

# Primary School Science Curriculum

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## Undergirding Principles and Rationale

Science is a body of knowledge about our world, including the theories, facts, principles, and methods used to investigate our world. This body of knowledge grows, shifts, and changes as scientists inquire and discover new things in order to better understand the universe, its parts and its processes. The knowledge, skills and attitudes developed through the practice of science equip students to be lifelong partners in the development of their multifaceted and constantly changing physical environment. Engagement in practical and meaningful science activities will continue to be one of humankind's finest tools in helping empower individuals and communities to meet the challenges of inevitable changes. Science informs us and will help Belize produce educated citizens who have the knowledge skills and attitudes to lead us into the future in a sustainable way.

Science education is imperative. It enables children to recognize the interdependency of plants, animals and the physical environment; develop critical thinking skills through research and experiments; promotes divergent thinking, leading to invention; and, allows children to transfer knowledge and skills from the classroom to their own life.

## What Science can do for Children

A science program of study has an important role to play in the development of children's knowledge, skills and abilities. Learning in science can help to:

- build confidence in children's ability to ask questions and explore or solve problems;
- foster team building through group tasks;
- provide skills to obtain or extract information, evaluate, use and share information;
- enhance reasoning by exploring simple to complex problems and issues;
- embrace respect for multiple perspectives and ways of knowing;
- promote the building of expertise in science as a broad discipline;
- create an awareness of global citizenship, to understand that we are all connected and our actions have impact, both positive and negative, on local, regional and global scales; and
- cultivate a passion for lifelong learning.

## Goals of the Science Program

The primary science curriculum will:

- encourage children to maintain and expand their sense of wonder and excitement for the natural world;
- enable children to use their knowledge, skills and abilities learned in the science classroom in their daily life;
- enable children to participate in critical discussions, as it pertains to their life;
- enable and encourage children to participate in actions that can make positive change in the world; and
- provide a scientifically literate foundation for future learning.

## Building Science Understanding

Building understanding in science is a process. It begins with assessing students' prior knowledge, and using this information, learning experiences are designed and facilitated in interactive and meaningful ways to explore the scientific concepts and skills. Progressing through the science curriculum, children will build on their prior knowledge, moving from general to more specific concepts, and learn how to determine what skills are needed for certain situations and how to apply those skills in real life.

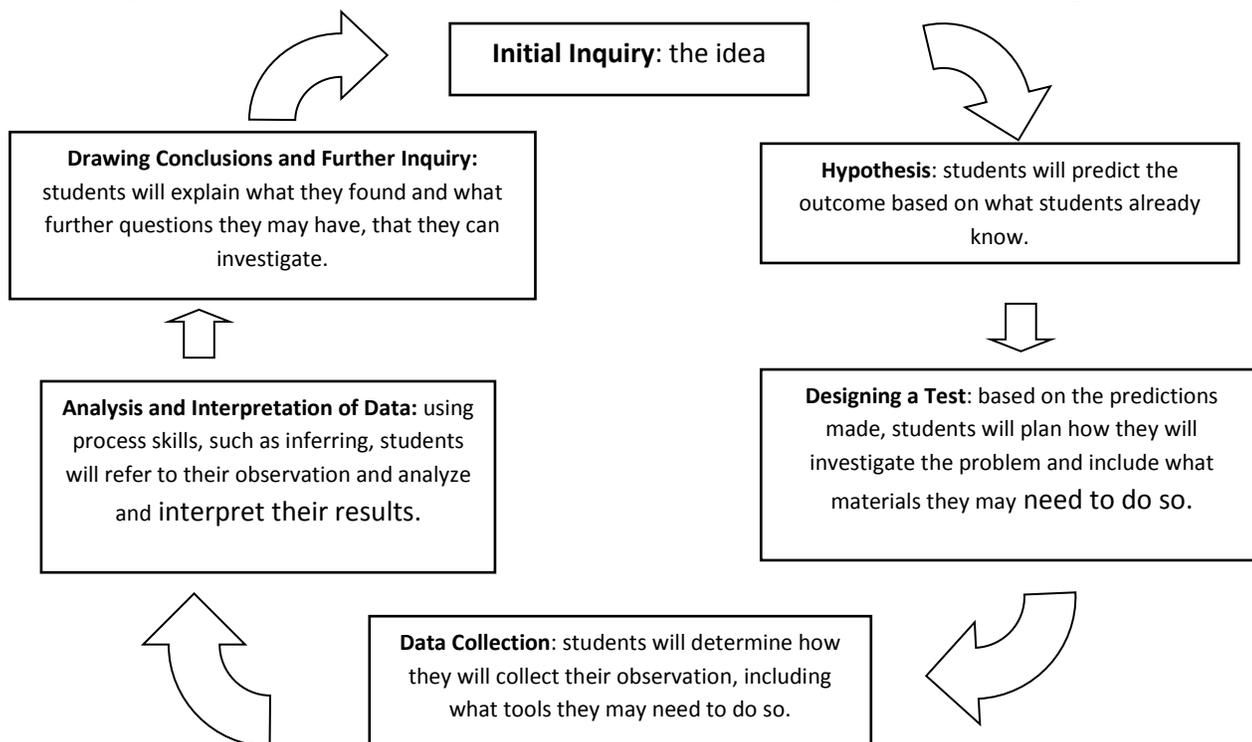
Learning in science, the actual instruction by the teacher, should be facilitated through relevant inquiry-based and interactive techniques, where children are actively engaged in the learning process both inside and outside the classroom. Through this experiential form of learning, children will not only enhance their understanding of concepts and application of skills, but also develop attitudes around science that are more positive. Overall, a solid foundation of knowledge and skills, progressing to more specific understanding and application, can help ensure a robust understanding of science now and into the future.

## Inquiry and Problem Solving

Children often bring their own natural curiosity about the world into the classroom; they are intrigued by many things and want to explore. This can be anything from understanding the mechanics of an insect crawling across the floor, to investigating the workings of a complex mechanical system. Children are keen to investigate and discover the answers to “why and how?”

A teacher's role is to help facilitate this natural curiosity and investigative passion. Teachers can help children develop their ideas into questions and problems, find ways to test their ideas, evaluate and reflect on their findings, and propose answer to why and how, as well as questions for future investigations.

Thus, a science program of study that adopts this philosophy can help students by focusing on asking questions and discovering answers; the tool in which to use to facilitate discovering is the scientific inquiry model.



Each step of the scientific inquiry process can help children organize their thoughts, observations and relevant scientific information. This can help guide students to posing new questions and investigating new ideas.

## Suggested Teaching Strategies for Inquiry

Teachers can do the following, to help guide students through the inquiry process.

- Propose questions to explore and investigate
- State a hypothesis and prediction
- Propose a plan to carry out an investigation
- Gather information from a variety of sources, using appropriate vocabulary and written and oral techniques
- Assist pupils to make, record and analyze observations
- Communicate with peers and suggest further investigations, build on ideas of others

## Skills and abilities that children will develop include:

- *Formulating Hypotheses (Hypothesizing)*: Making educated guesses based on evidence that can be tested through experimentation.
- *Predicting*: a component of hypothesizing. Can include forming an idea of an expected result - not a guess - but a belief of what will occur based upon present knowledge and understanding, observations and inferences. A prediction should be followed by a written or oral explanation to clarify ideas and reveal any misconceptions or missing information.
- *Experimenting (making a Plan)*: Designing one's own experiment to test a hypothesis using procedures to obtain reliable data. All basic and integrated skills to formulate a problem, collect data, and pose a solution are used. Doing a teacher-orchestrated science activity is NOT experimenting. Student demonstrates understanding and application of scientific method through inquiry, research and self-design of experiment to test a hypothesis.
- *Inferring*: Interpreting or explaining observations. More than one inference may be presented to explain an observation.
- *Observing*: Using the 5 senses (see, hear, touch, smell, taste) to find out about objects and events, their characteristics, properties, differences, similarities, and changes. Observations are recorded.
- *Collecting Data*: Gathering and recording information about observations and measurements in a systematic way.
- *Classifying*: a component of analyzing and interpreting data. Can include grouping or ordering objects or events according to similarities or differences in properties. Lists, tables, or charts are generated.
- *Measuring*: a component of collecting data. Can include comparing an unknown quantity with a known (metric units, time, student-generated frames of reference) - Observations are quantified using proper measuring devices and techniques. Measurements are to be recorded in an orderly and systematic fashion with labeled units of measure. Charts, graphs, or tables can be generated manually or with computer software.
- *Analyzing and Interpreting Data*: Organizing, analyzing, and synthesizing data using tables, graphs, and diagrams to locate patterns that lead to the construction of inferences, predictions, or hypotheses.
- *Evaluating Procedures*: a component of inferring. Can include describing what worked and what did not, and why; students will identify changes that could be made to improve the investigation and the reasons for change.
- *Communicating*: Using the written and spoken word, graphs, demonstrations, drawings, diagrams, or tables to transmit information and ideas to others. To reflect the true nature of science, ideas must be shared.

## Inquiry Skill Development

Students will work through the following skills development as they progress through the science program of study. Achievements of students, of each skill, will vary by age and grade, as well as depend on students' abilities and background. This template is a guide for teachers to use so that they can incorporate these skills into their lesson plans, as an engaging, interactive way to encourage learning.

Initiating and Planning	Students will	Students will	Students will	Students will
<b>Asking Questions and Exploring</b>	Ask questions that demonstrate curiosity about the natural world	Ask questions that can be answered through exploration; choose an investigation with guidance	Ask questions that can be answered through exploration; investigate specific questions	Formulate specific testable questions to investigate
<b>Making a Plan</b>	Discuss steps of a prepared procedure to find answers	With guidance, create a procedure to find answers to investigations; recognize fair tests	Using various methods, create a plan to find answers to questions; build fair tests using plans	Plan an investigation to a question independently and use fair tests
<b>Making a Prediction or Hypothesis</b>	"guess" and estimate possible outcomes of procedures	With guidance make predictions about possible outcomes based on experience and/or evidence	Predict and/or hypothesize the results of an investigation from personal experience and/or other evidence	Predict the results of investigation based on evidence; hypothesize how variables are related using evidence

Performing and Recording	Students will	Students will	Students will	Students will
<b>Carrying out a Plan</b>	Safely use selected tools and materials to explore investigations	Select and use safely, tools and materials to follow the steps in a procedure and/or plan	Select and use safely, tools and materials to follow the steps in a procedure and/or plan	Select and safely use tools and materials to follow a plan and modify where necessary
<b>Making and Recording Observations</b>	Observe and record characteristics of objects and events (e.g. verbally, illustratively, written)	Observe and record multiple characteristics of objects and events with various recording materials	Choosing and using appropriate recording devices, make and record descriptive observations	Using a variety of recording devices and methods, make and record descriptive, qualitative and quantitative observations

<b>Analyzing and Interpreting</b>	<b>Students will</b>	<b>Students will</b>	<b>Students will</b>	<b>Students will</b>
<b>Analyzing Data</b>	Discuss data, ask questions of data and be open to other ideas	With guidance, organize data using charts, graphs, etc and identify patterns in data	Organize data using a variety of tools and graphic organizers, and identify patterns of similarity and differences in data; summarize data	Select and rationalize why tools and/or graphic organizers have been used to organize data; identify patterns in the data and suggest reasons for patterns; provide explanations for differences and summarize data
<b>Inferring Answers</b>	Suggest possible answers to questions	Infer an answer to the investigation based on observation and experiences	Suggest multiple inferences to the investigation based on observation, experience and evidence	Suggest inferences and/or pose possible conclusions based on observation, experience and evidence
<b>Evaluating Procedures</b>	Describe what occurred, what worked and what did not work	Evaluate procedures for carrying out a plan and identify changes that could improve the procedure as well as provide reasoning for changes	With guidance, evaluate investigation processes and identify changes that could be made supported with rationalization for changes	Evaluate the investigation process used and explain changes that are rationale and well supported
<b>Identifying Application</b>	Identify learning and the relationship of experiences to prior knowledge	Identify how new learning experiences can be applied to other situations and identifying new questions that arose from the investigation	Identify how new experiences can be applied in multiple, diverse contexts and identify new questions that can use newly learned skills in investigation	Apply new learning and skills to new and different context through investigations

## Enduring Understanding in Science

Students need a framework which they can build their science knowledge, skills and abilities. A framework for science learning can be built from the big ideas (general concepts), which help students connect and organize their understanding of their experiences and make sense of the world around them. This enduring understanding is critical because it ensures students retention of knowledge, skills and abilities, even if they have forgotten specific details of what they have learned. This will be important for future application, in the real world (e.g. careers).

### Fundamental Concepts in Science

Below are the big ideas, or concepts, woven throughout the science curriculum that are fundamental to the strand and unit of study.

- **Similarity and Diversity:** these concepts provide the tools for organizing our experience in the world. Students learn to recognize the characteristics that can be used to make distinctions between materials, objects and events.
- **Systems and Interactions:** an important aspect of understanding and interpreting the world is the ability to think about whole systems as being made up of many different parts. The parts of the system interact with each other, and make up the whole. A change in part of a system can have an impact on the entire system.
- **Structures and Functions:** structure refers to the way in which things are put together. Students explore ways that the function or use of an object is related to the form that it takes.
- **Stewardship and Sustainability:** The concepts of change and continuity underlie our understanding focus on the need to use and care for the natural world. Responsible stewardship ensures future generations will enjoy the natural world.

### Connections across other Subject Areas:

Thinking about how the science program of study will connect with other subject areas (e.g. mathematics, social studies), through the concepts learned, as well as skills and abilities, will be important for teachers to think about when planning and facilitating learning. Making connections to other curriculum learning outcomes is promoted as an integral part of teacher planning. Lessons that are interrelated to other learning make it more authentic for the learner. Making connections through planning is at the heart of the teacher's Integrated Unit Plans. Some connections will include practicing skills learned in mathematics, in a science investigation, or thinking about how our actions will impact the environment and what we can do about it, locally, regionally, internationally and at different time scales.

## Outdoor Instruction in Science: Exploring Where we live

It is important to access and use the natural world to teach the science concepts and develop students' knowledge and skills. Outdoor spaces immediately outside the classroom, as well as in the local area around your school and at a distance, hold tremendous opportunities for children to investigate. Think of outdoor spaces as a resource to help facilitate learning through experience and hands-on inquiry. In the absence of making the child meet the outside world, teachers should try at best to bring or capture it within the classroom. This can be achieved through samples, videos, photographs and other relevant media material for instruction. Knowing where we live is important in developing an understanding of the human role and connection....

## Assessment Strategies in Science

In order for teachers to understand how students are progressing through the science program, teachers need to use appropriate assessment strategies, particularly those appropriate for inquiry-based learning. Assessment is information-gathering that encompasses all activities where students are asked to demonstrate what they know, understand and can perform. Assessment strategies should combine techniques to evaluate students' learning of concepts and process skills through cognitive, manipulative and procedural dimensions. Assessment uses information gathered to evaluate progress of skill attainment and comprehension, as well as identify gaps in student learning where more time may need to be spent. Through assessment, teachers will report on students' successes and challenges, as well as use information from assessment to modify their instructional strategies or instructional objectives to continue to meet students needs.

- **Formative Assessment:** is continuous assessment that is used to monitor students' ongoing progress to help students learn and help teachers reflect on/modify their instructional strategies.
- **Summative assessment:** provides a summary of each student's learning, usually in the form of a unit-ending test, showing thinking and understanding has shifted and the nature of final comprehension.
- **Diagnostic assessment:** gathers in-depth information about a specific area of understanding to determine what students actually know and what they can do with that knowledge.

Assessment needs to be fair and authentic. Fair and authentic assessment is based on what the teacher has taught and measures achievements accurately. When developing fair and authentic assessment, keep the following in mind:

- the needs of students, including special needs (inclusiveness and modifications);
- avoid gender, racial, political, or religious bias;
- be sensitive to contexts in which students live (relevant to their lives);
- maintain alignment with curriculum outcomes;
- promote self-assessment to encourage personal responsibility in learning;
- allow students to apply knowledge and skills in situations in and out the classroom;
- needs to be manageable for students;
- needs to include information that students are familiar with, so they can understand how to answer questions or complete tasks; and
- reliability in results, to accurately demonstrate students learning.

