REPUBLIC OF TRINIDAD AND TOBAGO
MINISTRY OF EDUCATION

GORTT/IBRD BASIC EDUCATION PROJECT

Primary School Syllabus

Standard Two and Standard Three

SCIENCE

Curriculum Development Division

August 2004

TABLE OF CONTENTS

FOREWORD

The Science Syllabus for Primary Schools in Trinidad and Tobago which was developed and introduced in the early eighties was significantly influenced by the then prevailing curriculum thrust toward acquisition of skills, with the emphasis on scientific processes and pupils' engagement in hands-on, minds-on activities. The Syllabus was then modified in 1994 with the inclusion of topics related to the environment and technology. There remained however, insufficient focus on concepts and content in the programme.

In 2001, the Government of the Republic of Trinidad and Tobago (GORTT) / International Bank for Reconstruction and Development (IBRD) Basic Education Project presented an opportunity to review the existing Primary School Science Syllabus. It also made provision for the training of teachers to improve the implementation of the Syllabus and the supply of equipment/resource materials to support its delivery.

This newly revised Science Syllabus for Primary Schools provides a focus on both the processes and content of science. It is designed to strengthen many of the skills used by students everyday such as creative problem solving, critical thinking, working co-operatively in teams, and using technology effectively. The Syllabus also reflects a new emphasis on exploring and developing attitudes and values related to science that are consistent with sustainable development and socially accepted moral and spiritual values.

The rapid developments in the fields of science and technology impact on every student of Trinidad and Tobago. Being involved in a search for how the natural world operates and how scientific knowledge can be applied to the benefit of society allows the student to take control of his/her environment. It contributes therefore to development at a personal as well as national level and promotes self-fulfillment. The teaching of science is therefore an important aspect of nation building and must be undertaken by teachers who have mastery of subject matter and of modern teaching and learning techniques.

Teachers must model the behaviours and attitudes that they expect their young charges to acquire, and students must be given the opportunities to practise these behaviours and attitudes. If a child is to learn to be creative and inventive, he/she must be taught by a teacher who is creative and inventive and allowed to practice being creative and inventive. If a child is to learn to solve problems, he/she must be taught by a problem solver and allowed to solve meaningful problems regularly.

The primary science curriculum was reviewed with inputs from an international and a local science consultant, science specialists and a specially selected group of Trinidad and Tobago science educators (see Acknowledgements for names of Science Curriculum Team Members). They combined their expertise and experience to revise the existing curriculum document and to produce the new draft Science Curriculum Document. This draft was implemented on a phased basis, initially at the levels of Infant Year I and II and Standard I in all primary schools in September 2001.

The Standard II and Standard III Syllabuses were piloted in September 2002.

It was recognised that there was a need for necessary groundwork to be undertaken prior to full-scale implementation of the Draft Science Syllabus. As part of this preparation, a series of Regional Workshops and School-Based Coaching Activities were held to explain as well as orient School Supervisors, Principals and Teachers toward the constructivist approach to the teaching of science. Via this approach the previous knowledge and experiences of the pupils are used to build upon or restructure so as to achieve the stated objectives. The teaching strategies and techniques that should be employed in implementing the new syllabus were also discussed and modelled in these workshops.

Based on feedback obtained from questionnaires and reports from school visits and workshops, the Science Syllabus for Standard II and Standard III was refined. This document is the result of these efforts.

The process of curriculum revision is ongoing and is being applied to the Standard IV and Standard V levels of the Syllabus in the 2003-2004 academic year.

In this regard, educators are invited to participate in the curriculum development process by providing feedback as the draft syllabus in Standards IV to V is being piloted in all primary schools. Comments may be submitted to the Curriculum Development Division, Rudranath Capildeo Learning Resource Centre, Mc Bean Village, Couva (Tel/Fax: 636-9296), or via email to curriculum@tstt.net.tt.

