowledge • Design conduct and evaluate scientific investigation • Make inference and draw conclusion	• Curiosity • Positive attitude to failure • Open to new ideas • Cooperation • Thinking independently	1.Describe an object while the remainders of the class guess what the object is. 2.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, popsicle sticks, orange, paper, cloth, etc.). 3.Class experiment: heat water to change it to steam; then let the steam go on a plate to be changed back to water.	Simple Science Text/Workbook 6 Harcourt Science Bk. 6 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	Students list 3 physical properties of pictures of six objects shown by teacher. Students will make popcorn and then measure the densities of the popped and unpopped corn using a balance. Teacher-made worksheet 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.

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
SCOPE OF WORK

GRADE 6

Topic: Physical Properties & Changes of Matter **Strand 3: Properties and Changes in Matter**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE		• 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.			4. https://studyjams.scholastic.com/studyjams/jams/science/matter/properties-of-matter.htm 5. https://www.scholastic.com/teachers/activities/teaching-content/matter-9-studyjams-interactive-science-activities/	https://www.pbslearningmedia.org/subjects/science/physical-science/matter-and-interactions/properties-of-matter/	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 of energy.

CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: Chemical Properties and Changes **Strand 3: Properties and Changes In Matter**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE	1. Identify chemical changes in objects and substances. 2. Investigate chemicals to identify some that will cause changes in matter. 3. Examine to distinguish between a physical change and a chemical change.	• **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.	• Formulate hypotheses • Make predictions based on reasoning and prior knowledge • Recognize and control variables • Pursue new knowledge • Design conduct and evaluate scientific investigation • Make inference and draw conclusion	• Curiosity • Positive attitude to failure • Open to new ideas • Cooperation • Thinking independently	1. **Teacher-Conducted Experiment:** Light a piece ofpaper using a match to show how the properties of the paper will change. Smoke and ashes will be formed. 2. **Student 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.	Simple Science Text/Workbook 6 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.acs.org/kids https://www.ck12.org/book/ck-12-fifth-grade-science/section/1.6/	Students describe in a short paragraph how a chemical change takes place. 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. 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.

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: Chemical Properties and Changes **Strand 3: Properties and Changes in Matter**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE	.	Examples of these are the chemicalchanges 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. 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**.			**3.** Collect three jars and three nails. Pour the same amount of Coca Cola, alcohol and salt water into each jar. Place one nail in each jar. Record the results over a one-month period. 4. **Class activities**: A. Make a fruit salad. B. Bake cupcakes. Explain why the fruit salad is an example of a physical change, but the cupcakes demonstrate a chemical change.		

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: Measuring Matter **Strand 3: Properties and Changes in Matter**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
b	1. Define the terms mass, density, volume, weight, and gravity 2. Examine and identify measuring tools used to measure matter. 3. Conduct an 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.	• Formulate hypotheses • Make predictions based on reasoning and prior knowledge • Recognize and control variables • Pursue new knowledge • Design conduct and evaluate scientific investigation • Make inference and draw conclusion • Make accurate observation and measurements	• Curiosity • Positive attitude to failure • Open to new ideas • Cooperation • Thinking independently	1.**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. 2.**Student 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.	Simple Science Text/Workbook 6 Science Horizon Bk. 5 Harcourt Science Bk. 4 www.cmouston.org/en/cev/1436 **www.eduplace.com/math/.../te_1_1** https://www.brainpop.com/science/matterandchemistry/measuringmatter/ https://flexbooks.ck12.org/cbook/ck-12-chemistry-flexbook-2.0/section/2.1/primary/lesson/matter- mass-and-volume-ms-ps	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. Beside each measurement have them write whether each item is used as a measure of length, volume or mass and then indicate the correct unit of measurement (e.g. Milk – volume – Litre)

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: Measuring Matter **Strand 3: Properties and Changes in Matter**

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
PHYSICAL SCIENCE	.	• Scientists measure volume with a beaker or a graduate, a tall cylinder with measuring marks on the side. • **Weight** can be measured using a spring scale.			Collect three jars and three nails. Pour the same amount of Coca Cola, alcohol and salt water in each jar. Place one nail in each jar. Record the results over a one-month period.	• https://sciencing.com/tools-used-measure-matter-7441224.html • https://www.youtube.com/watch?v=e_gGCunofgI • https://www.youtube.com/watch?v=SB8mph4d-AA	

Fundamental concepts and principles of environmental science include the investigation and articulation of ways to conserve and manage natural resources.

CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: Environmental Conservation

ENVIRONMENTAL SCIENCE

LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Explain ways in which humans harm the environment. 2. Explain how environmental threats lead to animals becoming endangered. 3. Define renewable/non-renewable resources.	• Many of the actions we do are harmful to the environment. These include: ○ burning **fossil fuels;** ○ overfishing our oceans; ○ improper disposal of garbage; ○ adding chemicals to our groundwater supplies; ○ using too much energy and water; ○ mass land clearing; ○ cutting down of hills; ○ filling in of mangroves; ○ replacing coastal wetlands with canals and marinas. • The United Nations has established the UN Sustainable Development Agenda with 17 goals that will help ensure a healthy future for all our planet's citizens. Not all the goals and issues have to do with the environment, but climate change has a major impact on public health, food and water security, migration, peace and security. Therefore, it's crucial that we think about how to protect the environment and issues that affect everyone.	• Communication • Evaluation • Application • Comprehension	• Curiosity	**Research** Have students research the UN Sustainable Development Agenda to learn more about what countries like The Bahamas that have promised to do to help the environment. **Class Project** Have groups identify one environmental problem in your school and plan a way to solve it. They should: ○ Investigate who is responsible for or contributing to this problem? How? ○ Who or what does this environmental problem impact most? How does this happen? ○ What children in your school know about the problem? ○ What are some probable solutions? ○ What can be done to correct this problem? **Letter** Have students write a letter to your principal/PTA outlining an environmental problem that exist in your school. Suggest possible solutions and outline ways in which your principal/ PTA can help.	Simple Science Text/Workbook 6	**Exit Ticket** **https://bnt.bs/curriculumhub/** Environmental Conservation

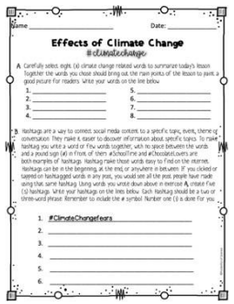
Fundamental concepts and principles of environmental science include the investigation and articulation of ways to conserve and manage natural resources.

CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: Climate Change

ENVIRONMENTAL SCIENCE

LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
• Describe effects of climate change. • Explain how climate change affects natural disasters and sea-level rise.	Gases like nitrogen and oxygen which make up 99% of the gas in the a**tmosphere** do not absorb heat from the sun. They allow it to reflect back into space from the Earth's surface. Other gases such as carbon dioxide, methane and nitrous oxide which make up roughly 0.1% of the atmosphere absorb heat. When those gases absorb solar energy, they radiate it back towards the planet's surface and to other gas molecules, creating the greenhouse effect. This is why they are called greenhouse gases. The **greenhouse effect** plays an important role in naturally regulating the temperature of our climate. Without it the Earth's average temperature would -64.4° F. That's roughly the temperature inside a "deep freeze" in your home. The term climate change is used to describe a long-term change in global temperatures and weather patterns.	• Comprehension • Application • Synthesis • Communication	• Curiosity • Cooperation • Tolerance of other's views	**Class Research** Have students research how laws are made in The Bahamas. In groups, have them propose and debate a new law that would help us fight climate change. **Online Quiz** Have students complete the quiz at the link below: https://edition.cnn.com/interactive/2019/04/specials/climate-change-solutions-quiz/ **Brochure** Have students create an educational brochure on what is climate change, what are its effects and what families can do to help.	Simple Science Text/Workbook 6 https://edition.cnn.com/interactive/2018/09/world/greenland-climate-change-cnnphotos/ https://edition.cnn.com/2019/01/18/health/climate-change-google-questions-answered/index.html https://edition.cnn.com/videos/weather/2018/12/10/climate-change-myths-explainer-wx-ncc-orig-llr.cnn https://edition.cnn.com/videos/weather/2018/01/18/nasa-climate-change-report-2018-gray-orig-js.cnn	**Exit Ticket** https://bnt.bs/curriculumhub/ 

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: Climate Change

ENVIRONMENTAL SCIENCE	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
		The earth's temperature has changed drastically in its 4.5-billion-year history. During the Ice Age (which was nearly 300 million years long), ice covered vast portions of the planet. Today, climate change is commonly used as a term to describe the effects of global warming that have occurred as a result of human activity following the industrial revolution in the 18th century. Greenhouse gases in the atmosphere are increasing because of human activities like burning fossil fuels, deforestation and modern farming practices. Scientists predict that if temperatures continue to rise, we will experience more extreme weather conditions, sea-level rise, the destruction of coastal ecosystems, loss of vital species and crops, population displacement and a huge cost to the global economy.					

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CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: Climate Change

ENVIRONMENTAL SCIENCE	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
		The United Nations warned that without urgent action global temperatures will rise even more and by the end of the century entire cities could be swallowed by the rising oceans, species of plants and animals would become extinction, and hundreds of millions of people could be forced to leave their coastal cities as the oceans rise. Climate change can be limited and halted but only if we take actions to help.					