**Traditional assessment** such as: multiple choice tests, matching tests, true-false tests and short answers are useful. On the other hand, **alternative forms of assessment** are also advocated. However, it is of paramount importance for the teacher to be *impartial* when considering the use of alternative assessments. *Subjectivity* is an outstanding feature of alternative assessment, therefore, *ethical issues* like teacher's misuse of judgement and favouritism surface. To lessen accusations of partiality, the teacher should ensure that students fully understand what they are expected to do and how they will be assessed. In the event of group tasks, each member should be fully aware of his/her contribution to the group.

The benefits of alternative forms of assessments are many; the tasks assigned are usually motivating to students. It also promotes interaction and collaboration among peers which allow pupils to share their learning with others and build self esteem.

Alternative forms of assessment promote higher level thinking and problem solving skills, students will demonstrate knowledge and skills through performance of tasks. Students' performance is measured using devices such as *checklists, rating scales, or rubrics*(the quality, criteria and standards by which a product or performance will be developed and/or assessed).

***Projects which may be assigned include:***

- |                   |          |                    |             |
|-------------------|----------|--------------------|-------------|
| Brochures         | graphs   | diagrams           | models      |
| cartoons          | displays | graphic organizers | photographs |
| collages          | drawings | journals           | posters     |
| crossword puzzles | games    | mobiles            | scrapbooks  |
| charts            | research |                    |             |

**Performances**

- |                                       |                            |                                    |
|---------------------------------------|----------------------------|------------------------------------|
| commercials/ads                       | experiments/investigations | reports (news reports, interviews) |
| role plays                            | debates                    | field trips                        |
| presentations (impromptu or prepared) |                            |                                    |

**Note:** There are credible websites which teachers may access to download worksheets and rubrics, it is advisable to alter the materials to suit class.

## **Examples of Skills in Science:**

- Observing, using senses and inferring based on observations
- Communicating about ideas, expressing prior knowledge
- Explaining observations using evidence and demonstrating understanding that all explanations are tentative and findings can change
- Predicting the outcomes of investigations by gathering some evidence and explaining how evidence has been used
- Experimenting through posing questions, planning for investigations, identifying important variables involved in fair tests, and conducting fair tests with single variables manipulated
- Using knowledge of planning and building (using manipulative and procedural skills), to design, evaluate and work out manufacturing ideas prior to building
- Implementing a proposed solution by choosing tools and materials appropriately to achieve outcomes
- Evaluating a product or design by identifying criteria positive and/or negative attributes
- Understanding the issues in order to locate relevant information and assess the reliability of information sources
- Analyzing and synthesizing information to compare and contrast different points of view
- Displaying open-mindedness and respect for others through individual and group collaboration

## **Examples of Attitudes in Science:**

- Showing confidence in technological use and decision-making abilities by demonstrating what is appropriate and for what purpose
- Displaying inventiveness by using materials and equipment in original and constructive ways
- Developing conclusions and posing new questions and ideas

Science has many opportunities for both teachers and pupils to learn in a fun filled environment. The shift from note taking and 'chalk and talk' must be visible in science instruction. Therefore it is imperative that teachers take charge of the learning process by employing instructional strategies which will yield meaningful, challenging and interactive lessons. All teachers must embrace the change in science instruction; teach our children through activity based lessons. Science is alive through active engagement!

## Belize Science Curriculum: Scope and Sequence

Class Level	Living Things	Healthy Environments	The Human Body	Matter and Energy	Structures and Mechanisms	Earth and Space Science
Inf. 1	People, Plants and Animals	Keeping Around us Clean and Safe	Parts of the Body and Senses			
Inf. 2	Plant and Animal Growth	Keeping Safe in our Environment	Healthy Food Choices			
Std. 1	Plant and Animal Habitats	Keeping our Environment Clean	Healthy Bodies			
Std. 2	Animal Growth and Development	Waste and Our World	Body Parts Organs and Life Processes	Hearing and Sound	Forces and Motion	Rocks and Soils
Std. 3	Plant Growth and Development	Discover an Ecosystem	Eating for Health	Heat	Simple Machines	Landforms and Changes
Std. 4	Animal Diversity	Water for Life	Staying Healthy	Pure Substances and Mixtures	Floaters and Flyers	Space Science
Std. 5	Plant Diversity	Interactions in Ecosystems	Cells and Systems	Light and Optics	Mechanical and Electrical Systems	Weather and Climate
Std. 6	Heredity and Reproduction	Changes to Ecosystems	Human Reproduction	Energy and Conversions	Energy Resources	Aquatic Ecosystems

# Living Things

This strand moves through the basic differences between people, plants and pets (animals), where students will develop an understanding of the basic needs and growth cycles of people, plants and pets (animals) through to developing an understanding of habitat needs of locally found animals and plants. Additionally, students comprehend the diversity of plant and animal life and how heredity and reproduction can influence biodiversity in Belize.

Throughout this strand, students will investigate, with guidance and on their own, the nature of things, demonstrating an understanding of the processes in growth, development, habitat needs and selection, and so on. Students will also identify patterns and order in the natural world and, with guidance and on their own, record their observations, using pictures, words and illustrations as well as make predictions and evaluate, based on observations. Most of the learning outcomes in this section are interconnected with aspects of environmental education as well as link to social studies.

Throughout this strand, students will acquire, develop and apply:

- curiosity and inventiveness;
- confidence in personal ability to explore materials and learn by direct study;
- team work skills and abilities;
- receptiveness to other ideas;
- a sense of responsibility for actions, and
- respect for living things, the environment, and commitment to their stewardship.

## Suggested Teaching Strategies

- Ask questions that lead to exploration and investigation
- Construct ideas by making predictions and hypotheses
- Identify one or more possible answers to questions asked by themselves and others
- Manipulate materials and make observations that are relevant to questions asked
- Carry out simple procedures that have been developed by others and by the students themselves
- Identify materials that will be used, as well as why they were chosen and how they were used
- Make inferences and describe observation, using illustrations, written and oral language
- Evaluate, describe and explain results
- Use, with guidance and individually, print and other sources of information provided. Sources may include library, classroom, community and computer-based resources
- Communicate results of investigations and activities, using illustrations, written and oral language

# Living Things

Students will develop a basic understanding of the differences between people, plants and animals, by identifying common characteristics of each group. Students will also develop a basic understanding of the needs of people, plants and animals.

**Fundamental Concepts:** Similarity and Diversity, Structures and Functions

**Enduring Science Understanding:** The differences between people, local plants and local animals (e.g. pets, common trees and plants) at a basic level, based on basic physical characteristics and the basic needs of people, local plants and local animals.

**Standard: S1: Students will identify the differences and similarities between people, local plants and local animals, based on their characteristics and basic needs.**

**Focusing Questions:**

What plants and animals are found locally?

What are similarities and differences between people, plants and animals?

What are the basic needs of people, plants and animals?

What are similarities and differences between the needs of people, plants and animals?

**Specific Outcomes:**

1.1 Students will be able recognize and identify a range of common animals and plants (living things). *(use terms such as fly, goldfish, tadpole, fruit tree, flowering tree - seen at home, on the way to school, in and around school or on a school visit)*

1.2 Students will be able to observe and identify similarities and differences between people, plant and animal species in their immediate surroundings. *(Observe using the 5 senses -see, hear, touch, smell, taste – as appropriate)*

1.3 Students will be able to classify the similarities and differences between people, plants and animals based on the observations made in 1.2. *(e.g., in charts record and sort living things, in terms of features such the similarities and differences between what was **seen** - as colour of coat, or size of leaf, **heard**- sounds they make, **smelt** - odor, **felt**- texture of leaf.)*

1.4 Students will be able to make observations and identify the basic needs of people, plants and animals. *(e.g. food, water, air, protection, love)*

1.5. Students will be able to discuss how the needs of people, plants and animals are alike and how they are different.

**Communicate understanding:**

Students will use their communication skills throughout this unit to convey their understanding of similarities and differences between people, plants and animals to different audiences and for a variety of purposes. *(e.g., using pictures / drawings to group plants and animals based on similarities or differences between them)*

# Living Things

Students will distinguish between living and non-living things, develop a basic understanding of how living things grow, and identify what living things need for growth. The use of their experiences with pets and plants around them are used to explore, recall and make connections with how living things grow.

**Fundamental concepts:** similarity and diversity, systems and interactions

**Enduring Science Understanding:** There are similarities and differences between living and non-living things. Living things are made of cells. Living things have growth needs.

**Standard: S2: Students will differentiate between living and non-living things, and develop an understanding of how and what makes living things grow.**

**Focusing Questions:**

How are living things different from non-living things?

How do living things grow physically?

What do living things need in order to grow?

**Specific Outcomes:**

2.1 Students will be able to differentiate between living and non-living things. *(i.e., identify the visible characteristics of living things vs visible characteristics of non-living things; growth, feeding, movement and reproduction)*

2.2 Students will be able to name cells as the building blocks that make up all living things. *(i.e., know that living things are made of cells but not be responsible for details of cell structure or functions)*

2.3 Students will be able to describe physical growth of living things in terms of the increase in the number of cells that make up their bodies. *(i.e., the more cells there are the bigger the organism; puppy → dog, seedling → tree, thin person → fat person; monitor growth by measuring height, weight of persons and other animals and plants)*

2.4 Students will be able to identify needs for physical growth of local plant and animal species. *(e.g., use inquiry approach to determine plants need for: water, sunlight; use “what if” situations for animal needs: food, water, air, warmth, cold)*

**Communicate understanding:**

Students will use their communication skills to convey their understanding of plant and animal physical growth to different audiences, and for a variety of purposes. *(e.g. tables and pictograph, drawings, use leggo or connecting blocks for models to communicate to peers, carry out plant investigations at home for family members)*

# Living Things

Students will develop their understanding of the habitat that plants and animals are found in, throughout different ecosystems in Belize (aerial, aquatic, terrestrial, fossorial). Students will be able to identify the basic habitat needs of plants and animals in the ecosystem which they are found. Students will make comparisons between the habitat of plants and animals.

**Connections within Science:** Infant 1 and 2 Living Things

**Fundamental Concepts:** Similarity and diversity, systems and interactions.

**Enduring Science Understanding:** There are similarities and differences between various habitats found in Belize. There are specific plants and animals that use these habitats. Which habitats are used and needed by both plants and animals/people.

**StandardS3:** Students will compare and describe the different habitats found in Belize and identify what type of plants and animals are found in these habitats, and explain how the characteristics of living things are supported by the habitats.

### Focusing Questions:

What are the different habitats found locally?

Where would you find animals and plants? (habitats)

What types of animals and plants would you find in a particular habitat?

What are the seven characteristics of all living things?

Why would certain plants and animals be found in a particular habitat?

### Communicate understanding:

### Specific Outcomes:

3.1 Students will be able to describe the different types of habitats found in Belize. (e.g., *aerial, arboreal, aquatic, terrestrial, fossorial*)

3.2 Students will be able make comparisons between the different types of habitats found in Belize. (e.g., *aerial, arboreal, aquatic, terrestrial, fossorial*)

3.3 Students will be able to make observations of a habitat in a local ecosystem and identify the living organisms occupying it. ( *Use inquiry approach using a variety of resources such as the school yard, gardens, nearby parks and open areas, books, videos, websites*)

3.4. Students will be able to name the characteristics of all living things and cite examples of how these are shown in local organisms. (*i.e., how plants and animals grow, reproduce, respire, move and respond to stimuli, excrete, circulate fluids, obtain food*)

3.5 Students will be able to explain how the habitat observed in 3.3 supports the characteristics of the living things found there. (*i.e., collect evidence and suggest reasons why the various plants and animals live in the habitat as related to their living characteristics*)

Students will use their communication skills throughout this unit to convey their understanding of plant and animal habitats to different audiences and for a variety of purposes. (*e.g., make posters, drawings of habitats, cite examples, 3-D models of habitats, set up a terrarium or aquarium, ant or insect farms*)

# Living Things

Standard

2

## Animal Growth and Development

Students will understand the growth cycles of different local animal species, and how their habitat supports their physical growth and life cycles, and how different stages may require different habitats. Students will compare and contrast this understanding to what they know about human growth and life cycles.

**Connections within Science:** Infant 2 and Std.1

**Fundamental Concepts:** Similarity and diversity, systems and interactions

**Enduring Science Understanding:** The physical growth cycles of different local animal species. Animals need different habitats during their growth cycle. Compare the growth cycles of humans and other animals.

**StandardS4:** Students will understand the physical growth cycles of different local animal species, as well as understand that some animals require different habitats during their growth cycle and how human growth cycle is similar to or different from that of other animals.

### Focusing Questions:

Can you describe a typical animal growth cycle?

What are the growth stages of different animals?

How is the human's growth cycle different or similar to that of other animals?

### Communicate understanding:

### Specific Outcomes:

- 4.1 Students will be able to observe the growth cycle of specific animals in order to identify the growth stages. (*e.g., students will incubate eggs – lizard, chicken, butterfly, mosquito, fish – in order to monitor their growth*)
- 4.2 Students will be able to describe typical physical growth cycles of animals. (*i.e., egg > immature form > mature organism; describe using line drawing and labeling as an example, measure height, weight and age of persons and other animals*)
- 4.3 Students will be able to identify the habitats needed to support different stages in the growth cycle of a variety of local animals. (*e.g., mosquitos need water in the egg and larval stages and aerial in the adult stage; lobsters need mangroves for egg and larval stage and coral reefs for adult stage*)
- 4.4 Students will be able to compare the life cycle of human beings with that of a variety of local animal species. (*i.e., compare in terms of growth stages and habitats required, to that of animals*)

Students will use their communication skills throughout this unit to convey their understanding animal growth and development to different audiences and for a variety of purposes. (*e.g., Create posters, drawings, jingles, charts or graphs, role plays or drama presentations.*)

# Living Things

Standard

3

## Plant Growth and Development

Students will initially distinguish between flowering and non-flowering plants. For flowering plants, students will be able to describe the physical growth cycle and development. Students will also be able to determine, through observations and measurement, the growth of local flowering plant species.

**Connections within Science:** Standard 2: Plant and Animal Habitats

**Fundamental Concepts:** Similarity and diversity, systems and interactions.

**Enduring Science Understanding:** Plants can be classified as flowering or non-flowering. Local flowering plant species have a typical cycle of physical growth and development.

**Standard: S5:** Students will distinguish between flowering and non-flowering plants and describe the physical growth and development cycles of local flowering plant species by observing and measuring growth at different stages of development.

### Focusing Questions:

What are the main parts of a flowering plant?

What is the growth cycle of flowering plants?

How does a seed grow?

How can we measure plant growth?

### Communicate understanding:

### Specific Outcomes:

5.1 Students will be able to distinguish between flowering and non-flowering plant species found locally.

5.2 Students will be able to describe typical physical growth cycles of flowering plants. (*i.e., seed > immature form > mature organism; describe using line drawing and labeling*)

5.3 Students will be able to observe the growth cycle of specific plants in order to identify the growth stages and the main parts of flowering plants: root, stem, leaf and flower. (*i.e., students will plant seeds in order to monitor their growth*)

5.4 Students will be able to use appropriate measures for plant growth at different stages in the growth cycle of a variety of local flowering plants. (*e.g., seedling - length of roots, stems and leaves; young plant - number of leaves; mature plant - height of plant over time (height of tree by scale drawing), number of growth rings, circumference of trunk*)

Students will use their communication skills to convey their understanding of plant growth and development to different audiences and for a variety of purposes.

Students will learn to use and construct simple dichotomous keys as tools for classifying organisms. Students will identify and explain what migration is, what adaptation is, and how migration, adaptation and natural changes to an ecosystem can affect the diversity of animal species. Lastly, students will identify and explain how various human activities can impact, either positively or negatively, the diversity of local animal species and suggest possible solutions to mitigate the impact.

**Connections within Science:** Standard 2 and 3.

**Fundamental Concepts:** Similarity and diversity, systems and interactions, stewardship and sustainability

**Enduring Science Understanding:** Adaptations, migrations, natural changes in ecosystems, and human activities impact the diversity of animals found in an ecosystem. The similarities among animals can be used as the basis for classification.