We are confident that this new Standard II to Standard III Primary Science Syllabus will contribute significantly to improving the quality of the teaching and learning of science in primary schools and to the achievement of the national educational goals.

.....

SHARON DOUGLASS-MANGROO
DIRECTOR OF CURRICULUM DEVELOPMENT(Ag.)

August 16, 2004

PRIMARY SCIENCE SYLLABUS

INTRODUCTION

Science is a distinct form of creative human activity, which involves one way of seeing, exploring and understanding reality. It is both a way of finding out about the world and a growing body of ideas and information about the way things work.

Science is one of the essential features of any society, having profound effects on people's lives and the environment, especially through its application for practical purposes. It is not a homogenous activity generating a single form of knowledge but consists of a variety of distinguishable, interconnected and overlapping disciplines within the scientific domain.

At the heart of scientific activity is the desire to explore and understand the world and to do so using a distinctive mode of enquiry. Central to this mode of enquiry is a set of systematic processes such as hypothesizing, observing, measuring, designing and carrying out experiments, recording and analyzing data, and evaluating investigations.

It is this mode of enquiry that allows students to collect the type of data needed for acquiring a view of the world that can complement other perspectives. Consequently science has earned a place in any balanced education and is a crucial factor in enhancing sustainable development in nations.

The overall goal of science education is to develop scientific capability in all young people from 5 – 18. The term "scientific capability" is used instead of "scientific literacy", since it conveys more clearly the focus of science education for action as well as for personal enlightenment and satisfaction.

Scientific capability encompasses five distinct but connected aspects:

1) Competence – ability to investigate scientifically
2) Curiosity – an enquiring habit of mind
3) Understanding – making sense of scientific knowledge and the way science works
4) Creativity – ability to think and act in a non linear way
5) Sensitivity – critical awareness of the role of science in society combined with a caring and responsible disposition

Becoming scientifically capable therefore involves not merely the acquisition of skills, knowledge, understanding and development of appropriate personal qualities and attitudes but also focuses on integrating and applying these personal and intellectual resources for both cognitive and practical purposes in a variety of contexts.

Organization of the syllabus

This syllabus is sequenced from Infant I to Standard 5. There are (6) strands through each year of the syllabus which helps pupils to develop important concepts in primary science. They help the pupil develop a sound understanding of the living and material world. The strands are:

1) Living things
2) Ecosystems
3) Matter and Materials
4) Structures and Mechanisms
5) Energy
6) Earth and Space

Each strand is presented under the headings: Concepts, Objectives, Enquiry Skills, Suggested Teaching/Learning Activities, and Suggested Assessment Activities.

Two types of objectives are specified. Those that relate to concepts and those that relate to process. One major change in this syllabus is the identification of concepts, which pupils need to develop.

The second type of objectives relates to Enquiry skills. As pupils achieve the objectives they will develop and refine their approach to enquiry in science. By setting science in context, pupils should be more able to transfer their learning to situations they meet outside the classroom setting. They will be able to:

Make predictions and hypotheses;
Devise and carry out investigations to answer their questions;
Interpret the outcomes; and
Evaluate their work and that of their peers.

In the objectives, you may recognize the twelve processes from the 1994 syllabus. There are a number of Enquiry Skills, which pupils develop as they study the six (6) strands previously listed. These are grouped into those that relate to:

- Planning Enquiries
- Conducting Inquiries
- Communicating Outcomes and Commenting on their Investigations.

The processes defined in the 1994 syllabus are here integrated across this New Syllabus. They are classified to match the Enquiry Skills.