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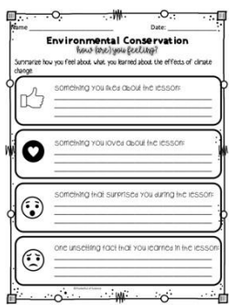
CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: Sustainable Development

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
ENVIRONMENTAL SCIENCE	• Define the term sustainable development. • Suggest ways we may live more sustainably.	• **Sustainable development** is the careful use and management of resources. Resources can be conserved by designing eco-friendly development projects in harmony with enclosing ecosystems, properly disposing of waste, engaging in practices such as reducing, reusing, composing, turning of appliances when not in use and using alternative forms of energy that do not required burning of fossil fuels. • 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 neededat one time;	• Comprehension • Analysis • Communication	• Cooperation • Tolerance of other's views • Open to new ideas	**Project Planning** Have students plan a green project or campaign. 1. Take a walk around your school campus; then decide on what environmental problem you will investigate and solve. 2. Plan a project or campaign to solve that problem - what will you do to help solve the problem you identified? 3. Think about possible challenges you might encounter and how you may overcome them. 4. Make a list of people, companies or organizations that may want to help you. 5. Decide how you will tell if you are successful. 6. What materials will you need to use?	Simple Science Text/Workbook 6	**Exit Ticket** **https://bnt.bs/curriculumhub/** 

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CU**RRICULUM GUIDELINES**
SCOPE OF WORK

GRADE 6

Topic: Sustainable Development

ENVIRONMENTAL SCIENCE	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
		- avoid opening the door frequently to check on cooking food; - operate dishwasher only when there is a full load. **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 dryer 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 workspace 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.			7. Share your results with your school. Decide what is the best way to let everyone at your school know what went well and what didn't.		

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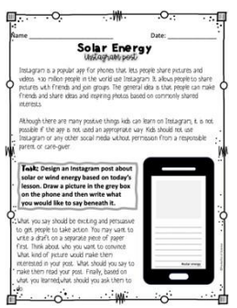
CURRICULUM GUIDELINES
SCOPE OF WORK

GRADE 6

Topic: Alternative Energy

ENVIRONMENTAL SCIENCE

LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
Describe at least two alternative source of energy that do not required burning of fossil fuels	• **Alternative energy** sources include wind power, solar energy and stored energy in moving waves. • The Bahamas with funding from the Interamerican Development Bank, with be building solar plant of five Family Islands in the next few years. Eventually, the Bahamas hopes to generate 30% of its energy form alternative energy sources	• Comprehension • Analysis • Synthesis	• Open to new ideas • Curiosity	**Creative Writing** The Island School on Eleuthera makes all the energy it uses using alternative sources of energy. Write five interview questions for them; then go to their website to find answers. Create a news story for ZNS about the Island School's use of alternative energy. Explain how other business may join them in using alternative energy. **Poster** Create a poster to explain and promote an alternate source of energy that can be used in the Bahamas. Investigate alternative source of energy that do not require the burning of fossil fuel.	Simple Science Text/Workbook 6 http://www.islandschool.org/ http://www.ceibahamas.org/	**Exit Ticket** **https://bnt.bs/curriculumhub/**  Name _____ Date: _____ **Solar Energy** Instagram is a popular app for phones that lets people share pictures and videos. 100 million people in the world use Instagram. It allows people to share pictures with friends and join groups. The general idea is that people can make friends and share ideas and inspiring photos based on commonly shared interests. Although there are many positive things kids can learn on Instagram, it is not possible if the app is not used an appropriate way. Kids should not use Instagram or any other social media without permission from a responsible parent or care-giver. **Task: Design an Instagram post about solar or wind energy based on today's lesson. Draw a picture in the grey box on the phone and then write what you would like to say beneath it.** What you say should be exciting and persuasive to get people to take action. You may want to write a draft on a separate piece of paper first. Think about: who you want to convince what kind of picture would make them interested in your post. What should you say to make them read your post. Finally, based on what you learned what should you ask them to

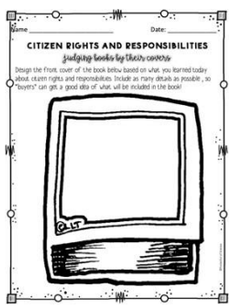
Fundamental concepts and principles of environmental science include the investigation and articulation of ways to conserve and manage natural resources.