**StandardS6:** Students will understand the diversity of different local animal species and how adaptations, migrations, natural changes in ecosystems, and human activities contribute to diversity. Students will learn to construct and use dichotomous keys.

**Focusing Questions:**

What is animal diversity?

What are different animal adaptations for survival?

What is a dichotomous key?

What is migration and why do animals migrate?

**Specific Outcomes:**

6.1 Students will be able to observe the diversity of animals in different ecosystems of Belize. (*i.e., typical animals found in aerial, arboreal, aquatic, terrestrial and fossorial ecosystems of Belize.*)

6.2 Students will be able to discuss adaptations as physical differences in local animal species that enable them to survive in their ecosystem. (*e.g., shapes and sizes of birds' beaks suited for the food they eat, eye sizes of animals active during the day versus those at night, animal coat color to blend into their environment*).

6.3 Students will be able to construct and use simple dichotomous keys to classify different local animal species. (*i.e., make and use dichotomous keys to classify animals based on observable physical characteristic such as number of body parts, colour, size, shape, smell, feel; reference can be made to the Linnaean classification system as dichotomous keys widely used by scientists*)

6.4 Students will be able to discuss migration as the movement of animals from one ecosystem to another, how this contributes to the diversity of animals found in local ecosystems and why it occurs. (*e.g., migration of birds, whales, turtles, crabs,*

How do natural changes impact animal diversity in an ecosystem?

How do humans' activities affect animal diversity?

How can we minimize human impact on animal diversity?

**Communicate understanding:**

*lobster, locust to meet their specific needs at different points in their growth cycle)*

6.5 Students will be able to discuss different natural changes to the ecosystem that can affect the diversity of local animal species. *(e.g., how do hurricanes, flooding, drought change the composition and distribution of animals in an ecosystem)*

6.6 Students will be able to discuss how various human activities can impact animal diversity in Belize and suggest possible solutions to mitigate the impact. *(e.g., unsustainable commercial use of wild animals, importation of diseased animals and foreign species, selective breeding of animals)*

Students will use their communication skills throughout this unit to convey their understanding of issues/factors related to animal diversity to different audiences and for a variety of purposes. *(e.g. display projects, make a booklet, letter to newspaper)*

Students will identify and explain what adaptation is, and how adaptation and natural changes to an ecosystem can affect the diversity of plant species. Students will identify and explain how various human activities can impact, either positively or negatively, the diversity of local plant species and suggest possible solutions to mitigate the impact.

**Connections within Science:** Standard 2, 3, 4

**Fundamental Concepts:** similarities and diversity, systems and interactions, stewardship and sustainability.

**Enduring Science Understanding:** Adaptations, natural changes in ecosystems, and human activities impact the diversity of plants found in an ecosystem.

**Standard:7.0 Students will understand the diversity of different local plant species and how adaptations, natural changes in ecosystems, and human activities contribute to diversity.**

**Focusing Questions:**

What is plant diversity?

What are different plant adaptations for survival?

How do natural changes impact plant diversity in an ecosystem?

How do humans' activities affect plant diversity?

How can we minimize human impact on plant diversity?

**Communicate understanding:**

**Specific Outcomes:**

7.1 Students will be able to observe plant diversity (flowering and non-flowering), in different ecosystems of Belize. (*i.e., typical plants found in aerial, arboreal, aquatic, and terrestrial ecosystems of Belize.*)

7.2 Students will be able to discuss adaptations as physical differences in local plant species that enable them to survive in their ecosystem. (*e.g., shapes, sizes and colour of leaves, shapes and size of seeds for dispersal, presence of thorns and prickles, fleshy, hairy or waxy surfaces*).

7.3 Students will be able to discuss different natural changes to the ecosystem that can affect the diversity of local plant species. (*e.g., how do hurricanes, flooding, drought change the composition and distribution of plants in an ecosystem*)

7.4 Students will be able to discuss how various human activities can impact plant diversity in Belize and suggest possible solutions to mitigate the impact. (*e.g., unsustainable commercial use of plants, importation of diseased plant material and foreign species, hybridization of plants*)

Students will use their communication skills throughout this unit to convey their understanding of plant diversity to different audiences and for a variety of purposes

Students will develop their understanding of heredity and reproduction of different, local plant and animal species throughout Belize. Students will understand the differences and similarities in reproduction of flowering versus non-flowering plants, and internal versus external reproduction in animals. Students will also develop and enhance their understanding of the concept of genes and genetic diversity, and how this can help create or maintain a viable population of breeding species, both plant or animal. Further, students will use this knowledge to compare and contrast how genes and genetic diversity can be used to help explain the differences and similarities in people. Lastly, students will use this knowledge to identify and explain how human activities can affect the genetic diversity of various local plant and/or animal species.

**Connections within Science:** Standard 4 and 5

**Fundamental Concepts:** similarities and diversity, systems and interactions, sustainability and stewardship.

**Enduring Science Understanding:** Heredity and reproduction contribute to diversity and survival of life on Earth.

**Standard: S8.0 Students will understand how heredity and reproduction in different local plants and animals contribute to diversity of life on Earth, and why this is important.**

### Focusing Questions:

What are some similarities and differences of traits/characteristics in specific specie?

What are living things made up of?

What is the basic structure of a typical animal cell?

What is the basic structure of a typical plant cell?

How does reproduction produce desirable and undesirable traits in animals and plants?

How is diversity beneficial

### Specific Outcomes:

8.1 Students will identify and compare (similarities and differences) traits or characteristics within different local plant and animal species in Belize. (*i.e., diversity within a plant and an animal species*)

8.2 Students will be able to explain that living organisms are made up of cells which are the basic units of all living things.

8.3 Students will identify the basic structure of a typical animal cell and be able to describe the major functions of its parts. (*cell membrane, , nucleus, , and cytoplasm*)

8.4 Students will identify the basic structure of a typical plant cell and be able to describe the major functions of its parts, (*cell membrane, cell wall, nucleus, vacuole, cytoplasm, chloroplasts*).

8.5 Students will explain the role of sexual reproduction in determining genetic diversity (*i.e. how different combinations of genes determine traits or characteristics in local plants and animals. Limit vocabulary to heredity, genes, alleles, dominance, co-dominance and recessive*)

<p>to plants and animals survival and for the ecosystems where they exist?</p> <p>What is selective breeding?</p> <p>What are some negative impact through cross-breeding of plants and animals?</p>	<p>8.6 Students will explain, using examples, how the expression of various traits (adaptations or characteristics) in local plant or animal species can be beneficial or detrimental in an ecosystem. <i>(e.g., the spotted coat of the jaguar is beneficial since it allows the jaguar to blend in with the rain forest but would be detrimental in a dry savannah ecosystem where the jaguar cannot blend in with the colour of the vegetation. Darker skin color provides more protection from the sun's rays than lighter skin color.)</i></p> <p>8.7 Students will research and discuss how and why human beings use selective reproduction (breeding) to ensure the expression of specific traits in plant and animal species. <i>(e.g., through cross-breeding certain varieties of corn so that there is a higher yield with less water usage; breeding certain varieties of dogs to produce the most desirable hunting traits)</i></p> <p>8.8 Students will research and discuss possible negative impacts of the use of selective reproduction. <i>(e.g., artificial insemination, <b>Genetically Modified Organisms</b> - modified grains, cloning)</i></p>
<p><b>Communicate understanding:</b></p>	<p>Students will use their communication skills throughout this unit to convey their understanding of Heredity and Reproduction to different audiences and for a variety of purposes. <i>(e.g., Family tree, research reports, presentations)</i></p>

# Healthy Environments

In this section students will learn about physical characteristics in the environment that can be unsafe in certain circumstances. Additionally, students will develop an understanding of how human actions and activities can have negative effects on the environment and what we can do to keep our environment clean. Students will also develop their knowledge and understanding related to their local environment and the ecosystems found within Belize, and connect this understanding to identifying and evaluating human actions in the environment and the effects our activities can have on ecosystem dynamics.

Most of the learning outcomes in this section are interconnected with aspects of environmental education as well as link to social studies.

Throughout this strand, students will acquire, develop and apply:

- curiosity and inventiveness;
- confidence in personal ability to explore materials and learn by direct study;
- team work skills and abilities;
- receptiveness to other ideas;
- a sense of responsibility for actions, and
- respect for living things, the environment, and commitment to their stewardship.

## Suggested Teaching Strategies

- Ask questions that lead to exploration and investigation
- Construct ideas by making predictions and hypotheses
- Identify one or more possible answers to questions asked by themselves and others
- Manipulate materials and make observations that are relevant to questions asked
- Carry out simple procedures that have been developed by other and by the student themselves
- Identify materials that will be used, as well as why they were chosen and how they were used
- Make inferences and describe observation, using illustrations, written and oral language
- Evaluate, describe and explain results
- Use, with guidance and individually, print and other sources of information provided. Sources may include library, classroom, community and computer-based resources
- Communicate results of investigations and activities, using illustrations, written and oral language

# Healthy Environments

Students will recognize what a healthy and clean space is as well as begin to understand how human activities determine the quality of their immediate surroundings. Students will recognize that unclean and unsafe surroundings pose health and safety risks. Students will participate in activities that keep spaces clean and safe.

**Fundamental Concepts:** Stewardship and sustainability, Systems and interactions

**Enduring Science Understanding:** Cleanliness and safety practices create a healthy environment.

**Standard: S9A.0 Students will recognise clean and safe spaces in school and at home and, recognise and practice activities that contribute to these qualities.**

**Focusing Questions:**

What makes a room unclean?

What makes a space safe or unsafe?

What are some things you can do to keep a room clean and safe?

**Communicate understanding:**

**Specific Outcomes:**

9A.1 Students will be able to use observation skills to identify the differences between clean and unclean spaces in their school and homes. *(e.g., spaces are organised, free of dirt & garbage)*

9A.2 Students will be able to recognise objects or conditions in spaces that make them safe or unsafe. *(e.g., unsafe: broom or toys on the floor, sharp objects within easy reach of small children, dangerous objects & hazardous materials not safely stored; conditions such as - wet floors, cluttered spaces, overgrown vegetation, exposed garbage heaps, stagnant water)*

9A.3 Students will be able to identify and participate in activities that keep spaces clean and safe and help improve the quality of their immediate spaces.

Students will use their communication skills throughout this unit to convey their understanding of keeping their surroundings clean and safe to different audiences and for a variety of purposes. *(role play cleaning practices, organizing spaces, checking for cleanliness, safe practices)*

# Healthy Environments

Students will distinguish between natural and human-built environments and specific components that illustrate their differences. With either type there exist potential dangers. Students will learn to identify potential dangers in the human built and natural environments and respond accordingly. Students recognize that to obey rules is one measure to keeping safe within these environments.

**Fundamental Concepts:** Systems and interactions

**Enduring Science Understanding:** Safety should be practiced in our natural and human-built environments.

**Standard: S9.0 Students will understand what a safe environment - natural and human-built - constitutes.**

**Focusing Questions:**

What are the two types of environments?

What are the components of a human built environment?

What dangers can be found in the environment?

How to respond to dangers in the environment?

**Specific Outcomes:**

9.1 Students will be able to give examples of human-built and natural environments.

*(use nearby examples for each - e.g., **human-built:** cities, villages, towns; **natural:** forest, mangrove, river, mountain, wetlands)*

9.2 Students will be able to identify basic and common components of the human-built and natural environments identified in 9.1. *(i.e., **human-built:** man-made structures such as buildings, streets, drains, vehicles, roads, parks and playground; **natural:** rivers, forest, rocks, hills, sea, reef, mangroves, swamps)*

9.3 Students will be able to observe and identify the potential and common dangers in human-built and natural environments. *(e.g., accidents , while working or playing, , crime, sickness attacks by animals, natural disasters, pollution and negative impacts of human behaviours)*

9.4 Students will be able to suggest how to best respond to common dangers in the human-built and natural environment. *(i.e., use cause and effect thinking to make best judgment for safety, such as: obey rules and signs; avoid dangerous situations; follow good advice; ‘think before you act’)*

**Communicate understanding:**

Students will use their communication skills throughout this unit to convey their understanding of keeping safe in our environment to different audiences and for a variety of purposes. *(e.g., make poster showing an environment, make appropriate safety signs, draw unsafe/safe pictures, role play safe and unsafe practices)*

# Healthy Environments

Students will develop their understanding of what a healthy and clean environment is, as well as begin to understand what actions humans undertake that can reduce the quality of the environment. Develop plans and actions to improve the quality of the environment.

**Connections within Science:** Infant 2

**Fundamental Concepts:** Stewardship and sustainability, systems and functions

**Enduring Science Understanding:** Responsible human actions ensure a clean and healthy environment.

**Standard: S10.0 Students will understand what a healthy environmental is, identify human actions that degrade the environment and activities that improve the quality of the environment.**

## Focusing Questions:

What is a healthy environment?

How do we harm our environment?

How can we keep our environment clean?

## Specific Outcomes:

10.1 Students will be able to identify a healthy environment. (*e.g., clean and controlled land use, controlled system for disposal of human waste; land spaces in their natural forms– lush natural forest and vegetation, clean water ways and natural catchments, clean air rich in oxygen,*)

10.2 Students will identify different human activities that can degrade the quality of the environment. (*e.g., air: air pollution, oxygen depletion; land: erosion, clearing, overuse, mining, flooding, improper disposal of wastes; water: pollution, depletion; wildlife: depletion, extinction*)

10.3 Students will be able to plan and carry out activities that can help improve the quality of the environment. (*e.g., local community clean-up activities, recycling, reusing and reducing activities, find out about activities organised by environmental groups in Belize*)

## Communicate understanding

Students will use their communication skills throughout this unit to convey their understanding of keeping our environment clean to different audiences and for a variety of purposes. (*e.g., make posters, signs, flyers to advertise clean-up activities, posters of before and after the clean-up activities, give oral reports of their actions, make posters & signs advocating positive behaviours for keeping the environment clean*)

# Healthy Environments

Students will be able to describe what waste is, and explain the differences between waste and compostable materials, as well as materials that can be recycled or reused in a variety of ways. Students will understand that humans and many other organisms produce waste and that this can result in positive or negative impacts on the natural systems.

**Connections within Science:** Standard 1, Standard 5

**Fundamental Concepts:** Systems and interactions, sustainability and stewardship.

**Enduring Science Understanding:** Humans and animals produce various types of waste. Human activities resulting in waste production can contribute to negative effects on the environment.

**Standard: S11.0** Students will understand and differentiate between different types of waste and how human activities can contribute to the negative effects of waste production.

### Focusing Questions:

What do the following mean: waste, compost, recyclable and reusable materials?

What are the different types of waste?

What are some negative impacts of waste on natural systems?

How can we reduce waste?

### Communicate understanding

### Specific Outcomes:

11.1 Students will be able to explain the differences between waste, compost, recyclable and reusable materials.

11.2 Students will be able to identify and classify different types of waste (*i.e., compostable materials, recycled materials and reused materials.*)

11.3 Students will be able to recognize that plants, animals and human-made systems produce waste of different types and give examples of the waste materials produced by each. (*i.e., examples of the various solid, liquid and gaseous wastes produced by animals, plants and human-made systems*)

11.4 Students will explore negative impacts of waste on various natural systems and be able to suggest ways in which these effects can be reduced. (*e.g., negative impacts of sewage and garbage on terrestrial, aquatic, arboreal and fossorial systems*)

11.5 Students will plan for and be able to implement actions they can take to reduce waste. (*e.g., practice the three Rs – reduce, reuse, recycle, including composting materials.*)

Students will use their communication skills throughout this unit to convey their understanding of waste and the impact on our world to different audiences and for a

variety of purposes.

**Standard**  
**3**  
**Discover**  
**an**  
**Ecosystem**

# Healthy Environments

In this unit, students will learn about ecosystems found within Belize (terrestrial, arboreal, aquatic and fossorial). They will focus on a local ecosystem (e.g. wetland, broadleaf forest, pine forest, savannah, farm, stream, mangrove or coral reef). Through studies in the field and classroom, students will learn about plants and animals that share the ecosystem, their interdependency with respect to obtaining food, and make predictions on the possible impact of a change in the occurrence of one organism in an ecosystem on other organisms of the same ecosystem.