Planning Enquiries.	Predicting	Describe in advance the outcome of an event based on a pattern formed from previous experience.
	Hypothesizing	A prediction based on observation or scientific knowledge and understanding. It should be testable.
	Controlling variables	Discriminating among factors that will, and will not, affect the outcome of an experiment.
	Designing procedures	To obtain information about interrelationships between objects and events.
Conducting Inquiries.	Observing	Using the senses – seeing, tasting, touching, hearing and smelling – to find out about objects or events in the environment. Using space-time relationships. Perceiving and describing objects in terms of their shape, motion, position or location. Perceiving and describing events in terms of sequences, duration, period of time between them and other events.
	Measuring	Finding out about an unknown quantity by comparing it with a known quantity.
	Classifying	Grouping objects or events using one or more observed properties.
	Carrying out	Carrying out procedures systematically and recording results in appropriate formats.
Communicating Outcomes and Commenting on Investigations.	Inferring	Figuring out an explanation based on observations of an object or event.
	Interpreting data	Explaining the meaning or the significance of information regarding an object or event.
	Defining Operationally	Constructing information from what has been done and what has been observed.
	Communicating and Commenting	Conveying information by means of oral or written descriptions, pictures, graphs, maps, demonstrations, etc, and evaluating outcomes and procedures.

Pupils can learn about science as a human activity by emphasizing that people of all ages, backgrounds and groups have made contributions to science and technology throughout history. They should then be able to recognize parallels between the way they work in the classroom and how scientists operate. Like scientists, pupils talk about and review their work and the work of others. Scientists and pupils often work in teams and produce knowledge together. Pupils will be asking questions and answering them through a variety of types of investigations. They will learn to use a range of instruments to develop an appreciation of a quantitative approach to their investigations. They will learn that others may interpret their evidence differently. Through their school science, it is hoped that pupils will demonstrate greater objectivity in assessing scientific information with more open-mindedness and appreciation for alternative ideas.

The teaching and learning approaches in this science syllabus draw on recent research in science learning and promotes the constructivist style of learning. Pupils come to school with views on many science concepts which impact on learning. Teaching of each new concept should start by identifying what pupils think. They can do this by brainstorming, sorting activities, sentence completion, drawing, discussing concepts, cartoons, journal entries and so on.

The assessment of pupils' learning can be done by observing them at work and by looking at the outcomes of their work. There is not always a need for many formal and traditional assessment exercises. There is thus a shift towards more formative assessments, during the lesson, and the integration of performance-based assessments where pupils engage in activities to demonstrate skills developed and also present in a variety of ways to their peers. These assessments can be in the form of written, oral, hands-on or technology-based presentations.

STRANDS

1. Living Things
2. Ecosystems
3. Matter and Materials
4. Structures and Mechanisms
5. Energy
6. Earth and Space

The following six strand-charts show the relationship between the strands, the sub-strands and the topic covered.

STRAND 1 – LIVING THINGS

SUB-STRANDS	STANDARD 2	STANDARD 3
GROWTH	Conditions for growth	
REPRODUCTION	Grouping animals 3	Flowers – parts Animals have young
IRRITABILITY/ SENSITIVITY	Eyes give us information about our surroundings	Plants respond to environmental changes
MOVEMENT		
NUTRITION	Food chains	Food chains are interconnected in a food web
EXCRETION		
RESPIRATION		

STRAND 2 – ECOSYSTEMS

SUB-STRANDS	STANDARD 2	STANDARD 3
HABITAT	Habitats -The impact of changes in environmental conditions	Habitats – The sea as a habitat
VARIETY		
INTERACTION		
ORGANISMS		
ENVIRONMENT		

STRAND 3 – MATTER AND MATERIALS

SUB-STRANDS	STANDARD 2	STANDARD 3
PROPERTIES	Dissolving Fresh Water and Sea Water have different properties	Air occupies space Air has mass Temperature affects dissolving
CHANGE		
SEPARATION	Separation of Mixtures 1 – sieve, hand picking, filtering, evaporation, magnet.	Separation of Mixtures 2- Chromatography, Distillation.
USES		

STRAND 4 – STRUCTURES AND MECHANISMS

SUB-STRANDS	STANDARD 2	STANDARD 3
STRUCTURES	Forces affect the stability, shape and strength of structures	Simple machines –Inclined planes.
MECHANISMS		

STRAND 5 - ENERGY

SUB-STRANDS	STANDARD 2	STANDARD 3
SOURCES / TYPES	Solar Energy – The sun as a principal source of energy	
USE	Uses of Solar Energy. Fire can be a hazard.	
TRANSFER		Temperature is measured via thermometers. Energy can be converted to other forms.
CONSERVATION		Energy travels in different ways.