CU**RRICULUM GUIDELINES**
SCOPE OF WORK

GRADE 6

Topic: Environmental Citizenship

ENVIRONMENTAL SCIENCE

LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
1. Define citizen environmental rights. 2. Describe citizen responsibilities as relates to the environment.	Citizen environmental rights mean all people should have access to the unspoiled natural resources that enable them to survive and be healthy. We are responsible for managing the environment. Our actions can have a negative or positive impact on the earth. One way to help solve issues facing the planet is to practice environmental stewardship. Environmental stewardship is the responsible use and protection of the natural resources. We may put environmental stewardship into action in our homes, schools, and communities. Caring for the entire planet may sometimes seem like a gigantic task. However, if we all make small changes in their own lives to help the environment together, we can make a huge impact.	• Communicate • Comprehension • Evaluation • Application	• Curiosity • Open to newideas	**Introduction to Famous Scientist** 1. Introduce students to Jane Goodall, a scientist who made environmental stewardship her life's mission. 2. Have them watch the Jane Goodall video where she offers advice for kids on environmental stewardship. 3. After reading about Goodall and watching the video, ask students: a. What environmental issue was Goodall concerned about? b. How did she get others involved? c. What advice did she give to kids?	https://www.rootsandshoots.org/ *Jane Goodall* by Jodie Shepherd, C. Press/F. Watts Trade (2015). https://www.youtube.com/watch?v=skAbsyRkCLg	**Exit Ticket** **https://bnt.bs/curriculumhub/** 

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CU**RRICULUM GUIDELINES**
SCOPE OF WORK

GRADE 6

Topic: Environmental Citizenship

	LEARNER OUTCOMES	CONTENT/ CONCEPTS	SKILLS	ATTITUDES	ACTIVITIES	RESOURCES	METHOD OF ASSESSMENT
ENVIRONMENTAL SCIENCE		**Jane Goodall** As a young girl, Jane Goodall dreamed of working with wild animals. When she was 26, Goodall was offered the chance to study chimpanzees in Tanzania, Africa. She spent the next 25 years researching the apes in their natural habitat. She made important discoveries about the animals' lives such as how they raise their young and use tools. Goodall saw that chimpanzees and their homes were under threat. The same thing was happening to other animals all over the world. So, Goodall created a program called Roots & Shoots. It encourages kids to create community projects to protect the planet.			**Blog Post** Have students write a blog post for the Ministry of Education website about why how students may become good environmental stewards and how they can help their school become more eco-friendly.		

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 convincedthat 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 regardsto 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 are asked to encourage experimentation that does not necessarily have a known outcome and that will leadto testable questions. During this experimentation, students are encouraged to takerisks 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 and their own 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 impartedby 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 livs and environment.

Constructivists probe students' knowledge base and examine and classify their concepts to 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. There are many benefits that can be accrued from utilizing the Constructivism Theory, but 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. It enables us to better understand the cognitive level at which students process information. Students who 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 who 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 labelled units of measure. Charts, graphs, or tables can be generatedmanually 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.** A 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	others in classroom	other scientists
Record	science journals and notebooks	field notes, data sheets, computer
Measure	thermometers, lab equipment, etc.	scientific instruments
Sort/Classify	colour, size, shape, weight	classification keys, field guides
Compare	Which one is biggest? Which one went the farthest? etc.	change over time change in conditions
Analysis and Sharing	Why did this happen? Tell others…	data analysis tell others

Use of the Scientific Method

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

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

1. **PURPOSE**	The purpose is the question that is to be answered by doing the experiment. State the reason or reasons why you are doing the experiment. State the purpose as a question needing an answer.
2. **HYPOTHESIS**	A hypothesis is an educated guess on how the experiment/activity will turn out that is based on prior knowledge. Although a good hypothesis is testable, it may not be correct. Experimenting can find out whether or not the hypothesis is correct or not.
3. **MATERIALS**	All materials required for the activity/experiment need to be identified. One must be as accurate as possible in describing the materials. Be sure to give exact amounts and quantities.
4. **PROCEDURE**	The procedure describes everything that will be done during the experiment. The procedure affects the result of the experiment; therefore, care should be taken to explain the procedure as accurately as possible. State the procedure as numbered steps (It would help if they be written beginning with behavioural terms).
5. **OBSERVATION**	The observation describes exactly what happens during an experiment. Report the observations made and the data collected during the experiment. Data is 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 qualityof 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 theyare 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 togoals 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 acceptresponsibility 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 can 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 is 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 people 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 like 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 - Kinaesthetic 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 - Kinaesthetic 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. People 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, people 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

People 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 in engineering, surgery, design, architecture 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.

- **Kinaesthetic Style**
  These persons process and remember information through their bodies and their feelings. Kinaesthetic 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 wentwrong.
- **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 opportunities 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 students can express themselves in writing as indicated by the way they respond to problem-solving questions.

Science Notebooks

Students can be asked to prepare individual science notebooks that include all the observations and records generated during a module or unit. The notebooks 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 to 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 websites before they are used and recommended to students. Please note that the suggested websites listed below have been reviewed for currency and suitability for students and teachers. As the internet is constantly changing, some websites 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 websites.

3. **Teachers**
   www.teacher@hmco.com/act_archive
   Resource of ideas and activities for each month of the year 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 sscience 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 websites 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 Broadcast**
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
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 andlinks 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. **Cool Science for Curious Kids**
www.hhmi.org/coolscience/
Explorations in life science by the Howard Hughes Medical Institute.