### Connections within Science:

Standard 2: *Waste and Our World*

Standard 4: *Water for Life*

Standard 5: *Interactions and Environments*

**Fundamental Concepts:** similarity and diversity, interdependence

### Enduring Science Understanding:

There is ongoing interaction between organisms in the natural environment.

**Standard: S12.0 Students will describe ecosystems found in Belize. They will observe and identify interactions among organisms in an ecosystem and identify the role of each organism as part of a food chain.**

### Focusing Questions:

What is an ecosystem?

What are the different types of ecosystems in Belize?

What features of an ecosystem allow plants and animals to survive there?

### Specific Outcomes:

12.1 Students will be able to explain what an ecosystem is and identify the general components of an ecosystem. (i.e., *identifying living and non-living things in an ecosystem*)

12.2 Students will be able to identify and describe examples of aquatic and terrestrial ecosystems in Belize (e.g., *wetland, broadleaf forest, pine forest, savanna (grassland), stream, mangrove, sea grass beds, coral reef*)

12.3 Students will be able to investigate and observe non-living features of a local ecosystem that help determine which plants and animals successfully live there. (e.g., *climate—particularly temperature and rainfall ; slope of the land or sea bottom; the presence of rock or soil on which plants might grow, certain food sources available, shelter provided to different animals*)

12.4 Students will be able to identify different types of animals and plants that live in

<p>What roles do organisms play in a food chain?</p> <p>What is the impact of changes in the occurrence of one organism on other organisms?</p>	<p>different local ecosystems. (<i>e.g., plants: trees, grasses, shrubs, flowering, non-flowering; animals: aquatic, terrestrial, arboreal and fossorial</i>)</p> <p>12.5 Students will be able to explain the roles of different organisms in a food chain as:</p> <p><i>Producers - organisms that make their own food using sunlight</i></p> <p><i>Consumers - organisms that eat living plants and/or animals</i></p> <p><i>Decomposers - organisms such as molds, fungi, insects and worms that reuse and recycle materials that were formerly living.</i></p> <p>12.6 Students will observe interactions for obtaining food among organisms in a local ecosystem and be able to construct food chains on the basis of the observations made. (<i>e.g., observe body structures that are used to obtain food; observe adaptations for producing, gathering, capturing and/or ingesting food to determine position on the chain</i>)</p> <p>12.7 Students will be able to predict the possible impact of a change in the occurrence of one organism in an ecosystem on other organisms of the same ecosystem (<i>i.e., describe what would happen if the number of particular organisms in a food chain increased, decreased or the organism disappeared from the ecosystem</i>)</p>
<p><b>Communicate understanding:</b></p>	<p>Students will use their communication skills throughout this unit to convey their understanding of local ecosystems to different audiences and for a variety of purposes. (<i>e.g., Projects, news presentations, debates, charts, posters</i>)</p>

# Healthy Environments

Students will learn about water on earth in its various forms. Students will understand the water cycle and that the water cycle and water are necessary for maintaining life on earth. Students will also understand how human activities can degrade water quality and deplete the quantity of water available to sustain life and that we are responsible for conserving water now and into the future.

## Connections within Science:

Std. 1: Keeping Our Environment Clean

Standard 3: Discover an Ecosystem

**Fundamental Concepts:** systems and interactions, stewardship and sustainability

## Enduring Science Understanding:

Water exists in different states and is replenished through a cycle. The cycle and water is necessary for life (humans, animals and plants). Human activities may have a positive or negative effect on water.

**Standard: S13.0 Students will understand that water exists in different states, the water cycle and the importance of water and the water cycle to all living things, how different human activities impact the quantity and quality of fresh water and the responses needed to safeguard water sources.**

### Focusing Questions:

What are the states in which water exists?

What is the water cycle?

What is the importance of the water cycle?

Why is water important to living things?

### Specific Outcomes:

13.1 Students will be able to demonstrate that water changes from one state to another and explain how the change in state is brought about. (*i.e., solid  $\leftrightarrow$  liquid  $\leftrightarrow$  gas due to water in a particular state being cooled or heated*)

13.2 Students will be able describe the water cycle and explain the changes in state water undergoes at each step in the cycle. (*Limit to basic cycle due to melting of ice, evaporation, condensation and precipitation.*)

13.3 Students will be able to explain the importance of the water cycle to plant, animal and human life. (*i.e., Water is the main component of all living systems; life cannot be supported without water. Fresh water is a finite resource largely replenished through the water cycle.*)

13.4 Students will be able to give examples of how water in its different forms sustains life. (*e.g., water is an essential nutrient; water – fresh and salt - as the habitat for*

In what ways is water used for life?

How does human use of water impact its quality and quantity?

How can we conserve and protect our water sources?

**Communicate understanding:**

*some plants and animals; ice is used as resting places, for protection and transportation by animals in cold regions; water droplets in the air are used by some plants in tropical forests; many animals need water for reproductive processes)*

13.5 Students will be able to discuss how different human activities impact the quantity and quality of fresh water in Belize and other parts of the world.

13.6 Students will be able to plan and implement activities to help conserve or protect water sources in Belize.

Students will use their communication skills throughout this unit to convey their understanding of how water sustains life to different audiences and for a variety of purposes.

<b>Standard</b>  <b>5</b>	<b>Interactions in Ecosystems</b>	<b>Healthy Environments</b>
<p>Students will understand and explain how ecosystems function as a system. Students will be able to identify various interactions in different types of ecosystems (terrestrial, aquatic, arboreal and fossorial) and examine how humans impact on ecosystems changes over time.</p>		

**Connections within Science:**

Standard 2: *Waste and Our World*

Standard 3: *Examining a Local Ecosystem*

**Fundamental Concepts:** Similarity and diversity, systems and interactions, stewardship and sustainability

**Enduring Science Understanding:** Many interactions occur within an ecosystem.

**Standard: S14.0 Students will identify and explain interactions in a variety of ecosystems.**

<p><b>Focusing Questions:</b></p> <p>What is an ecosystem?</p> <p>What types of interactions occur between the living and non-living components of an ecosystem?</p> <p>What are some reasons why living things interact with each other and with the non-living things in the ecosystem?</p> <p>What is a food web?</p> <p>What are the effects of humans on ecosystems?</p>
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<p><b>Specific Outcomes:</b></p> <p>14.1 Students will be able to explain what an ecosystem is and identify the various components and classify the components as living or non-living. <i>(Include a review of SO12.1 and 12.2)</i></p> <p>14.2 Students will be able to give examples of interactions between the living and non-living components of an ecosystem and suggest reasons for the interactions. <i>(e.g., armadillos, crabs and worms burrow into the ground to make their homes; bats hide in caves; fish and other aquatic animals live in water; birds fly through air; small plants grow on rocks, large plants grow on soils)</i></p> <p>14.3 Students will be able to give examples of interactions that occur among living things in an ecosystem and suggest reasons for the interactions. <i>(e.g., birds make nests in trees, prey-predator relationships, cleaning shrimp and fish, animals eat plants)</i></p> <p>14.4 Students will be able to construct food webs to illustrate interactions based on food getting activities among living things. <i>(Review SO 12.6 and expand to food webs)</i></p> <p>14.5 Students will observe and explain how humans are a part of many different ecosystems, how our interactions with the ecosystems have changed over time, and how our actions can positively or negatively affect the functioning of the</p>
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	<p>ecosystems. (e.g., <i>human interactions with the Belize Barrier Reef over time has changed from source of food for local populations to food for export markets, a site for small local tourism to cite of large scale cruise tourism; harvesting of lumber for local construction to harvesting for export markets; hunting of game meat for small local consumption to hunting for market produce; use of pesticides to kill insects ; human activities geared to conservation and protection of plant and animal life forms – designating areas as reserves or protected areas</i>)</p>
<p><b>Communicate understanding</b></p>	<p>Students will use their communication skills throughout this unit to convey their understanding of interactions in ecosystems to different audiences and for a variety of purposes.</p>

# Healthy Environments

Students will learn how ecosystems undergo change (both naturally and human-caused). Students will be able to identify changes in ecosystems caused by human activities. Students will be able to describe what actions they can take to help conserve, protect and minimize impacts on ecosystems.

## Connections within Science:

Standard 2: *Waste and Our World*

Standard 3: *Examining a Local Ecosystem*

Standard 5: *Interactions in Ecosystems*

**Fundamental Concepts:** similarity and diversity, systems and interactions, stewardship and sustainability

**Enduring Science Understanding:** There are interactions and diversity within ecosystems.

**Standard: S15.0 Students will examine changes – natural and man-made – to an ecosystem, identify the effects of the changes and make suggestions of actions which humans can undertake to conserve, protect and minimize impacts on ecosystems.**

<p><b>Focusing Questions:</b></p> <p>How are ecosystems affected by human-caused and natural changes?</p> <p>What can you do to prevent or minimize negative impacts to ecosystems?</p>	<p><b>Specific Outcomes:</b></p> <p>15.1 Students will be able to identify and explain how changes resulting from natural causes affect ecosystems. (<i>e.g., earthquakes, floods, tropical depressions &amp; storms, drought, hurricanes</i>)</p> <p>15.2 Students will be able to identify and explain how human-caused changes have and can impact ecosystems. (<i>e.g., land clearing, dredging, land reclamation, draining of wetlands, building of dams, cities, roads, diverting of rivers, damage of coral reefs, cutting of mangroves, pollution [air, noise, waste]</i>)</p> <p>15.3 Students will be able to research and plan actions humans can take to prevent or minimize the negative impacts that would result from changes to an ecosystem. (<i>e.g., advocate for environmentally safe practices; support protection legislation; decrease personal ecological footprints; practice the 3Rs- reduce, reuse, recycle</i>)</p>
<p><b>Communicate understanding</b></p>	<p>Students will use their communication skills throughout this unit to convey their understanding of changes to ecosystems which can be positive or negative to different audiences and for a variety of purposes.</p>

# The Human Body

Students will develop their knowledge and understanding related to the human body, their body parts, senses and systems, and how the body functions. Additionally, knowledge of what constitutes a healthy diet, the effects of proper nutrition, and participating in regular or daily exercise will be explored. It is expected that students will develop healthy practices. Students will also learn about disease prevention, human reproduction and how certain activities can put people at higher risk for various illnesses.

Throughout this strand, students will acquire, develop and apply:

- curiosity and inventiveness;
- confidence in personal ability to explore materials and learn by direct study;
- team work skills and abilities;
- receptiveness to other ideas ;
- a sense of responsibility for actions ;
- respect for each other, the role the environment plays in their health; and
- commitment to a balanced and healthy lifestyle.

## **Suggested Teaching Strategies**

- ⇒ Ask questions that lead to exploration and investigation
- ⇒ Construct ideas by making predictions and hypotheses
- ⇒ Identify one or more possible answers to questions asked by themselves and others
- ⇒ Manipulate materials and make observations that are relevant to questions asked
- ⇒ Carry out simple procedures that have been developed by others and by the students themselves
- ⇒ Identify materials that will be used, as well as why they were chosen and how they were used
- ⇒ Make inferences and describe observation, using illustrations, written and oral language
- ⇒ Evaluate, describe and explain results
- ⇒ Use, with guidance and individually, print and other sources of information provided. Sources may include library, classroom, community and computer-based resources
- ⇒ Communicate results of investigations and activities, using illustrations, written and oral language

Infant

1

**Parts of the Body and Senses**

# The Human Body

Students will explore their clothed bodies. Identify all external body parts and name them. Students compare themselves with others. Students will also learn about the different senses, how they are used in everyday life and why they are important.

**Fundamental Concepts:** Similarity and diversity, systems and interactions

**Enduring Science Understanding:** The body consists of different parts. The senses are used for making observations.

**Standard: S16.0** Students will recognise the different parts of the human body and the five major sense organs, the use of each sense organ and why they are important. Identify similarities and differences among their peers and recognise that we change as a result of growth.

**Focusing Questions:**

What are the different parts of the body?

What are the five senses?

How are we similar or different from others?

In what ways we change as we grow?

**Specific Outcomes:**

16.1 Students will be able to recognize and name the main external parts of the human body (*e.g., identify main parts such as head, hand, abdomen, knee on a diagram*)

16.2 Students will be able to identify the five major sense organs that humans have, give the function of each and suggest why they are important. (*i.e., eye → seeing, nose → smelling, skin → touch, ears → hearing, tongue → tasting; the senses give us information about our surroundings and are used in making observations in science*)

16.3 Students will be able to identify similarities and differences between themselves and other children, (*e.g., compare eye colour, hair colour, height or weight.*)

16.4 Students will be able to identify general physical changes they have undergone since birth and link them to the concept of growth. (*e.g., sequence pictures from birth to present showing differences in height, size of feet, weight and body shape.*)

**Communicate understanding:**

Students will use their communication skills throughout this unit to convey their understanding of their body parts and senses to different audiences and for a variety of purposes.

Infant 2

2

**Healthy Food Choices**

# The Human Body

Students will be introduced to the concept that foods are placed into groups based on the nutrients they provide. They will place a variety of local foods into their appropriate food groups and tell what each food contributes to growth and energy needs. They will suggest healthy food choices for meals and snacks as well as offer reasons why making healthy food choices are important.

**Connections within Science:**

Infant 1: *Parts of the Body and Senses*

**Fundamental Concepts:** Similarity and diversity, systems and interactions

**Enduring Science Understandings:** Foods are classified into food groups based on their nutritional content.

**Standard: S17.0 Students will know the different food groups and begin to develop an understanding of how healthy food choices can positively impact their lifestyles.**

**Focusing Questions:**

What are food groups?

What are nutritious foods?

What constitutes a healthy meal?

What would a healthy breakfast contain?

Why should we make healthy food choices?

**Specific Outcomes:**

17.1 Students will be able to match different types of local foods to the food groups they belong to.

17.2 Students will be able to give examples of nutritious foods and tell how they contribute to their growth and energy needs. (e.g., *fruits, vegetables, fish, meat, eggs, milk*)

17.3 Students will be able to suggest healthy food choices for balanced meals and as snacks. (e.g., *typical healthy snacks and balanced meals made from locally available food,*)

17.4 Students will be able to discuss the significance of making healthy food choices. (i.e., *eating healthy foods helps us to avoid some types of illness / eating healthy foods helps us to maintain good health*)

**Communicate understanding**

Students will use their communication skills throughout this unit to convey their understanding for making healthy food choices to different audiences and for a variety of purposes.

# The Human Body

Standard

**1**

## Healthy Bodies

Students will understand what healthy eating and an active lifestyle constitute, and why they are important for maintaining healthy bodies. The dietary guidelines for Belize will be used to evaluate meals and make suggestions for balancing the meals. In addition, students will discuss the importance of practicing good hygiene, resting and engaging in recreational activities.

### Connections within Science:

Infant 2: *Healthy Food Choices*.

**Fundamental Concepts:** Systems and interactions, Health and wellness

**Enduring Science Understanding:** A healthy balanced diet, regular physical activity, good hygiene, rest and recreation are important to our wellbeing.

**Standard: S18.0 Students will explain different ways of maintaining a healthy body.**

### Focusing Questions:

What is a balanced diet?

What are the different food groups?

What are different types of physical activity?

How do we practice good hygiene?

How do rest and recreation help us stay healthy?

### Specific Outcomes:

18.1 Students will be able to define a balanced diet. (*i.e., A balanced diet contains sufficient amounts of fibre and the various nutrients - carbohydrates, proteins, fats, vitamins, minerals and water – to maintain good health.*)

18.2 Students will be able to use the dietary guidelines for Belize to make suggestions for improving the composition of sample meals. (*e.g., given a sample meal, students will use the recommended portions for each food group to make suggestions for balancing the meal*)

18.3 Students will be able to discuss the importance of regular physical activity to maintaining good health and give examples of different ways they can be active every day. (*e.g., going for a walk, helping with vigorous chores, running, swimming, climbing, jumping rope, playing physical sports*)

18.4 Students will be able to discuss good hygiene practices and the importance of good hygiene in maintaining healthy bodies. (*e.g., personal hygiene -role play how to bathe properly; food preparation hygiene – washing fruits and vegetables; home hygiene – washing dishes and clothes*)

18.5 Students will be able to discuss the importance of rest and recreation for emotional wellness and maintenance of good health. (*e.g., getting enough sleep per day; engaging in relaxing, fun activities - taking leisurely walks*)

### Communicate understanding

Students will use their communication skills throughout this unit to convey their understanding of diet and physical activity to different audiences and for a variety of purposes.