STRAND 6 – EARTH AND SPACE

SUB-STRANDS	STANDARD 2	STANDARD 3
SPACE TRAVEL		
SOIL & ROCKS	Soil – components, properties	Resources in Soil – minerals, petroleum, natural gas.
PLANETS		
EARTH		

SYLLABUS OF WORK

STANDARD 2 - LIVING THINGS

Concepts	Objectives	Enquiry Skills	Suggested Teaching/Learning Activities	Suggested Assessment Activities
	Pupils will be able to:			
1. Certain conditions are necessary for proper plant growth.	i. demonstrate that growing plants need light.	Control variables by using seedlings of the same number, type and age. Observe. Measure. Communicate by written /visual description.	Pupils are presented with the hypothesis –" Plants grow better in darkness than in the light." With the help of the teacher they plan an investigation that will enable them to compare the growth of similar plants in light and in darkness. Pupils make observations, draw, label and describe what they observe. They may accept, reject or modify their initial responses.	Pupils explain the effects of light/darkness on plants. They investigate plants that grow well indoors or in shady areas.
	ii. demonstrate that growing plants need water.	Control variables by using seedlings of the same number, type and age. Observe Measure. Compare. Communicate orally and visually.	Teacher shows pupils posters of a green healthy lawn and another that is dried and brown due to the lack of water. Pupils discuss differences and suggest reasons for them. Pupils investigate the effects of water on plants by setting up two similar trays of seedlings. One tray is watered everyday. The second is not watered. Pupils observe, record and interpret observations over a five-day period. They present their findings to the class.	Reports and presentations are assessed. Research plants that grow well in extreme dry/wet conditions.

STANDARD 2 - LIVING THINGS (cont'd)

Concepts	Objectives	Enquiry Skills	Suggested Teaching/Learning Activities	Suggested Assessment Activities
	Pupils will be able to:			
2. Vertebrates can be grouped based on different characteristics	i determine which animals should placed into the categories: bird, fish, amphibian, reptile and mammal.	Classify. Compare.	Pupils research characteristics of each vertebrate group – bird, fish, amphibian, reptile, mammal. They view a videotape/series of pictures of a variety of vertebrates. They name all animals and group them according to the researched characteristics.	Pupils are provided with pictures of a different set of vertebrate animals and are asked to classify them according to the specified criteria.
3. Eyes give us information about our surroundings	i perform simple tests to determine the status of their eyesight.	Observe	Invite pupils who did an eye test to share their experiences. Introduce eye test chart. Pupils carry out simple reading test to determine whether they are long sighted or short sighted. N.G.O's/Optical firms maybe invited to screen pupils' vision.	Pupils carry out simple eye test on family members and report their results.
	ii describe ways of protecting the eyes.	Communicate orally and in writing.	Role play scenes featuring the uses/importance of goggles, shades and welding masks. Pupils identify the need to protect their eyes. Each group discusses and produces a poster on rules for eye safety.	Posters are assessed.
4. Animals feed on organisms	i explain the terms "producers" and "consumers". ii identify animals that feed on plants. iii identify animals that feed on other animals. iv construct a food chain of at least three links.	Communicate by visual description Define operationally	Pupils identify familiar animals and discuss what they feed on. Ensure that selections include herbivores, carnivores, omnivores. Pupils should understand that some organisms feed on plants, some feed on animals and some feed on both plants and animals. Teacher introduces concepts of producer and consumer. Teacher illustrates how feeding relationships can be represented in a food chain.	Pupils draw food chains for organisms living. - on land. - in a pond. - in the sea.