31. **The Exploratorium**
www.exploratorium.edu
Hands-on internet museum that lets students explore science and art in interactive exhibits and games.

32. **Science Learning Network**
www.sln.org
Experiments, activities and information for students and teachers in all areas of science (Kindergarten- Junior High School).

33. Educational Web Adventure
www.eduweb.com
Exploring science, social studies and art through storytelling and interactive games.

34. **Sandlot Science**
www.sandlotscience.com
A site full of unbelievable optical illusions.

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 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, kinaesthetic, 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 practicalsuggestions 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 are the key to laboratory safety.

Safety should be the priority in preparing 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 behaviour 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 known 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 of which should be properly disposed (mercury thermometers can be identified by their silver-coloured 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 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.
- Store tools and equipment safely 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.

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 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 increases 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 anda definition in other quadrants of the box. They are encouraged to proceed in any order using the examples and characteristics to help them formulate a definition.

IV. "ALPHABOXES"

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

V. "PUT RHYTHM TO WORDS"

This strategy could be used to aid students in learning definitions of science words and assessing their knowledge of concepts taught in a lesson/unit.
This strategy provides the opportunity for participants to be creative. In small groups, participants are provided with five definitions each (e.g. "AN ECOSYSTEM IS A PLACE WHERE LIVING AND NONLIVING THINGS AFFECT EACH OTHER."). They are encouraged to read the definitions, identify key words in the definitions, identify the part of speech for selected words in the definitions – (integrating language Arts) discuss meaning and 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 used to show how science concepts can be taught (e.g. Information on "Bones Found in the Human Body" is provided. In small groups, participants use the tune of familiar nursery rhymes and songs to learn basic content on a topic.

VII. VOCABULARY WHEELS (by Jane Feber)

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

VIII. SWAT

This is a fun way to review vocabulary. Teachers are encouraged to select an area in the classroom where science words can be mounted (science wall).
At the end of each unit, the students are grouped into two teams. Each team is provided a light plastic fly swatter. At various intervals two persons (one from each team) stand with fly swatter and back to word wall. Remaining students are given the initiative to give the definition of a word on the word wall. The "GO" Sign then gives 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 coloured paper. They can use the foldables for note taking or written activities.

X. VOCABULARY CHARADE (by Madeline Marcotte)

This strategy can be used with any age group. The purpose of this technique is to review science vocabulary previously studied. The techniques utilize visual/spatial,body/kinaesthetic 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 the topic being studied and write it in the centre of the graphic. Keep in mind a few questions:

1. What is the central word, concept, research question? (e.g. Vertebrates)
2. What are the concepts? The items, descriptive words or telling questions that you can associate with the concept, topic, etc. (e.g. animals with backbones, 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. (Seewww.forpd.ucf.edu/strategies/samMap.html)

Glossary of Primary Science Curriculum Terminology

TERM	DEFINITION
Adaptation	A body part, a body covering or an action that helps an animal to survive.
Adult	The final stage in the life cycle of an organism
Air	A mixture of gases including oxygen and carbon dioxide.
Air Pollution	Pollutants in the air impact the growth and variety of plants.
Air Pressure	The force of air pressing on Earth.
Alternative Energy	Kinds of energy that do not come from fossil fuels.
Alveoli	Tiny air sacs at the end of bronchioles where the lungs and blood exchange oxygen and carbon dioxide during the process of breathing in and out.
Amphibian	A cold-blooded vertebrate that lives part of its life in water and part on land.
Angiosperm	A plant in which the sex organs are within flowers and the seeds are in a fruit.
Antioxidants	Substances that prevent corrosions (rusting).
Arachnid	A group of arthropods that include spiders, scorpions, mites and tics.
Arthropods	A group of invertebrates with jointed legs, segmented bodies and an exoskeleton.
Asteroid	A small rocky object that orbits the sun.
Astronomer	A scientist who studies objects in space.
Astronomy	The study of objects in space.
A**tmosphere**	The blanket of gases surrounding the earth or another planet.
Attract	To push something. A magnet attracts things made of iron.
Axis	An imaginary line that goes through the North Pole and the South Pole of Earth.
Backbone	The row of bones that run along the centre of the back; also called the spine or vertebrae.
Balance	A tool used to measure mass.
Balance-Diet	A diet of a variety of foods that gives the body all the nutrients it needs.
Barometer	An instrument used to measure air pressure.
Beak	The hard, curved mouth part of a bird.
Bedrock	The solid layer of rock in the Earth's surface found beneath soil, sand or gravel.
Biodegradable	The chemical breakdown of materials by a physiological environment.
Biodiversity	Variety of living things.
Birds	Warm-blooded animals that have feathers and lay eggs.
Black Mangroves	A type of mangrove that has numerous short roots that bend up from the ground called pneumatophores. Black mangrove also excrete salt, which you can see on the back of the leaves.
Bronchial tubes	Tubes that carry air into the lungs.
Bush Medicine	Medicine made from local plants
Buttonwood	A type of mangrove with button-like inflorescences.
Camouflage	A colour or shape that helps an animal blend in with its environment.
Carbon dioxide	A gas found in the air needed by plants to make food. It is also produced by the body when we breathe out.