**Standard**  
**2**  
**Body Parts  
Organs and  
Life  
Processes**

# The Human Body

Students will understand that the body is made up of many different parts (external and internal) and systems that all work together in various ways (life processes), to accomplish various tasks to support everyday life. Students will relate these life processes to living healthy through proper functioning body parts.

**Connections within Science:**

Infant 1: *Parts of the Body and Senses*

**Fundamental Concepts:** similarity and diversity, systems and interactions

**Enduring Science Understanding:** The body has external and internal parts supporting essential life processes.

**Standard: S19.0:** Students will understand different external parts of the body and internal organs and how they interrelate to support basic life processes, for maintaining healthy bodies.

**Focusing Questions:**

What are the functions of the external body parts?

What are the skeleton and muscles of the body?

What are some of the major organs of the body?

How are does life process relate in order to maintain a healthy body/life?

How can we care for our body?

**Specific Outcomes:**

19.1 Students will be able to identify major external parts of the human body, describe the function of each and how they relate to each other. (*e.g., arms and hands; head and neck; legs and feet; ears, skin, eyes, nose and tongue*)

19.2 Students will be able to name major organs of the human body such as the brain, heart, lungs, stomach, liver, urinary bladder, small and large intestines, kidneys, and identify these organs on an outline of the human body.

19.3 Students will be able to tell that humans have an internal skeleton and muscles and demonstrate how the skeleton and muscles work together to support their bodies and help them move efficiently (*e.g., make a hinged cardboard model of joints and muscles to demonstrate how a movement occurs*)

19.4 Students will be able to investigate how basic life processes such as circulation, simple respiration, excretion and digestion interact with each other in order to maintain healthy bodies (*e.g., conduct simple investigations to compare breathing and pulse rates before and after exercise; compare sweating rate before, during and after exercise and explain the differences noted in terms of the life processes that are involved; link food consumption to meeting energy need for physical activities*)

19.5 Students will be able to explain how and why they need to appreciate and care for

	<p>their own body. (<i>e.g., keep our body healthy - maintaining healthy life processes - by eating a healthy diet, regular exercising, and practice good hygiene.</i>)</p>
<p><b>Communicate understanding:</b></p>	<p>Students will use their communication skills throughout this unit to convey their understanding of body parts, organs and life processes to different audiences and for a variety of purposes.</p>

**Standard**  
**3**  
**Eating for Health**

# The Human Body

Students will explore the Belizean food basket and use the Dietary Guidelines for Belize to inform the making of choices for healthy foods in the right proportions to create balanced meals. They will investigate the factors that influence their personal food choices and discuss the impact of caffeine, alcohol, tobacco and drugs may have on food choices.

**Connections within Science:**

Infant 1: *Parts of the Body and Senses*

Standard 2: *Body Parts and Systems*

**Fundamental Concepts:** Similarity and diversity, systems and interactions

**Enduring Science Understanding:** Good nutrition is based on healthy food choices.

**Standard: S20.0 Students will understand what nutrition is, and how making healthy and balanced food choices contribute to proper nutrition**

**Focusing Questions:**

What is a balanced diet?

What affects our eating habits?

How can we care for our body?

How does caffeine, alcohol, tobacco and drugs affect or health?

What are some negative effects from substance abuse?

**Communicate understanding:**

**Specific Outcomes:**

20.1 Students will be able to identify and communicate the need for variety of foods and moderation in the amount of food consumed in a balanced diet for good health. *(e.g., importance of protein, fats, carbohydrates, minerals, water, vitamins; dangers of consuming excessive amounts of fats and carbohydrates)*

20.2 Students will be able to plan a healthy daily diet. *(i.e., select healthy foods in the right proportions to make a balanced meal - refer to the Dietary Guidelines for Belize)*

20.3 Students will be able to identify and evaluate factors that affect choices for healthy eating. *(e.g., the impact of technology/media; cost of food; variety of food available; cultural preferences)*

20.4 Students will be able to discuss the impact of caffeine, alcohol, tobacco and drugs on personal food choices. *(e.g., alcohol depresses hunger, tobacco affects taste and smell, some drugs stimulate appetit, others decrease appetite)*

Students will use their communication skills throughout this unit to convey their understanding of good nutrition to different audiences and for a variety of purposes

Standard

4

**Staying  
Healthy**

# The Human Body

Students will be able to explain that proper care of the human body means maintaining healthy organs and organ systems. This can be accomplished by practising proper hygiene, breathing clean air, consuming adequate amounts of clean water and nutritious foods, engaging in regular physical exercise and obtaining enough sleep. A healthy lifestyle makes the body feel better and helps it resist disease.

**Connections within Science:**

Std. 1: *Diet and Exercise*

Standard 3: *Eating for Health*

**Fundamental Concepts:** systems and interactions

**Enduring Science Understanding:** Unhealthy lifestyles can result in a variety of diseases.

**Standard: S21.0 Students will identify conditions necessary for maintaining good health, diseases that can result when these conditions are not met and be able to suggest how to prevent them.**

**Focusing Questions:**

What conditions are necessary for maintaining good health?

What are some diseases that result from unhealthy lifestyles?

How do you practice good personal hygiene?

What are some risk factors associated with diseases?

**Specific Outcomes:**

21.1 Students will be able to identify the conditions required to maintain a healthy life style. (*i.e., clean surroundings, air and water, good personal hygiene, nutritious foods, exercise and sleep*)

21.2 Students will be able to link diseases that may result when conditions for maintaining a healthy life style are not being met. (*e.g., diseases resulting from poor nutrition – diabetes, hypertension, high cholesterol, constipation, vitamin & mineral deficiencies; resulting from poor hygiene – gingivitis, tooth cavities, acne, lice infestation; resulting from unmanaged stress – ulcers, headaches, mental distress; other diseases resulting from poor lifestyle choices – lung cancer (cigarette smoking), cirrhosis of liver (excessive drinking of alcohol), HIV , STIs, hepatitis C*)

21.3 Students will be able to demonstrate positive personal hygiene and health care habits. (*e.g., hand washing, other habits to reduce germ transmission, habits for dental hygiene, wearing clean clothing, covering open wounds, bathing*)

21.4 Students will be able to discuss selected diseases (addressed in 21.2) in terms of their cause(s) and risk factors, and suggest choices and behaviours which will prevent acquiring the disease. (*e.g., blood-borne diseases—HIV, AIDS, hepatitis B/C; risk factors: sharing needles, body piercing, tattooing, helping someone who is bleeding, being sexually active*)

**Communicate  
understanding**

Students will use their communication skills throughout this unit to convey their understanding of how healthy lifestyles prevent some diseases to different audiences and for a variety of purposes.

**Standard**  
**5**  
**Cells and Systems**

# The Human Body

Students will discuss the relationship between cells, tissues, organs and organ systems in the human body and describe the basic function of selected organ systems.

**Connections within Science:**

Standard 2: *Body Parts and Systems*

**Fundamental Concepts:** systems and interactions

**Enduring Science Understanding:** There are different types of cells, tissues and organ systems in the human body.

**Standard: 22.0 Students will discuss how cells, tissues and organs are related in the human body and describe the basic function of selected systems.**

**Focusing Questions:**

What are cells?

What role do cells play in making up the human body?

What are the different body systems and what are their basic functions?

**Communicate understanding:**

**Specific Outcomes:**

22.1 Students will be able to recall that cells are the building blocks of all living things and give examples of specialized cells that make up the human body. (*e.g., skin cells, blood cells, nerve cells, muscle cells, fat cells*)

22.2 Students will be able to discuss the relationship between cells, tissues, organs and organ systems. (*i.e., cells organise to form tissues, tissues organise to form organs, groups of organs form organ systems*)

22.3 Students will be able to describe the basic function of different organ systems in the human body. (*digestive, excretory, circulatory, skeletal, nervous and, respiratory system*)

Students will use their communication skills throughout this unit to convey their understanding of cells and body systems to different audiences and for a variety of purposes. (*e.g. Models, diagramming, role play, songs, poems*)

**Standard**  
**6**  
**Human**  
**Reproduction**

# The Human Body

Students will know the structure and function of the reproductive system and the basic process of reproduction in humans. Additionally, students will explore issues related to reproductive health and identify different actions they can make to support good reproductive health choices.

**Connections within Science:**

Standard 4: *Keeping Healthy*

Standard 5: *Cells and Systems*

**Fundamental Concepts:** Similarity and diversity, systems and interactions

**Enduring Science Understanding:** To continue existence species must reproduce.

**Standard: S23.0: Students will understand human reproduction, reproductive systems and their functions, and the necessity for safe choices where reproduction is concerned.**

**Focusing Questions:**

What are the components of the reproductive system?

What is the basic process of reproduction in human beings?

What is puberty?

What are some emotional changes that occur during puberty?

What are some social issues associated with becoming sexually mature?

**Specific Outcomes:**

23.1 Students will be able to identify and describe the basic components of the human male and female reproductive systems.

23.2 Students will be able to describe the basic process of reproduction in humans. (*i.e., fertilization, implantation of embryo, fetal development, birth*)

23.3 Students will be able to discuss issues associated with human reproduction and maturity - physical, emotional and social. (*i.e., **physical changes:** puberty and secondary sexual characteristics; **emotional changes:** mood swings, sexual attraction; **social issues:** teenage parents, sexual exploitation, health risks - teenage pregnancy, STIs*)

23.4 Students will be able to identify actions they can take to ensure their reproductive health and safety. (*e.g., access accurate information on reproduction, avoid risky behaviours, talking with a 'safe person'*)

**Communicate understanding:**

Students will use their communication skills throughout this unit to convey their understanding of human reproduction to different audiences and for a variety of purposes.

# Matter and Energy

This strand introduces students to the concepts of hearing and sound, where sound will be understood as a form of energy that can be transmitted through a variety of mediums. students will explore other fundamental concepts related to matter and energy such as heat energy and how it is used in human and animal life; pure substances and mixtures, what they are and why they are important; light and optics and what uses humans have for various light sources, types and optics; and, energy conversions and how this relates to human energy production and use.

Throughout this strand, students will learn how to design and carry out an investigation, using procedures that provide a fair test of the question being investigated. They will identify and evaluate the importance of observations, measurement and the application of various methods to record, compile, interpret and communicate observations and measurements.

Throughout this strand, students will acquire, develop and apply:

- curiosity and inventiveness;
- confidence in personal ability to explore materials and learn by direct study;
- team work skills and abilities;
- receptiveness to other ideas;
- a sense of responsibility for actions; and
- understanding of the interconnectedness humans have with the environment.

## Suggested Teaching Strategies

- Ask questions that lead to exploration and investigation
- Construct ideas by making predictions and hypotheses
- Identify one or more possible answers to questions asked by themselves and others
- Manipulate materials and make observations that are relevant to questions asked
- Carry out simple procedures that have been developed by other s and by the students themselves
- Identify materials that will be used, as well as why they were chosen and how they were used
- Make inferences and describe observation, using illustrations, written and oral language
- Evaluate, describe and explain results
- Use, with guidance and individually, print and other sources of information provided. Sources may include library, classroom, community and computer-based resources
- Communicate results of investigations and activities, using illustrations, written and oral language

Students will develop an awareness of their sense of sound and how it is used in daily life, as well as how animals use hearing. Students will also learn how sound travels.

**Connections within Science:** Standard 2: Body Parts and Systems

**Fundamental Concepts:** Similarity and diversity, systems and interactions

**Enduring Science Understanding:** Our ears allow us to hear sounds. Sound travels as waves.

**Standard: S24.0 Students will explore the nature of sound and hearing, sources of sound, qualities of sound, and the importance of hearing for animals and man.**

**Focusing Questions:**

What are some ways we can make sound?

How do we hear sound?

What are some examples of vibrations?

How does the size of the vibration affect the sound?

What ways can you produce sounds?

How does sound travel?

How is hearing important to humans and animals?

**Specific Outcomes:**

24.1 Students will be able to explain that sounds are made as a result of different types of vibrations and will investigate ways to produce different sounds. (*e.g., by striking a drum, a gong, a triangle, an empty glass; by blowing air into a bottle; by plucking an elastic band; by constructing a device that involves vibrating strings which produce sounds.*)

24.2 Students will be able to explain what is meant by the pitch and loudness of a sound and demonstrate, using simple devices, change in pitch and loudness of sound. (*e.g., investigate vibrating different lengths of a ruler to produce differing pitch; hitting a drum with various degrees of force to produce louder or softer sounds (the larger the vibration, the louder the sound.)*)

24.3 Students will be able to demonstrate that sounds travel as sound waves and investigate things that carry sound. (*e.g., air, water, through solid objects (walls, floors), string in a string telephone, metal when tapping pipes.*)

24.4 Students will be able to name the parts of the ear and explain how the ear detects sounds. (*i.e., use terms such as outer, middle and inner ear, eardrum, cochlea, nerve, brain*)

24.5 Students will be able to explain why and how hearing is important to humans and animals. (*e.g., animals: sensing danger (some have large ears), finding food, recognizing their own young, recognizing a potential mate; humans: as a sense for observation and safety, listen to music and speech, use of two ears to detect sound*)

	<p><i>location)</i></p> <p>24.6 Students will be able to discuss sources of sound pollution and investigate different ways of sound insulation. (<i>e.g., dampen the vibrating object with different materials: newspaper, cloth, cotton, wool, sponge, bubble wrap</i>)</p>
<p><b>Communicate understanding:</b></p>	<p>Students will use their communication skills throughout this unit to convey their understanding of hearing and sound to different audiences and for a variety of purposes.</p>

**Standard**  
**3**  
**Heat**

# Matter and Energy

Students will understand that heat is a form of energy. Adding or removing heat affect substances in different ways. Students will explore the way heat travels by conduction, convection and radiation. Heat is used by humans in a variety of ways for various purposes and care must be taken during its use.

**Connections within Science: Our environment**

**Fundamental Concepts:** Systems and interactions, structures and functions

**Enduring Science Understanding:** Heat is a form of energy. Heat travels by conduction, convection and radiation.

**Standard: S25.0 Students will understand what is heat how it affects substances and us, how it is measured, how it travels and when it can be harmful.**

**Focusing Questions:**

What is heat?

What are some sources of heat?

How does adding or removing heat affect different substances?

How does heat travel?

How do we use heat?

In what ways can heat be dangerous?

**Specific Outcomes:**

25.1 Students will be able to explain what heat is and suggest sources of heat. (*i.e., Heat is energy. Sources of heat e.g., sun, fire, light bulbs, electrical appliances, rubbing two things against each other*)

25.2 Students will be able to investigate how adding or removing heat affects substances. (*e.g., use instruments to measure the temperature of different substances before and after adding (or removing) heat from them, record and discuss the changes observed, e.g., melt ice to water, bend a thin wire or metal strip back and forth, rub the palms of your hand together briskly*)

25.3 Students will be able to demonstrate how heat travels (*i.e., conduct experiments to demonstrate conduction, convection and radiation*).

25.4 Students will be able to discuss different ways that heat is used by humans, dangers in using heat and ways we can exhibit care around objects that are hot or produce heat. (*e.g., heat is used for cooking food; a hot stove top will burn your hand*).

**Communicate understanding**

Students will use their communication skills throughout this unit to convey their understanding of heat to different audiences and for a variety of purposes.

## Standard

## 4

# Pure Substances and Mixtures

# Matter and Energy

We interact with substances on a daily basis, understanding their chemistry allows us to better use or avoid them when necessary. Students will understand the differences between a pure substance and a mixture, as they relate to gases, liquids and solids. Students will be able to analyze, identify and communicate the results from mixing and separating substances, and explain how and why substances and/or mixtures can be used in daily life.