STANDARD 2 - ECOSYSTEMS

Concepts	Objectives	Enquiry Skills	Suggested Teaching/Learning Activities	Suggested Assessment Activities
	Pupils will be able to:			
1. Changes in environmental conditions can affect organisms in a particular habitat.	i identify changes in environmental conditions which may occur as a result of particular events.	Communicate orally or in writing	Discuss the effects of bush fires and flooding on a terrestrial habitat e.g. removal of vegetation, removal of soil, damage of soil etc. Discuss how these affect organisms e.g. loss of homes, destruction of food sources, migration, death of organisms.	Pupils create a list of rules to be observed to reduce or prevent the occurrence of flooding and bush fires.
	ii predict the effects of these changes in the environment on organisms.	Predict based on observations	Discuss the effects of drought or drainage of wetlands on organisms such as fish, water lilies, Scarlet Ibis, mangrove. Discussion may be based on the viewing of relevant videos or from pupils' experience of these occurrences.	Write a story of a Scarlet Ibis that returns home one evening to find all the mangrove cut down.

STANDARD 2 - MATTER AND MATERIALS

Concepts	Objectives	Enquiry Skills	Suggested Teaching/Learning Activities	Suggested Assessment Activities
1. Some substances dissolve in water	Pupils will be able to: i. explain the terms: solute, solvent, solution	Defining operationally.	Teacher elicits pupils responses to the following questions. What do you think will happen if sugar/salt and sand are put into water and stirred? How can you find out? Teacher may choose to use words solvent, solute and solution appropriately. Pupils are led to the appropriate use of these terms in forming solutions.	Given labeled samples of various substances, pupils are asked to describe them as solute, solvent or solution.
	ii. from a given set, determine which substances can dissolve in water	Classify substances according to their ability to dissolve in water.	Pupils are provided with a variety of substances and are asked to determine which dissolve in water. Pupils present their findings and clarify varying opinions through further activities.	Provided with a variety of new substances, groups will classify them based on their solubility in water.
2. Mixtures can be separated by various methods.	i. separate a mixture of two or more solids using an appropriate method. ii. separate a mixture of a solid dissolved in water using an appropriate method.	Experiment with mixtures.	Pupils use various methods of recovery (a sieve, hand picking, filtering, evaporation, magnetism) to separate components of a mixture.	Groups are provided with a different sets of mixtures to separate. Reports, activities and presentations assessed.
3. . Fresh water and salt water have different properties.	i. compare the properties of fresh water and salt water.	Plan an investigation. Predict outcomes.	Investigate :- (i) floating and sinking of a solid in salt water and fresh water. (ii) lather formation using salt water and fresh water. Present findings to the class. Discuss conclusions	Assess the design of the investigations, the activity and presentations.

STANDARD 2 – STRUCTURES AND MECHANISMS

Concepts	Objectives	Enquiry Skills	Suggested Teaching/Learning Activities	Suggested Assessment Activities
1. Forces affect the stability of objects	Pupils will be able to: i. investigate how forces affect the stability of a structure. ii. demonstrate how forces affect the shape and strength of a structure.	Use space/time relationships to describe the effect of forces. Predicting Experiment with structures. Communicate outcomes of activities.	Pupils investigate at least three effects of a force on the stability of a cardboard box. They describe real life situations, of these effects (e.g. an overloaded truck climbing a hill, over stacking). Pupils are asked what they think would happen if a force is applied to a small bristol-board box, a sheet of tissue paper, a lump of plastercine and a rubber band. Pupils record their predictions. Provided with samples, pupils investigate the effects of forces on the shape and strength. Pupils compare their observations with predictions and present results to the class.	Provided with samples e.g. a toy truck, pupils will report on the effects of a force on the samples. Provided with different structures e.g. straw, pupils complete a report sheet on the effects of applying forces on the shape and strength of these samples. Oral presentations. Reports assessed.