Glossary of Primary Science Curriculum Terminology (Continued)

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.
Cephalothorax	The body part of some arthropods where the head and the thorax are in one.
Characteristics	Special quality of a group or thing that makes it different from others; trait.
Chemical property	The property of changing readily from solid or liquid to a vapor.
Chlorophyll	A chemical found in special structures in plant cells.
Chloroplasts	Food producers of the cell.
Cirrus Clouds	Thin, feathery clouds that form high in the sky.
Climate	The general weather conditions in an area in or over a long period.
Climate Change	Studies suggest most plants will have difficulty adapting to the rise in temperature and extreme drought that we will experience because of our changing climate.
Clouds	Tiny drops of condensed water that gather in the atmosphere.
Cold-blooded	An animal whose body temperature changes as the outside temperature changes.
Condensation	The changing of a gas into a liquid.
Cone	A part of a non-flowering plant that bears the seeds.
Cone-bearing Plant	A plant that bears seeds in cones instead of flowers; also called conifers.
Conservation	The wise use and careful management of natural resources.
Conserve	Protect something from harm, destruction, or overuse.
Constellation	A group of stars such as Southern Cross, Great Dipper, Little Dipper, Orion and the twelve signs of the Zodiac.
Core	The layer of the earth beneath the mantle and at the centre of the earth.
Crust	The outer layer of the earth.
Crustaceans	Invertebrates that have two body sections and two pairs of antennae.
Cumulus Clouds	Big fluffy clouds that look like puffs of cotton.
Current	A large stream of water that flows in the ocean.
Degree	A thermometer measures heat on a scale.
Density	How full area is: the concentration of people or things within an area in relation of its size.
Diaphragm	A thick sheet of muscle just below the lungs that does the work of breathing.
Distance	A measure of how far an object moves from one place to another.
Dorsal Fin	A fin found on the backs of fish, whales and dolphins.
Ear	The sense organ of hearing.
Earth	The third planet from the sun.
Ecosystem	A place where living and non-living things interact.
Energy	The power to do work. It is the ability to cause change.
Environment	The surroundings or conditions in which a person, animal or plant lives or operates
Erosion	The movement of weathered rocks and soil from one place to another place.

Glossary of Primary Science Curriculum Terminology (Continued)

Evaporation	The process by which liquid changes into gas.
Exhale	To breathe out.
Exoskeleton	The hard outer covering for the body of many invertebrate animals, mainly arthropods.
Eye	The sense organ of sight.
Feathers	The covering of birds.
Fibre	Helps foods move through the digestive system and prevents some forms of cancer.
Fin	A thin part sticking out from the body of a fish.
Fish	Cold-blooded animals that live in the water and breathes through gills.
Flower	The parts of some plants in which seeds and fruits form.
Flowering Plant	A plant that produces seeds in flowers.
Food chain	The path that energy takes as one living thing eats another.
Food web	A group of food chain that overlap.
Force	A push or pull on an object caused by another object.
Forest	A place where many trees grow.
Fossil Fuels	Natural resources that are burned for energy.
Fossils	The remains or traces of past life found in sedimentary rock.
Fresh Water	Water that has no salt
Fulcrum	A fixed point or a point that does not move on a lever.
Fur	The hairy coat of some mammals.
Gas	A state of matter that does not have a definite shape or a definite volume.
Germination	The beginning of the growth of a plant embryo.
Gills	A body part found in fish and young amphibians that takes in oxygen from the water.
Glacier	A huge sheet of ice.
Graduate Cylinder	A tall cylinder with measuring marks on the side.
Gravitational Force	A force that pulls all objects toward each other.
Greenhouse Effect	The trapping of the sun's warmth in a planet's lower atmosphere.
Habitat Loss	The removal of plants for farms, development and housing.
Habitats	The natural homes or environments of an animal, plant or other organism
Hair	Thin, thread-like strands that grow from the skin of mammals.
Hibernation	A period when an animal goes into a long deep “sleep”.
High Tide	The time at which the water level of the ocean reaches its highest point on land.
Hill	A high place that is smaller than a mountain.
Hurricane	A large tropical storm that is formed in warm water.
Iceberg	A huge chunk of ice that has broken away from a glacier and is floating in the ocean.
Illegal harvesting	Taking resources without permission to do so.