**Fundamental Concepts:** Similarity and diversity, systems and interactions

**Enduring Science Understanding:** Pure substances and mixtures are significant to human life.

**Standard: S26.0 Students will understand what pure substances and mixtures are, and how they are significant to human life.**

### Focusing Questions:

What is matter?

What is a pure substance?

What is an element and a compound?

What is a mixture?

How can you separate mixtures?

How do we use pure substances and mixtures?

### Communicate understanding:

### Specific Outcomes:

26.1 Students will define matter and be able to describe and model differences in the arrangement of molecules of matter in its three states. (*e.g. models showing the spacing of molecules of water in its three states: gas, liquid, solid*)

26.2 Students will be able to differentiate between and state examples of pure substances and mixtures. (*i.e., **pure substances** -element and compounds- consist of one type of substance and can exist as a gas, liquid, solid; **mixtures** contain two or more substances and normally exist in only one state*)

26.3 Students will be able to differentiate between and state examples of elements and compounds. (*e.g., **elements**: iron, gold, oxygen; **compounds**: water, salt, sugar*)

26.4 Students will be able to observe and describe different mixtures. (*e.g., **solutions**: vinegar, air; **mechanical mixtures**: soil, blood, concrete; combinations of gases, liquids, solids*)

26.5 Students will be able to investigate what happens when different substances are mixed. (*i.e., observe what happens when different substances are mixed and offer explanations for the results. **Ensure safe substances are used***)

26.6 Students will be able to design and conduct investigations to separate various mixtures and report on the results. (*i.e., plan and test ways of separating mixtures, observe what happens and explain what happened **Ensure safe substances are used***)

26.7 Students will be able to give examples of and explain how pure substances and mixtures are used in everyday life by humans.

Students will use their communication skills throughout this unit to convey their understanding of substances and mixtures to different audiences and for a variety of purposes.

## Matter and Energy

The world we see through our eyes and how we see it makes it utterly important for us to study light and optics. Students will learn about light by studying the effects of light on things within their environment. Students will learn about the properties of light and how optical instruments help to improve our work and lives.

**Connections within Science:** Body parts – the eye

**Fundamental Concepts:** Similarity and diversity, systems and interactions, structures and functions

**Enduring Science Understanding:** Light and its properties are significant to human life.

**Standard: S27.0 Students will identify light sources, how light travels, how the path of light changes due to refraction and reflection, and how some optical devices are used.**

**Focusing Questions:**

What are some light sources?

How does light travel?

Light passes through different object in different ways, how do we classify them?

How does a light cast a shadow?

What is the difference between reflecting and refracting?

**Specific Outcomes:**

27.1 Students will be able to identify a range of light sources and distinguish between objects that emit their own light and those that require an external source of light. (*e.g., **emit own light:** sun, lightening, fire, luminous materials, electrical lamps (bulbs, tubes),bioluminescent plants and animals; **require external source:** moon, bicycle & car reflectors)*)

27.2 Students will be able to investigate how light travels. (*i.e., light travels in a straight line. Use simple activities of light traveling through pinholes*)

27.3 Students will be able to classify materials as transparent, partly transparent (translucent) or opaque. (*i.e., conduct simple activities to determine whether or not light passes through a material*)

27.4 Students will be able to create shadows and investigate how the size and shape of the shadows can be changed. (*e.g., create shadow figures using hands or paper cutouts; alter shadow size by moving the light source closer or farther away; alter shape by changing the plane of the shade-casting object or the screen*)

27.5 Students will be able to investigate the reflection of light using plane mirrors. (*i.e., trace the path of light traveling into and out of a mirror and describe reflected*)

<p>What are some optical devices we use?</p> <p>What are the parts of the eye?</p> <p>How are objects seen?</p>	<p><i>images formed- lateral inversion of object)</i></p> <p>27.6 Students will be able to investigate the refraction of light using a glass of water. <i>(i.e., trace the path of light traveling into and out of the water and describe refracted mages formed - pencil in water appears bent)</i></p> <p>27.7 Students will be able to identify optical devices and describe how they affect light and the images they create. <i>(e.g. hand lens, telescope, pinhole camera, camera, kaleidoscope; Extended activities can involve students in making lenses, telescopes, pinhole camera and kaleidoscopes)</i></p> <p>27.8 Students will be able to explain the structure of the human eye and how an object is seen. <i>(i.e., use terms eyelid, pupil, lens, retina, nerve, brain; use brief descriptions of how an object is ‘seen’; <b>do not</b> use ray diagrams)</i></p>
<p><b>Communicate understanding:</b></p>	<p>Students will use their communication skills throughout this unit to convey their understanding of light and optics to different audiences and for a variety of purposes.</p>

# Matter and Energy

The concept of energy is central to scientific study and must be explored to its fullest. Energy exists in various forms and can convert from one form to another. Students will explore conversion of energy to and from electrical energy and, in given scenarios, use flow charts to trace the flow of energy from one step to another and identify the energy conversions that occur.

**Connections within Science: Hearing and Sound, Heat, Light and Optics**

**Fundamental Concepts:** Similarity and diversity, systems and interactions, structures and functions

**Enduring Science Understanding:** The uses of the various forms of energy and the resources they are derived from impact the environment.

**Standard: S28.0 Students will define energy, identify forms of energy, demonstrate that energy converts from one form to another and given different scenarios trace the conversions of energy and identify the form at each stage.**

**Focusing Questions:**

What is energy?

What are the different types of energy?

What is meant by conversion of energy?

Into what other forms can electrical energy be converted

What forms of energy can be converted into electrical energy?

**Specific Outcomes:**

28.1 Students will be able to define energy and give examples of forms of energy. (*i.e., energy is the ability to do work; **kinetic energy** – radial, motion, sound, heat & electrical; **potential energy** – chemical, nuclear, gravitational, & mechanical*)

28.2 Students will be able to conduct simple demonstrations to show that energy converts from one form to another and recognize that energy cannot be created or destroyed. (*e.g., rubbing hands briskly together causes them to feel warm; shake a wind chime to make sound; use a potato to light a flashlight bulb; use a battery to light a bulb, make a radio emit sounds*)

28.3 Students will be able to give examples of situations in which other forms of energy convert to electrical energy and instances where electrical energy is converted to other forms of energy. (*e.g., **energy converted to electrical energy:** chemical energy in batteries; motion energy of running water at hydroelectric plants; nuclear energy of radioactive materials at nuclear generating stations; motion energy of wind turning wind turbines; heat energy of the sun in solar panels; motion energy from ocean waves at wave power stations; **electrical energy converted to:** electrical energy is converted to heat energy in a toaster, light and sound energy in a television, mechanical energy in a blender*)

28.4 Students will be able to trace the energy conversions for a given scenario. (*i.e., use a flow chart to identify the type of energy at each step; trace the flow of energy and energy conversions through a food web*)

**Communicate understanding:**

Students will use their communication skills throughout this unit to convey their understanding of energy and conversions to different audiences and for a variety of purposes

## Structures and Mechanisms

Throughout this strand, students will learn how to design and carry out an investigation, using procedures that provide a fair test of the question being investigated, as well as identify and evaluate the importance of observations, measurement and the application of various methods to record, compile, interpret and communicate observations and measurements.

Throughout this strand, students will acquire, develop and apply:

- curiosity and inventiveness;
- confidence in personal ability to explore materials and learn by direct study;
- team work skills and abilities;
- receptiveness to other ideas;
- a sense of responsibility for actions; and
- understanding of how systems in structures and mechanisms work.

### Suggested Teaching Strategies

- Ask questions that lead to exploration and investigation
- Construct ideas by making predictions and hypotheses
- Identify one or more possible answers to questions asked by themselves and others
- Manipulate materials and make observations that are relevant to questions asked
- Carry out simple procedures that have been developed by other and by the student themselves
- Identify materials that will be used, as well as why they were chosen and how they were used
- Make inferences and describe observation, using illustrations, written and oral language
- Evaluate, describe and explain results
- Use, with guidance and individually, print and other sources of information provided. Sources may include library, classroom, community and computer-based resources
- Communicate results of investigations and activities, using illustrations, written and oral language

**Standard**  
**2**  
**Forces and Motion**

# Structures and Mechanisms

Students will develop an understanding that the movement of an object can be initiated by pushing or pulling the object and that gravity, friction and weight affect the movement of the object.

**Connections within Science: Std. 3**

**Fundamental Concepts:** Similarity and diversity, systems and interactions, structures and functions

**Enduring Science Understanding:**

The movement of an object may be changed with a push or pull.

**Standard: S29.0 Students will understand that the movement of objects is a result of forces being applied to it and that gravity, friction and weight affect movement.**

**Focusing Questions:**

What is a force?

What happens when a force is applied to an object?

What is the effect of gravity on an object that is thrown?

How do different surfaces affect a moving object?

How differently will an object move depending on the size of force applied?

**Specific Outcomes:**

29.1 Students will be able to describe force as a push or a pull and explain how applying a force can create motion. *(i.e., pushing or pulling an object causes it to move)*

29.2 Students will be able to demonstrate a basic understanding of the concepts of gravity, friction and weight.

29.3 Students will be able to relate the effect of gravity on the movement of an object. *(e.g., investigate the effect of gravity on: thrown objects – eventually they will fall to the ground; objects at rest – they will stay in place )*

29.4 Students will be able to explain how friction affects the movement of an object. *(i.e., investigate the effect of friction on the movement of an object on different surfaces from smooth to rugged).*

29.5 Students will be able to correlate the weight of an object to the amount of force required to move the object. *(e.g., i.e., investigate to compare the force required to move a heavy vs a light object from a position of rest; to keep a heavy vs a light object in motion)*

**Communicate understanding:**

Throughout this unit student will use their communication skills to convey their understanding of forces and motion to different audiences and for a variety of purposes.

Standard

3

**Simple  
Machines**

## Structures and Mechanisms

Students will explain what a simple machine is and will be able to identify and describe how levers, inclined planes, gears and pulleys are used as simple machines, as well as demonstrate an understanding of how simple machines can help humans do work. Students will plan for and test simple machines for making work easier.

### Connections within Science:

Standard 2: *Forces and Machines*

Standard 5: *Mechanical Systems*

**Fundamental Concepts:** Systems and interactions, structures and functions

**Enduring Science Understanding:** Levers, inclined planes, pulleys and gears are simple mechanical machines used for doing work easier.

**Standard: S30.0 Students will explain what a simple machine is and give examples and will explore how simple machines can help humans do work.**

### Focusing Questions:

What are simple machines?

What are levers?

How do levers make work easier?

What is an inclined plane?

How do inclined planes make work easier?

Where are some examples of devices that use pulleys and gear systems?

### Specific Outcomes:

30.1 Students will be able to explain what a simple machine is based on observations they have made. (*i.e., a mechanical device that changes the direction or magnitude of a force; simplest mechanisms that use leverage to multiply force*)

30.2 Students will be able to identify levers as simple machines and identify examples of levers in everyday life. (*e.g., parts of the human body such as arms and legs function as levers; common household tools/devices such as shovel, wheel barrow, bottle opener, can opener*)

30.3 Students will be able to explore how simple levers can be used to make work easier. (*e.g., plan and conduct investigations, using a plank and a wedge, to lift objects and explore how shifting the wedge (fulcrum) can make lifting easier but reduces the height lifted,*)

30.4 Student will be able to explore how simple inclined planes can be used to make work easier. (*e.g., plan and conduct investigations, using an inclined plane to roll a barrel onto the back of a truck and explore how changing the angle of the inclined plane can make the effort easier but increases the distance the barrel must roll.*)

	<p>30.5 Students will be able to identify pulley and gear systems and discuss the impact of pulley and gear systems on daily life. (<i>Identify impact as “they make work easier to do” e.g. Elevators and other lifting devices use pulley and gear systems to lift heavy objects; , sewing machines, and windshield wipers on cars and trucks, pulleys are used to raise flags and boat sails, gears are used to move ferries across water</i>)</p> <p>30.6 Students will be able to demonstrate how a pulley or gear system performs a specific task (<i>e.g. design, build, and test a mechanism that will raise and lower a flag or a changing billboard; a model elevator that could be used to lift things to the upper floor; a model drawbridge or ferry used for a river crossing</i>).</p>
<p><b>Communicate understanding</b></p>	<p>Throughout this unit students will use their communication skills to convey their design skills to different audiences and for a variety of purposes. (<i>e.g. write a set of instructions for setting up a pulley system</i>)</p>

Standard

**Floaters and Flyers**

**4**

**Structures and Mechanisms**

Students will explore the feature of plants and animals that make them fly or float that assisted the designs of human-created floaters and flyers. They will explain basic principles of buoyancy and flying, as well as design and make models of aircrafts and water crafts. Students will test their models and make alterations to improve their buoyancy or flight.

**Connections within Science:** Simple machines

**Fundamental Concepts:** Similarity and diversity, systems and interactions, structures and functions

**Enduring Science Understanding:** Air and water crafts use principles of aerodynamics and floatation that are similar to animals and plants that float or fly.

**Standard: S31.0 Students will be able to explain basic principles of aerodynamics and floatation and compare the features of air and water crafts to those of animals and plants that float or fly, design, construct and test simple air and water crafts models.**

**Focusing Questions:**

What are some features that make animals and plants float or fly?

How human created floaters and flyers are made similar to animals and plants that float or fly?

What are the four forces that interact during flight?

What are ways you can alter a model airplane to improve

**Specific Outcomes:**

31.1 Students will be able to recognize features of some plants and animals that enable them to float or fly. (*e.g., observe animals, plants and plant seeds - ducks, water lilies, seed pods, birds - and identify the features of the plant, animal or plant seed that help them to float or fly – light weight, feathers, impermeable/water-tight surfaces, air bubbles or sacs, ability to flatten the body, long wings, body shape*)

31.2 Students will be able to make connections between the features of plants and animals identified in 31.1 and the features of human-created floaters and flyers. (*i.e., for parachutes, aircraft, water craft their- weight, buoyancy, span, shape, impermeable/water-tight materials*).

31.3 Students will be able to identify and describe on a diagram the four forces that interact for flight – lift, weight, drag, and thrust - and the relationships between these required for flight (*i.e., lift must be greater than weight for a plane/bird to take off; thrust must be greater than drag for a plane/bird to take off; lift must be less than weight for a plane/bird to land; thrust must be less than drag for a plane/bird to land* )

31.4 Students will be able to plan, design and make model flyers and investigate through altering the design how flight can be improved. (*e.g., parachute - modifications can*

<p>flight?</p> <p>What are the principles of buoyancy/floatation?</p> <p>What are ways you can alter a model watercraft to improve buoyancy?</p>	<p><i>include weight, diameter and type of material; a paper plane glider/kites – modifications can include angle of flaps, materials, rudder and shape. Relate modifications to the four forces that influence flight)</i></p> <p>31.5 Students should be able to identify and describe on a diagram the principles of floatation – buoyancy, downward force (weight), upward force (thrust), displaced volume &amp; density - and the relationships between them that are required for floatation (<i>i.e., Buoyancy is the loss in weight an object seems to undergo when placed in a liquid. The object must make room for its own volume by pushing aside, or displacing, an equivalent (or equal) volume of liquid. The object is exerting a downward force on the liquid and the liquid is therefore exerting an upward force on the object. The solid body floats when it has displaced just enough liquid to equal its own original weight. A denser liquid exerts a greater upward force and makes floating easier</i>)</p> <p>31.6 Students will be able to plan, design and make model floaters (water craft) and investigate through altering the design how to improve its buoyancy. (<i>e.g., <b>boat and submersibles</b>: modifications can include weight, depth of hull, materials, shape; <b>liquid modifications</b>: density - easier to float on salt water than fresh water</i>)</p>
<p><b>Communicate understanding</b></p>	<p>Throughout this unit students will be able to communicate various concepts related to floating and flying in a variety of ways and to different audiences.</p>

Standard

5

**Mechanical  
and  
Electrical  
Systems**

# Structures and Mechanisms

Students will be able to identify and describe what mechanical and electrical systems are, including their components and how they function. Students will explain how humans use both systems and for what purposes. Students will explore simple electrical circuits and determine the effects of varying the components of the circuit, and conclude that several components are critical for control and safety.