STANDARD 2 – ENERGY

Concepts	Objectives	Enquiry Skills	Suggested Teaching/Learning Activities	Suggested Assessment Activities
	Pupils will be able to :			
1. The sun is the principal source of energy on the surface of the earth.	i. identify applications of solar energy in their daily lives.	Design a model to demonstrate an application of solar energy.	Pupils describe applications of solar energy in their daily lives.	Assess model/presentations.
	ii. predict the effect on their lives if the sun was absent.		What would happen if the sun did not shine for a week?	Group reports assessed.
2. Inappropriate use of fire can be hazardous.	i classify objects that are combustible and those that are not.	Classify materials	Pupils identify everyday objects which can easily catch fire and those which may not.They observe teacher demonstration of samples. They compare observations with their ideas. Discussion of differences observed	Question: What is the benefit of this classification exercise?
	ii. recommend precautions that may be taken when using fire or preventing it.	Communicate.	Pupils recall fires in their community and the effects. They discuss precautions when using or preventing fires. Teacher reinforces ideas with the use of pictures, video or print resources.	Pupils compose song, poem, rap etc. on fire safety.
			Invite a fire officer to speak with pupils or organize a visit to a fire station.	Poster display on precautions when using fire.

STANDARD 2 – EARTH AND SPACE

Concepts	Objectives	Enquiry Skills	Suggested Teaching/Learning Activities	Suggested Assessment Activities
1. Soil is made up of various components, which have different properties.	Pupils will be able to: i. describe the various components of a soil sample. ii. demonstrate a technique for soil analysis. iii. separate a soil sample into its different components by sieving and sedimentation.	Observe the nature of the soil sample. Observe the characteristics of soil components. Analyze a soil sample. Measure width of the various layers.	Give each group two samples of soil. A group first examines the soil and reports on colour, texture and structure and any other visible features. Pupils use the other sample to separate components using a sieve. They describe the various layers, then given water and measuring cup, each group performs the sedimentation process on a sample. They observe and measure the width of each layer. Group Presentations	Given another soil sample, pupils describe it according to criteria, colour, texture and structure. Pupils separate a soil sample into its components using an appropriate technique. Assess technique used.
2. Different types of soil have different properties.	i observe the flow of water through soil types.	Measure Classify Compare	Groups are presented with a sample of soil. Place about 1/2 litre of a particular soil into an inverted two-litre plastic bottle (with a cut-off bottom). Pour 300ml of water onto the soil and begin timing how long water takes to pass through the soil. Pupils make observations e.g. Is all the water staying on top? Where is it going? Do you see air bubbles? Ask pupils to explain why the soil and water behaved that way when water is poured onto it. Groups to identify how this information is important to our daily lives.	Provided with a variety of soil types, groups perform activities to classify them. Group presentations to identify criteria used to classify soils.

STANDARD 3 - LIVING THINGS

Concepts	Objectives	Enquiry Skills	Suggested Teaching/Learning Activities	Suggested Assessment Activities
1. Plants respond to changes in the environment.	Pupils will be able to: i explain the growth response of seedlings to unilateral light.	Observe Communicate by drawings. Measure length of seedlings. Plan project.	Pupils investigate the response of seedlings grown in a closed box with a small opening on one side (different groups of pupils may cut holes on different sides of the box). Pupils record responses after a period of about seven days. They observe changes and communicate these through oral and written description, focusing on direction of growth, length and colour of seedlings.	Assess pupils drawings and descriptions.
2. A flower consists of many parts.	i identify the parts of a flower	Observe Compare Communicate by drawing	Using a large bisexual flower e.g. Barbados Pride or Flambouyant. Teacher assists pupils through the process of identifying and dissecting the various flower structures. Pupils draw a whole flower and label the structures.	Pupils identify similar structures on other flowers