Glossary of Primary Science Curriculum Terminology (Continued)

Inclined Plane	A flat surface with one end higher than the other.
Indigenous plants	Plants that are native to a particular country or area.
Infected	Affected with a disease-causing organism.
Inhale	To breathe in.
Inner planets	The four planets closest to the sun: Mercury, Venus, Earth, and Mars.
Insects	Arthropods that have three body segment (head, thorax, and abdomen) and six legs.
Invasive Species	Alien or non-native species that are brought from other country that grow faster and outcompete the native plants.
Invertebrates	Animals without backbones.
Kinetic Energy	The energy of motion.
Lake	A body of water with land all around it.
Larva	The juvenile or young form of an insect just after hatching.
Leaf	The part of a plant where most of the plant's food is made.
Leaves	The part of a plant that takes in light and air to make food.
Length	The distance from one point to another.
Lever	A simple machine made up of a bar that turns on a fixed point.
Life cycle	The order of the stages in an animal's growth.
Ligaments	Connective tissue.
Liquid	A kind of matter that flows and takes the shape of its container.
Littering	Making an area untidy by leaving items lying around.
Living	Needing food, water and air to grow and change.
Low tide	The time at which the water level of the ocean reaches its lowest point on land.
Lungs	Organs through which air-breathing vertebrates get oxygen from air.
Magnet	An object that will attract things made from iron.
Mammals	Warm-blooded animals that are covered with hair or fur and produce milk to feed their young.
Mangroves	Another name for the wetland ecosystem. The most dominant species of plants that grow in wetlands. Four (4) kinds of mangroves are found in Bahamas and 50 kinds in the world.
Mantle	The layer of the earth just beneath the crust.
Marine Debris	Waste that litters the ocean.
Marine Protected areas	Areas of the ocean that are protected completely or have rules for how people will use the areas.
Marine Resources	Useful assets from the sea.
Mass	A measure of the amount of matter in an object.
Matter	Anything that has mass and takes up space.
Metamorphosis	The changes in form that occur from egg to adult in some animals.
Meteorologist	A scientist who studies weather.
Meteorology	The study of weather.

Glossary of Primary Science Curriculum Terminology (Continued)

Migration	Turtle's instinct on where to go.
Mimicry	An adaptation in which an animal looks like a harmful animal.
Mineral	An object that is solid, is formed in nature and has never been alive.
Mixture	Made of two or more different substances.
Mollusk	An invertebrate that has a soft body.
Moon-Earth	Closet neighbour in space.
Motion	Any change in a position of an object.
Mountain	The highest kind of land with sides that slope towards the top.
Muscles	Found throughout the body and are responsible for movement.
National Parks	A protected area on land or in the sea.
Natural resource	A useful material that is taken from the environment.
Nervous System	A control system made up of the brain, the spinal cord and the nerves.
Newton	The metric unit of force.
Non-Biodegradable	Waste that cannot be broken down by other living organisms.
Nonliving	Not needing food, water and air; not growing.
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-seed plant	A plant that does not form seeds.
Nose	The sense organ of smell.
Nutrients	Materials needed by living things for growth; materials in food that are used by the body.
Nymph	Young stage of insects that undergo incomplete metamorphosis.
Ocean	A large body of saltwater on Earth.
Ocean Pollution	Unwanted substances that are put in the ocean.
Orbit	The path that an object follows around another space object.
Outer planets	The four planets farthest from sun: Jupiter, Saturn, Uranus and Neptune.
Overexploitation	When too many trees are removed or when they are harvested in a unsustainable manner.
Overfishing	Taking too many fish.
Oxygen	A gas found in the air that is needed to support life.
Paleontologists	Scientists who study fossils.
Parasite	Mushrooms growing on live trees.
Particles	Small bits of matter.
Pathogens	A bacterium, virus or other microorganism that can cause disease.
Phases of the Moon	The different shapes the moon appears to have from Earth over about a month.
Photosynthesis	A process in which plants make their own food.
Physical change	A change of the size, shape or state of matter.
Physical Property	A property of matter that can be observed or measured.