**Connections within Science:** Std. 2, Std. 3, Std. 4

**Fundamental Concepts:** Systems and interactions, structures and functions

**Enduring Science Understanding:** Mechanical and electrical systems assist us to make work easier.

**Standard: S32.0** Students will analyze simple mechanical systems, explain how forces are used to control moving mechanical devices, observe the effect of magnets on objects, explore simple magnetic devices and electrical circuits and how magnets and electrical devices are used by humans.

**Focusing Questions:**

What is a mechanical system?

What are some examples of simple mechanical devices used in the home?

How do you slow down a moving car?

How do magnets behave?

What are some examples of how magnets are used in everyday life?

**Specific Outcomes:**

32.1 Students will explain what a mechanical system is and give examples. (*i.e., combination of simple machines designed to interact with each other and perform a given function – combinations of inclined planes, levers, pulleys, wheel & axle, wedges and screws*)

32.2 Students will be able to analyze a variety of simple mechanical systems. (*i.e., examine common tools, toys, kitchen devices - identify components that act as simple machines, determine the contribution of individual components to the overall function of the devices, the operation of the devices, and how the input force or motion that is applied to one part of a device is transferred to other parts of the device*)

32.3 Students will be able to identify and demonstrate how simple forces can be used to power or stop (control) a moving mechanical device. (*e.g., **force to initiate move:** demonstrate using toy cars - direct pushes, pulls, incline planes; make model rollers with stored energy from rubber bands and springs; **counter force:** brakes, increased resistive surfaces*)

32.4 Students will observe the behavior of magnets on objects, identify ways in which magnets are used in everyday life. (*e.g., **behavior:** repulsion, attraction of other*)

<p>What are some components of an electrical circuit?</p> <p>How are switches, fuses and breakers used in circuits and electrical devices?</p> <p>In what ways do we use electrical systems?</p>	<p><i>magnets and some metals, no effect on non-metals; <b>uses:</b> lifting derelict cars, separating small pieces of metals from non-metals, in compasses - attraction to magnetic north – make a floating needle compass; <b>force:</b> push and pull metal toy cars)</i></p> <p>32.5 Students will be able to conduct investigations with different electrical circuits that operate lights, a small motor or induced magnetism to determine what happens when the components of the circuit are altered. <i>(e.g., provide simple circuits that operate motors, buzzers, LEDs, magnetic induction for students; have students make variations to: the number and arrangement of the circuit's components; make and record observations, offer explanations for the observations)</i></p> <p>32.6 Students will be able to explain the importance of switches and other safety control mechanisms to the design and operation of electrical circuits and devices. <i>(e.g., switches, fuses, breakers, insulated wires, ground wire)</i></p> <p>32.7 Students will be able to identify examples of applications of electrical systems in the school, community and/or home and explain how they are used <i>(e.g. cooling, heating, lighting, communication, transportation.)</i></p>
<p><b>Communicate understanding:</b></p>	<p>Throughout this unit students will use their communication skills to convey their understanding of simple mechanical and electrical devices to different audiences and for a variety of purposes.</p>

# Structures and Mechanisms

Students will classify different forms of energy resources and identify the different energy sources humans use in daily life (e.g. food, fuels). Be able to describe where energy comes from and how we use it, as well as why it is important in our lives. Students will be able to explain how energy is harnessed from one source to another, and why this is significant to how we obtain energy. Students will analyse the effects of extracting non-renewable resources to provide for our energy needs and explain how these needs and the effects of energy use have changed over time. Lastly, students will plan for and undertake personal actions to help reduce energy use and/or use alternative forms of energy.

**Connections within Science:** Energy and Conversions

**Fundamental Concepts:** Similarity and diversity, systems and interactions, structures and functions

**Enduring Science Understanding:** Most of the energy needs of humans are derived from no-renewable resources.

**Standard: S33.0 Students will be able to classify different types of energy resources and describe how the energy stored in the resources can be harnessed for use by humans. Students will analyse the effects of extracting non-renewable resources to provide for our energy needs and explain how these needs and the use of energy have changed over time and identify ways to minimize negative effects on the environment.**

**Focusing Questions:**

What are the different types of energy resources?

How is energy harnessed?

What are immediate and long-term effects of energy use by society?

In what ways can we conserve energy resources?

**Specific Outcomes:**

33.1 Students will be able to recall various forms and sources of energy (28.1).

33.2 Students will be able to classify different types of energy resources and suggest for each whether they are currently or potentially available in Belize. (*i.e., renewable and non-renewable resources; natural and human-created energy sources - burning wood for fuel, coal, oil, gas, solar, wind, hydro* )

33.3 Students will be able to describe how energy can be harnessed from different sources for use by humans. (*e.g., food, solar, wind, water, oil and gas, electrical, thermal, wave, ocean*)

33.4 Students will be able to analyze the immediate and long-term effects extraction and uses of natural resources for energy production has on society and the environment, and make recommendations for minimizing the effects now and in the future.

33.5 Students will be able to describe ways in which the use of energy by society, the amount of energy used, and the effects on the environment have changed over time.

<p>In what ways can we conserve energy at home?</p>	<p><i>(e.g., drying clothes in a dryer instead of using a clothesline; playing video games instead of playing board games; using electric lights instead of candles; types of pollution created from energy production; increase in contributions of greenhouse gases from fossil fuel use, travel in cars instead of walking or riding bicycles)</i></p> <p>28.5 Students will identify, plan for and undertake personal actions that help reduce energy use and/or use alternative forms of energy to illustrate that positive conservation attitudes and behaviors are integral to stewardship and sustainable use of energy. <i>(e.g., as a class plan to turn off all the lights and/or fans in the classroom and at home when not in use, use fluorescent bulbs, use appropriate size burner on stove, iron clothes in bulk, turning off the faucet while brushing teeth or washing and rinsing dishes to conserve water, reusing, reducing or recycling products or using fewer products, use public transportation, daylight saving time)</i></p>
<p><b>Communicate understanding</b></p>	<p>Throughout this unit students will use their communication skills to convey their understanding of energy resources and its conservation to different audiences and for a variety of purposes.</p>

# Earth and Space Science

This strand engages students in developing their understanding of the Earth's composition as well as landforms and how they can change over time as a result of a variety of processes, both natural and human-created. Additionally, students will learn what space science is and why it is significant to human life, as well as explore the differences and interconnections between weather and climate, and how human activity can have an effect on both weather and climate. Lastly, students will develop their understanding of Belize's marine ecosystems and how and why they are significant to Belizean life.

Throughout this strand, students will acquire, develop and apply:

- curiosity and inventiveness;
- confidence in personal ability to explore materials and learn by direct study;
- team work skills and abilities;
- receptiveness to other ideas;
- a sense of responsibility for actions; and
- respect for living things, the environment, and commitment to their stewardship.

## Suggested Teaching Strategies

- Ask questions that lead to exploration and investigation
- Construct ideas by making predictions and hypotheses
- Identify one or more possible answers to questions asked by themselves and others
- Manipulate materials and make observations that are relevant to questions asked
- Carry out simple procedures that have been developed by others and by the students themselves
- Identify materials that will be used, as well as why they were chosen and how they were used
- Make inferences and describe observation, using illustrations, written and oral language
- Evaluate, describe and explain results
- Use, with guidance and individually, print and other sources of information provided. Sources may include library, classroom, community and computer-based resources
- Communicate results of investigations and activities, using illustrations, written and oral language

**Standard**  
**2**  
**Rocks,  
Minerals  
and Soils**

# Earth and Space Science

Students will understand the differences between rocks and minerals. Students will identify similarities and differences, and classify different types of rocks they find through investigations. They will investigate how rocks contribute to the formation of soil and examine soil samples to identify the components of the samples. They will also investigate how a variety of rocks, minerals and soils are used in human life.

**Connections within Science:** Std. 2 Waste and our World

**Fundamental Concepts:** Similarity and diversity, systems and interactions

**Enduring Science Understanding:** There are different types of rocks and soils in Belize.

**Standard: S34.0 Student will be able to differentiate between rocks, minerals and soils, explain how they are used to support human life and how rocks contribute to the formation of soil.**

**Focusing Questions:**

How are rocks and minerals different?

What are different types of rocks found locally?

What are some features you can use to describe rocks?

How do rocks help form soil?

What are the soils made up of?

What do we use rocks, soils and minerals?

**Specific Outcomes:**

34.1 Students will be able to differentiate between rocks and minerals. (i.e., rocks are made up of two or more minerals; minerals are made up of only one substance)

34.2 Students will be able to give examples of rocks and minerals found in Belize. (*e.g., Rocks: mountain, stone, boulder, pebbles; Minerals: dolomite, gold, petroleum*)

34.3 Students will be able to classify local rocks on the basis of color, luster or “shininess” (shiny, dull, glassy, metallic, earthy), texture (rough, smooth, uneven), and hardness (based on scratch tests with available materials).

34.4 Students will be able to demonstrate one or more ways by which rocks break down to form the basis for soil. (*e.g., by shaking a group of small soft rocks in a jar of water; by striking rocks together*)

34.5 Students will be able to describe soils as a combination of different minerals, rocks, and organic materials layered together in various ways. (i.e., investigate a local soil sample to identify its components)

34.6 Students will be able to give examples of how minerals, rocks and soils are used by humans. (e.g., gold is used for jewelry; rocks are used for construction; soils are used for agriculture)

**Communicate understanding:**

Throughout this unit students will use their communication skills to convey their understanding of rocks, minerals, and soils to different audiences.

**Standard**  
**3**  
**Landforms and Changes**

# Earth and Space Science

Students will understand what landforms are, how different natural events and human activities shape them over time and how changes in landforms can be positive or negative for humans, animals and plants.

**Connections within Science:** Plant and Animal Habitats; Rocks and Soils;

**Fundamental Concepts:** similarity and diversity, systems and interactions, structure and function

**Enduring Science Understanding:** The earth’s landforms and their formation vary across the globe.

**Standard: S35.0 Students will be able to discuss landforms, how they are changed and the impacts changes have on humans, animals and plants.**

**Focusing Questions:**

What are different commonly found types of landforms on earth?

What landforms are found in Belize?

How are landforms changed?

How do changes in landforms affect humans, animals and plants?

**Specific Outcomes:**

35.1 Students will be able to identify a variety of earth’s surface features that are landforms. (*e.g., mountains, valleys, hills, caves, flatlands, islands*)

35.2 Students will be able to identify and describe natural landforms found in their local area, within Belize and in other countries, and note similarities and differences between them.

35.3 Students will be able to discuss how landform changes are brought about and how changes can be positive or negative for humans, animals and plants. (*e.g., earthquakes, erosion, hurricanes, human activities: construction, mining*)

**Communicate understanding:**

Throughout this unit, students will use their communication skills to convey their understanding of landforms to different audiences and for a variety of purposes.

# Earth and Space Science

Students will observe and identify objects in the day and night sky, as well as understand how the solar system works. Students will understand how seasonal cycles, phases of the moon and motion relate to human life and experience. Students will also be able to demonstrate an understanding of space exploration and what this knowledge has done for humankind.

**Connections within Science:**

**Fundamental Concepts:** Similarity and diversity, systems and interactions

**Enduring Science Understanding:** Our planet earth is a part of the solar system.

**Standard: S36.0 Students will be able to describe the solar system and the impact celestial bodies have on the earth.**

**Focusing Questions:**

What is the difference between a star and a planet, a moon and a planet, meteors and satellites?

What four planets are closest to the sun?

What causes day and night?

What is a sun dial?

Why do we have seasons?

**Specific Outcomes:**

36.1 Students will be able to differentiate between stars, moons, planets, meteors and satellites.

36.2 Students will be able to design and build a model of the solar system and communicate their understanding of how the solar system works. *(e.g., using simple materials, such as balls and beads, create a model of the solar system to explore the relative position and sizes of the sun, earth’s moon, earth and other planets that are part of our solar system; draw line graph showing distances from the sun.)*

36.3 Students will be able to demonstrate and explain how the earth’s rotation around the sun results in cyclical changes from day to night. *(i.e., rotation and revolution of the earth causes night and day; build a device for plotting the apparent movement of the sun over the course of a day - a sundial or shadow stick )*

36.4 Students will be able to explain seasonal changes as a result of the angle of the sun above earth’s horizon determining the amount of the sun’s energy received at different times throughout the year and how seasons affect humans, plants and animals *(e.g., yearly cycles of weather change benefits: farming crops, breeding*

What are the phases of the moon and how do these affect systems on earth?

**Communicate understanding:**

*seasons, pollination, migration of animals)*

36.5 Students will be able to identify the phases of earth's moon, describe each phase, and explain how this cycle of phases is important for humans and for some animals and plants. (e.g., *descriptions include that monthly phases of the moon are regular and predictable, impact tides and are used to inform appropriate times for farming, breeding, harvesting)*

Throughout this unit students will use their communication skills to convey their understanding of celestial bodies in our solar system to different audiences and for a variety of purposes

Students will be able to explain weather and climate and how they affect the world they live in. They will measure different weather conditions, explain how tropical weather systems develop and monitor the movement of a hurricane. Students will identify different weather and climate patterns and trends, and identify how humans may impact weather and/or climate.

**Connections within Science:**

**Fundamental Concepts:** similarity and diversity, systems and interactions

**Enduring Science Understanding:** Weather and climate vary. Natural elements and human activities may impact weather and climate.

**Standard: S37.0 Students will understand weather, climate and the interrelations between each, measure different weather conditions, how tropical weather systems form and are monitored, the effects of weather and climate on living things, and how humans have and are influencing climate.**

**Focusing Questions:**

What is the difference between weather and climate?

How can we tell which area is warmer than another?

What is air convection and how does it affect us?

What are some devices used to measure weather conditions?

What are some common types of clouds?

How are weather systems formed?

**Specific Outcomes:**

37.1 Students will be able to distinguish between climate and weather and explain general effects of climate and weather on living and non-living things. (*i.e., climate refers to long-term weather trends in a particular region and that climate varies throughout the world*)

37.2 Students will be able to make observations and predict where, in any given indoor or outdoor environment, one might find the warmest and coolest temperatures. (*e.g., make predictions based on prevailing wind, location relative to a water body, sunrise and sunset, reflective surfaces of roofing materials, immediate vegetation and other landscape*)

37.3 Students will be able to explain the patterns of air movement, in indoor and outdoor environments, that occur when one area is warm and another area is cool. (*e.g. inversions - room natural ventilations, land and sea breezes*)

37.4 Students will be able to build and use simple devices to measure ambient temperature, wind speed, wind direction and rainfall and use a barometer to measure atmospheric pressure. (*e.g., make and use a rain gauge; create a weather vane to determine wind direction, use a classroom barometer and record changes - a drop in pressure*)

How do humans affect climate?

What are greenhouse gasses and how do they affect our climate?

How can we reduce climate change?

*indicates an increased chance of rain, a rise in pressure indicates an increased chance of clear skies)*

37.5 Students will be able to recognize common types of clouds and relate them to different weather patterns.

37.6 Students will be able to determine possible changes to the local weather by observing the amount of cloud cover, the type and color of clouds, the movement of clouds, changing wind direction and speed, air moisture, and other measured data (37.4).

37.7 Students will be able to make their own weather forecast by using their observation skills to record weather measurements over a period of time and analyzing trends in the weather.

37.8 Students will be able to explain how weather systems such as tropical depressions, tropical storms and hurricanes are generated and how their impacts affect humans, animals and plants. *(i.e., different surfaces on earth retain and release heat at different rates)*

37.9 Students will be able to track a hurricane over time and connect this to the hurricane warning system for Belize. *(i.e., use latitude and longitude on a hurricane tracking chart to track the movement and forecast of hurricanes)*

37.10 Students will be able to identify how various human actions contribute to changing weather patterns and climate *(e.g., increasing the amount of greenhouse gases on earth, global warming, impacts on biodiversity; impacts on low-lying coastal areas; impacts on water availability)*

**Communicate understanding:**

Throughout this unit students will use their communication skills to convey their understanding to different audiences and for a variety of purposes

# Earth and Space Science

Earth is described as the water planet: over two-thirds of earth's surface is covered by oceans and freshwater systems. By exploring examples of aquatic systems, students come to appreciate the dynamic nature of these systems and learn about the interrelationship of the aquatic systems and how they support life. Students will also investigate factors that affect the distribution and health of living things in aquatic environments and humans can protect aquatic systems.