STANDARD 3 - LIVING THINGS (Cont'd)

Concepts	Objectives	Enquiry Skills	Suggested Teaching/Learning Activities	Suggested Assessment Activities
3. Animals have young which grow into adults which in turn produce young.	Pupils will be able to: i describe stages in the life cycle of the frog, mosquito, butterfly and housefly.	Communicate by drawings and written description.	Display frog eggs in a container. Pupils observe and record the changes these eggs undergo over a period of time. Similar strategies are applied to investigate the life cycles of the mosquito and butterfly and housefly. Pupils draw and label changes they observe at various intervals.	Arrange pictures of stages in life cycle of a particular animal in the correct order. Discuss at what stage in their life cycle, mosquitoes are best controlled or eradicated.
4. Food chains are interconnected in a food web.	i determine what is a herbivore, a carnivore and an omnivore. ii construct a simple food web. iii describe the importance of food webs.	Communicate via food webs	Pupils observe an aquatic/terrestrial ecosystem e.g. school garden, pond. They list all the living things seen. They discuss how these organism feed. Teacher reviews the concept of food chains. Pupils draw food chains in the ecosystem under discussion. Food chains are arranged to show interconnections, thus developing a food web. Pupils and teacher discuss the importance of food webs in an ecosystem.	Pupils dramatize the formation of a food web by assuming names of animals/ plants and holding hands to show linkages. What effect would removal of one organism have on the other organisms in a food web.

STANDARD 3 - ECOSYSTEMS

Concepts	Objectives	Enquiry Skills	Suggested Teaching/Learning Activities	Suggested Assessment Activities
1. The sea is a habitat for many organisms	Pupils will be able to: i present evidence that the sea supports living organisms in and around it.	Inferring through observations and experiences	Present pupils with several pictures of marine organisms. Pupils research these organisms to get information on what they feed on, how they "breathe", move etc.	Pupils draw a table showing marine organisms and what they feed on.
	ii classify marine organisms as those that live in the water, on the beach and on the rocks.	Classify	Pupils classify the organisms into those which live in the water, on the beach or on rocks.	Pupils list differences in environmental conditions faced by organisms which live in the water, on the beach and on the rocks.
2. Various forms of pollutants affect marine life.	i identify pollutants which may affect marine life	Communicate orally or in writing	Pupils read an article or view a video on pollution of the marine environment.	Pupils make a list of pollutants.
	ii predict the effects of pollutants on marine organisms.	Predict consequences after collecting data or making observations.	Pupils and teacher discuss how named marine organisms may be affected by pollutants e.g. plastic and Styrofoam containers, oil spills, waste from yachts, detergents, chemicals from factories.	Pupils discuss the possible consequences of a leather back turtle ingesting a plastic bag.
	iii discuss ways of reducing pollution of the marine environment.	Inferring based on information	Pupils prepare a list of suggestions for reducing the incidence of pollution.	Draw a picture showing how pelicans may be affected by an oil spill.