Glossary of Primary Science Curriculum Terminology (Continued)

Planet	A large space object that moves 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	An unwanted matter that has been added to the air, water or soil.
Population	A group of the same kind of living thing that all live in one place at the same time.
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.
Precipitation	Water in the atmosphere that falls to Earth as rain, snow, hail or sleet.
Predator	An animal that feeds on other living animals.
Prey	The animals that predators eat.
Producer	A living thing that makes food by using the sun's energy.
Property	A characteristic that describes matter.
Pupa	The third stage in a complete life cycle in which an insect is inactive and enclosed in a cocoon or case.
Radiant Energy	Energy that comes from the sun.
Rain Gauge	An instrument used to measure rainfall.
Recycle	To use something over again in a new way.
Recycling	The process of converting waste into reusable material.
Red Mangroves	Red mangroves, which are broad-leaved evergreen trees which grow in wetlands. They have above-ground prop roots.
Renewable resource	Any natural resource that can be replenished naturally with the passage of time.
Repel	To push away. Poles that are the same on a magnet repel each other.
Reproduce	To produce offspring or new individuals through sexual process.
Reptiles	Cold-blooded animal with a dry body covered with scales.
Resource	A material that living things use.
Respiratory System	The transport system that brings oxygen into the body.
Revolution	The movement of a planet along its orbit around the sun.
Revolution	The movement of one object around another object.
Richter scale	A scale for measuring earthquakes which uses numbers from 1 -9.
Rock	A hard, non-living thing that comes from the earth.
Root	A part of a plant that anchors the plant in the ground.
Roots	A part of a body that hold it in the soil and take in water and nutrients.
Rotation	The spinning motion of an object.
Salt Water	Water from the sea.
Scales	The body covering of some vertebrates like fish and reptiles.
Season	The seasons are spring, summer, fall and winter.
Seed	The part of a plant from which a new plant can grow.

Glossary of Primary Science Curriculum Terminology (Continued)

Seed plant	A plant that forms new plants from seeds.
Sense organ	A body parts that tells a person about touch, sight, hearing, taste or smell.
Shelter	A place where animals can be safe.
Simple machines	A device with few or no moving parts that changes the size or direction of a force.
Skeleton	The bones that make up an animal's body.
Skin	A natural protective body covering and site of a sense of touch; "your skin is the largest organ of your body".
Solar System	A group of planets in space that moves around the sun.
Solid	A state of matter that takes up a specific amount of space and has a definite shape.
Solute	The substance that does the dissolving.
Solution	When water is added to sugar, a solution is made. It dissolves in another substance.
Solvent	The substance that is dissolved.
Source	A place where something comes from.
Speed	Distance travelled per unit of time.
Spider	Invertebrates that have two body segments (head and abdomen) and eight legs.
Sponge	Sponges are marine animals, invertebrates and filter feeders (they filter tiny particles of food from the water).
Spore	A single cell that can grow into a new organism.
Spring	The season after winter where the weather gets warmer.
Spring scale	A tool that measures forces such as weight.
Star	An object in the sky that gives off its own light.
Stem	A part of a plant that supports the leaves, flowers or cones
Stinging-Cell Animals	Have stinging cells that contain poisonous threads.
Stomata	Tiny opening in the leaves.
Storm	An unusual weather disturbance.
Stratus Clouds	Low-lying, flat clouds that look like dull, grey blankets.
Substance	Something made of only one kind of matter.
Summer	The season after spring that is usually hot. Summer has many hours of daylight.
Sun	The star closest to earth.
Sustainable Development	The careful use and management of resources. Resources can be conserved by designing eco-friendly development projects in harmony with enclosing ecosystems, properly disposing of waste, engaging in practices such as reducing, reusing, composing, turning of appliances when not in use and using alternative forms of energy that do not required burning of fossil fuels.
Temperature	A measure of how hot or cold something is.
Tentacles	A tentacle is an arm-like part that contains the stinging cells.
Thermometer	A tool to measure temperature (heat on a scale).
Thunderstorm	A small local weather disturbance which can be identified by tall clouds, heavy rain and thunder and lightning.
Tides	The alternate rise and fall of the sea level on a daily basis.

Glossary of Primary Science Curriculum Terminology (Continued)

Tongue	A sense organ of taste.
Tornado	A small funnel of quickly spinning air.
Trachea	A soft tube in the respiratory system with rubbery rings around it.
Tree	A figure that branches from a single root.
Troposphere	The layer of the atmosphere closest to Earth.
Vacuole	Sacs in the cytoplasm of a plant cell.
Valley	A low land between mountain or hill.
Vector	An organism that spreads diseases or parasites from one animal or plant to another.
Vertebrates	Animals with backbones.
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.
Volume	The amount of space that matter takes up.
Water Cycle	The movement of water from Earth's surface into the air and back to the surface again.
Water Vapor	Water in the form of a gas.
Waves	The alternate rising and falling of water.
Weather	The condition of the air at a certain time and place.
Weather Forecaster	People who predict future weather.
Weather Instrument	A scientific tool used to measure the elements of weather.
Weathering	The changing of rocks near earth's surface through the actions of natural elements such as a wind, rain, heat, wave action, ice and snow.
White Mangroves	A type of mangrove that has two nodes.
Wind	Moving air.
Wind Vane	A tool used to show the direction in which the wind is moving.
Wings	The part of an animal used for flying.
Winter	The season after fall that is usually cold. Winter has the fewest hours of daylight.
Work	What is done when a force moves on an object.

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