**Connections within Science:**

Standard 4: *Water for All*

Standard 5: *Landforms and Changes*

**Fundamental Concepts:** Similarity and diversity, systems and interactions, structures and functions.

**Enduring Science Understanding:** A large portion of earth's surface is covered with bodies of salt and fresh water.

**Standard: S38.0 Students will be able to identify aquatic bodies, how aquatic systems are connected and support life and will investigate the relationship between aquatic systems and living things that are found in and around them, make predictions of the effect of changes to the water on living things that utilise the aquatic system and how humans affect aquatic systems and can reduce their impacts.**

**Focusing Questions:**

What are some fresh and salt water bodies in and around Belize?

How do sediments and nutrients flow from one water system to another?

What are the factors that affect the distribution and productivity of life in aquatic systems?

What are some of the living things found in fresh and salt water in and around

**Specific Outcomes:**

38.1 Students will be able to identify fresh and salt water systems in and around Belize and major water systems throughout the world (*e.g., **Belize:** sea, lagoons, estuaries, rivers, ponds, creeks, cenotes – other underground sources as repositories of the earth's water; **world:** great lakes, seas, oceans, ice sheets*)

38.2 Students will be able to describe how water flows through continental drainage systems to seas and ocean basins carrying sediments and nutrients with it as it empties from one water system to another. (*e.g., dissolved solids and stream-borne sediments wash into rivers and then intermix with seawater; surface water drains into the underground water table; connect to the water cycle 13.2/3*)

38.3 Students will be able to describe how the interconnections (38.2) between water systems are critical contributors for the distribution and productivity of aquatic animals and plants. (*e.g., river and ocean currents can affect food and nutrients available for sea life; water acidity limits coral growth; poor water quality or the*

<p>Belize?</p> <p>How do we negatively impact water systems?</p> <p>In what ways can we reduce our impact on the water systems?</p>	<p><i>presence of particular chemicals limits survival of sensitive populations; the oxygen content of water determines what can live in it.)</i></p> <p>38.4 Students will be able to investigate select living things found in and around a body of fresh or salt water in Belize and predict what might happen to the living things if changes occur to the body of water. <i>(e.g., investigate the distribution of a fish, a mammal, a bird, a coral, a surface plant, a water weed in and around the body of water, investigate its place in a food web, how it uses the body of water; predict the effect on the organism if the water gets too hot / dries up / is contaminated)</i></p> <p>38.5 Students will be able to explain how humans affect freshwater and saltwater systems and how humans can reduce those impacts. <i>(e.g., use of adjacent lands, methods used to dispose of wastes, the harvesting of aquatic species, pollution)</i></p>
<p><b>Communicate understanding:</b></p>	<p>Throughout this unit students will use their communication skills to convey their understanding of aquatic systems to different audiences and for a variety of purposes.</p>

## General Guidelines in Science

Instruction in Science should ensure pupils engagement to maximize retention. Activity based instruction in science motivates and enhances pupils social and cognitive development. Statements in the introduction (science curriculum) clearly explain and justify the importance of science instruction at the primary level. The scope and sequence chart, and learning outcomes clearly delineate what should be taught at each level of our primary education. Active engagement in science will enable pupils to recognize that science skills (scientific process skills) are intertwined.

Teachers need to provide a variety of learning experiences for students which promote understanding of self, their world, and their environment. Intellectual development is an ongoing process at the elementary level. During these years several stages of development are occurring, with this in mind, teachers need to ensure that the content and concepts presented are consistent with the developmental level of the children. Since not all pupils are learning at the same rate or have the same capabilities, teachers must tailor their lessons to engage all pupils despite their ability, interest, and developmental needs.

The table below shows some process skills which may be employed by teachers in science instruction that are age appropriate.

Infant 1	Infant 2	Std. 1	Std. 2	Std. 3	Std. 4	Std 5	Std. 6
sensing	classifying	communicating	comparing	inferring	organizing	analyzing	inferring
describing	observing	measuring	applying	predicting	hypothesizing	forming	evaluating
recalling	recording		experimenting	concluding	interpreting	conclusions	conceptualizing

The processes above will form a part of the vocabulary in science lessons. Pupils should be familiar with the terms and use them correctly to express self both orally and written. Engaging pupils in these processes will develop the thinking patterns appropriate for each cognitive level.

### Performance Objectives

Each lesson should be purposeful; it should state clearly what should be achieved. Performance objectives tell what pupils should be able to after or during instruction. Objectives are also used to:

- decide what materials, arrangement of furniture, and teaching strategies will be used;
- diagnose students' abilities; and
- inform pupils of what they should expect in each lesson.

Performance objectives also inform teachers of what needs to be done after each lesson. Some behaviours which are observable include pupils:

- asking relevant questions at varying degrees (basic recall to higher order)

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- gathering data or sharing evidence which supports their answers
- suggesting alternate solutions to problems investigated
- rejecting ideas when evidence gathered does not support hypotheses

Teachers must be mindful of pupils' attitude toward learning. The checklist below may help keep track of the development of a positive attitude toward science.

	never	sometimes	always
Student _____			
Date _____			
1. Expresses a liking for science.			
2. Requests to use science materials.			
3. Reads science books.			
4. Does science activities at home.			
5. Volunteers to bring in materials for experiments.			
6. Asks questions beyond text material.			

Sample, teachers may alter.

The checklist above automatically creates a record for the teacher, which will track the students during the term. A similar checklist may be developed to monitor the attainment of objectives in science lessons.

## Science Toolkit

The science toolkit contains materials which will be kept in the classroom for use during lessons. It may include but is not limited to the following:

### Materials

- cotton
- gloves
- rope
- water paint (primary colours)
- needles
- small bells
- inflatable balls
- scissors
- paint brush
- 1 inch nails
- string
- colored paper
- corks
- plastic spoons
- storage bins
- craft sticks
- flashlight bulbs
- magnifying glass
- small mirrors
- utility knives
- colored pencils
- play dough
- glass strips
- construction paper
- pencils
- markers
- skewers
- measuring cups
- measuring spoons
- paper plates
- markers
- thread
- charts & posters
- pictures

### Materials

- erasers
- balloons
- tape measure
- adhesive tape (masking, clear)
- basins
- bins
- glue
- paper clips
- buttons
- scissors
- toothpicks
- bats
- candles
- magnets
- screws
- flashlights
- batteries
- pins
- drinking straws
- elastic
- rulers
- foam balls
- adhesive labels
- rubber bands
- funnel
- marbles
- spatulas
- goggles
- paper fasteners
- thermometers
- wheels
- steel rods for axils
- pulleys

## Resources around the home/school

There are many items which are disposed daily both at home and in school. These may be collected washed and stored for use in science lessons.

### School

- seeds
- paper
- materials from other projects
- old brooms
- toilet paper rolls
- show boxes for sorting and organizing

### Home

- plastic bottles/gallons
- cans
- egg cartons
- food jar
- empty boxes
- damaged appliances
- old toys
- leaves
- feathers
- old clothing
- news papers
- magazines
- pennies
- pictures
- utensils

**Other Resources:** textbooks, encyclopedias, internet, educational CDs, index cards, magnets, hand lenses, etc.

### Places to Visit

There are many places where teachers may take students to explore and investigate science concepts. These include:

- a processing plant
- a farm
- a local industry
- utility company (power station, water treatment plant, etc.)
- the zoo
- a market
- the beach/river bank
- weather bureau
- reserves/protected areas/local parks
- TV station
- A dump (solid waste disposal site)

**All visits should be planned and tasks assigned for pupils to benefit from visit/s.**

## General Safety Rules

- store all materials properly
- harmful materials should be locked at all times and only accessible by adults
- demonstrate the proper use of all materials (follow instructions)
- give clear, complete directions before students begin each activity
- take appropriate precautions when using heat sources
- instruct pupils not to taste or touch substances or materials without permission
- stress the importance of not touching mouth, eyes, face or any body parts while working on activities
- always wash hands thoroughly after each activity
- stress the importance of appropriate behaviour during each activity
- expose pupils to emergency procedures e.g. first aid and fire drill
- make or purchase a poster with safety rules and review it regularly with pupils
- first aid kit should be stocked at all times, always replace items used
- seek medical attention immediately if there is an accident

All classrooms no matter the size of the room should develop and maintain a nature corner with real animals and plants or plant products. This will assist pupils to develop a greater appreciation for science. Science is alive!



Belize Curriculum

# Lesson Plan

<b>Teacher:</b>	
<b>School:</b>	
<b>Class:</b>	
<b>Subject:</b>	
<b>Date:</b>	
<b>Duration:</b>	minutes

<b>Title</b>		
<b>Overview</b>		
<b>Big Idea or Essential Question</b>		<b>Key Vocabulary:</b>
<b>Objective(s)</b>		
<b>Introduction</b>		
<b>Activities</b>	<u><i>Student-Centered</i></u>	<u><i>Teacher Support</i></u>
<b>Wrap Up</b>		<i>Assignment:</i>
<b>What Next</b>		
<b>Resources / Materials</b>		<i>Technology Use:</i>
<b>Assessment</b>	<i>Check for Understanding:</i>	<i>Formal:</i>
<b>Evaluation</b>	<i>Things that worked very well:</i>  <i>Things that did not work well:</i>  <i>Things to change / improve:</i>	<i>Other ideas to keep in mind:</i>

## Glossary

The following terms are common terms that teachers and students should have knowledge about, as well as understand how they apply to conceptual learning. Students should be encouraged to use the correct vocabulary, as it allows them to articulate ideas more clearly, to better understand the ideas of others and to link their new learning to their existing understandings. As the students revisit concepts and vocabulary in new contexts throughout the grades, their understanding of them will become richer and more sophisticated.

The definitions below are provided for teacher reference. They are NOT intended for student memorization and assessment.

*Aquatic:* means relating to water; living in or near water or taking place in water

*Arboreal locomotion:* is the locomotion of animals in trees. In every habitat in which trees are present, animals have evolved to move in them. Some animals may only scale trees occasionally, while others are exclusively arboreal. These habitats pose numerous mechanical challenges to animals moving through them, leading to a variety of anatomical, behavioural and ecological consequences

*Climate:* encompasses the statistics of temperature, humidity, atmospheric pressure, wind, rainfall, atmospheric particle count and other meteorological elemental measurements in a given region over long periods. Climate can be contrasted to weather, which is the present condition of these elements and their variations over shorter periods. A region's climate is generated by the climate system, which has five components: Atmosphere, hydrosphere, cryosphere, land surface, and biosphere.

*Consumer:* organisms that eat living plants and/or animals.

*Decomposers:* organisms such as moulds, fungi, insects and worms that reuse and recycle materials that were formerly living.

*Energy:* is an indirectly observed quantity. It is often understood as the ability a physical system has to do work on other physical systems. Since work is defined as a force acting through a distance (a length of space), energy is always equivalent to the ability to exert pulls or pushes against the basic forces of nature, along a path of a certain length.

*Force:* is any influence that causes a free body to undergo a change in speed, a change in direction, or a change in shape. Force can also be described by intuitive concepts such as a push or pull that can cause an object with mass to change its velocity (which includes to begin moving from a state of rest), i.e., to accelerate, or which can cause a flexible object to deform. A force has both magnitude and direction, making it a vector quantity

*Fossorial:* a fossorial organism is one that is adapted to digging and life underground such as the badger, the naked mole rat. It is an adjective most commonly used to describe the habit of living underground, even if the physical adaptations are minimal - and a great many rodents are considered fossorial. Some organisms are fossorial to aid in temperature regulation, while others utilize the underground habitat for protection from predators or food storage.

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*Food Web:* a network of interrelated food chains

*Food Chain:* a sequence of organisms eating other organisms to gain nourishment; a food chain starts with a primary energy source such as the sun, followed by a producer that makes its own food.

*Habitat:* Those parts of an ecosystem that support the survival and reproduction of an organism by providing food, water and shelter.

*Non-renewable Resources:* is a natural resource which cannot be produced, grown, generated, or used on a scale which can sustain its consumption rate, once used there is no more remaining. These resources often exist in a fixed amount and are consumed much faster than nature can create them. Fossil fuels (such as coal, petroleum and natural gas) and nuclear power (uranium) are examples

*Organism:* a living thing. Plants and animals are organisms

*Producers:* organism that make its own food using sunlight.

*Renewable Resources:* it is replaced by natural processes and if replenished with the passage of time. Renewable resources are part of our natural environment and form our eco-system

*Simple machine:* elementary "building blocks" of which all more complicated machines (compound machines) are composed. E.g. wheels, levers, and pulleys are all used in the mechanism of a bicycle. The mechanical advantage of a compound machine is just the product of the mechanical advantages of the simple machines of which it is composed. Simple machines fall into two classes; those dependent on the vector resolution of forces (inclined plane, wedge, screw) and those in which there is an equilibrium of torques (lever, pulley, wheel).

*Terrestrial:* refers to things related to land or the planet Earth

*Transformation (energy):* it resides in a different state

*Weather:* is the state of the atmosphere, to the degree that it is hot or cold, wet or dry, calm or stormy, clear or cloudy.

*Work:* the amount of energy transferred by a force (mechanical work),

## Resource Considerations

Alberta Education Learning Resources Center <http://www.lrc.education.gov.ab.ca/pro/default.html>

Alberta Environment Teacher Resources <http://environment.gov.ab.ca/edu/listingEd.asp?audience=Teachers&head=ED>

Link to Learning <http://www.linktolearning.com/>

Science Netlinks <http://www.sciencenetlinks.com/matrix.php>

United States Environment Program Teaching Resources <http://www.epa.gov/teachers/teachresources.htm>

United Nations Science Series [http://library.unesco-iiicba.org/English/SECONDARY\\_SCIENCE\\_SERIES/index\\_pages/science\\_lessons\\_by\\_topic.htm](http://library.unesco-iiicba.org/English/SECONDARY_SCIENCE_SERIES/index_pages/science_lessons_by_topic.htm)

### Living Things.

Belize Audubon Society <http://www.belizeaudubon.org/>

Belize Zoo <http://www.belizezoo.org/>

Science Teachers – Life Science <http://www.science-teachers.com/life.htm>

### Healthy Environments.

Belize Audubon Society <http://www.belizeaudubon.org/>

Belize Zoo <http://www.belizezoo.org/>

Human-Environmental Interactions <http://www.outreachworld.org/resource.asp?curriculumid=629>

North American Association on Environmental Education <http://www.naaee.net/>

Reef Briefs – Marine Ecosystems <http://ambergriscaye.com/reefbriefs/index.html>

### Your Body and You.

The Lesson Plans Page – Physical Education and Health <http://www.lessonplanspage.com/PE.htm>

BBC - Human Body <http://www.bbc.co.uk/science/humanbody/>

### Matter and Energy.

Discovery Education <http://www.discoveryeducation.com/teachers/free-lesson-plans/matter-and-energy.cfm>

Energy Kids <http://www.eia.doe.gov/kids/>

Explore Sound <http://www.exploresound.org/Home/Links.aspx>

Kids Konnect <http://www.kidskonnect.com/subject-index/15-science/91-matter-a-energy.html>

Renewable Energy Center <http://www.therenewableenergycentre.co.uk/educational-resources/>

The Science of Light <http://www.learner.org/teacherslab/science/light/index.html>

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### **Structures and Mechanisms.**

Exploratorium <http://www.exploratorium.edu/structures/>

Simple Machines <http://www.fi.edu/qa97/spotlight3/spotlight3.html>

Mechanisms <http://www.technologystudent.com/cams/camdex.htm>

### **Earth and Space Science.**

Earth Science Teaching <http://geology.com/teacher/>

GreenLearning <http://www.greenlearning.ca/>

Science Teachers – Space Science <http://www.science-teachers.com/space.htm>

Science Teachers – Physical Science <http://www.science-teachers.com/physical.htm>