STANDARD 3 – MATTER AND MATERIALS

Concepts	Objectives	Enquiry Skills	Suggested Teaching/Learning Activities	Suggested Assessment Activities
1. Air takes up space and has mass.	Pupils will be able to: i. demonstrate that air takes up space.	Design a fair test	Pupil stuff some toilet paper at the bottom of a plain drinking glass. They push this glass with tissue paper, vertically down a container of water. They remove this glass in the same direction it was pushed down. They observe the tissue paper and explain why it is not wet. Teacher asks leading questions and repeats activity.	Pupils asked to design another activity to demonstrate that air occupies space. Poster display
	ii. demonstrate that air has mass.	Design a fair test	Pupils compare the masses of an empty balloon and one filled with air using a simply made equal-arm balance. Discuss results.	Hands-on activity assessed.
2. Mixtures can be separated by various methods.	i. Separate a mixture of at least two substances using an appropriate method of separation.	Carrying out an activity	Provide pupils with suitable mixtures to separate. Ask them to conduct an activity to separate them. Demonstrate the processes of chromatography and distillation to pupils. Pupils give appropriate applications.	Performance assessment. Allow them to practise the process of chromatography.
3. Temperature and particle size affect how fast substances dissolve in water.	i. Determine the effects of water temperature on dissolving time	Predict how fast a solute dissolves. Control variables that affect dissolving. Experiment	Teacher asks pupils what they think would happen if a teaspoon of sugar is placed in a glass half filled with tap water. Ask pupils what can be done to make the sugar dissolve faster. Pupils investigate the effect of particle size (of sugar) with dissolving time. They add more spoonfuls of sugar to the water, stir until no more dissolves. Ask pupils why they think the sugar no longer dissolves. Ask what they think will happen if the solution was heated and more sugar added and stirred? Let them test their prediction and write a statement of what they actually found out.	Determine how best to make a mug of orange drink. Should we add sugar to cold water or to ordinary tap water.

STANDARD 3 – STRUCTURES AND MECHANISMS

Concepts	Objectives	Enquiry Skills	Suggested Teaching/Learning Activities	Suggested Assessment Activities
	Pupils will be able to:			
1. Inclined planes are simple machines	i describe how a simple machine makes work easier.	Classify	Set up workstations with necessary resources to solve challenges given e.g. open a can, lift an object. Observe several simple machines to classify according to how they work e.g. can opener.	Group presentations assessed.
	ii demonstrate the use of a simple machine.	Carrying out	Provided with a variety of simple machines, each group demonstrates how to use their choice of machine. Pupils will present findings to class.	Group demonstrations
	iii apply the use of an inclined plane to their daily lives.	Communicate	Pupils asked how inclined planes are used in their home /community and state how they make work easier. Teacher augments pupils responses with pictures and video. Provided with resources like pallet sticks and match boxes filled with sand, pupils will demonstrate applications of inclined planes.	An essay on “Inclined planes in our daily lives” Display.

STANDARD 3 – ENERGY

Concepts	Objectives	Enquiry Skills	Suggested Teaching/Learning Activities	Suggested Assessment Activities
1. Temperature is a property of substances.	Pupils will be able to: i draw from observation, the parts of a thermometer. ii measure temperature of a substance using a laboratory thermometer. iii explain that temperature tells how hot or cold an object is.	Observe Communicate by drawing Measure temperatures Communicating	Pupils observe a mercury/alcohol thermometer.They draw and label its parts e.g. bulb, liquid, graduations, numbers, etc. Pupils place a thermometer in various substances e.g. warm water, cold water. They observe movement of the mercury/alcohol in the thermometer. Pupils asked to write what does temperature refer to. They discuss and present to class the topic- How temperature affects one's life.	Drawings assessed. Measure temperature : example - indoor - outdoor - body temperature Presentations on how temperature affects one's life.
2. Energy travels in different ways.	i infer that heat energy travels from the higher temperature to a lower temperature.	Inferring Communicating and commenting	Pupils explain: How they feel as they move from a shady area to the open air on a sunny day or how does it feel if you touched a piece of metal exposed to the sun. Why do you feel that way? Pupils infer that heat energy travels from a higher to a lower temperature.	Pupils research other situations where the transfer of heat energy is used by man e.g. Solar Energy. Portfolio assessment.
3. Energy can be transformed from one form to another	ii conclude that energy can be converted from one form to another.	Observe Communicate outcomes	Set up stations to demonstrate how electrical energy is converted to sound light and heat energy through the use of electrical appliances. They create flow diagrams to depict energy conversion.	Pupils research other examples of energy transformations. Poster display of transformations.

STANDARD 3 – EARTH AND SPACE

Concepts	Objectives	Enquiry Skills	Suggested Teaching/Learning Strategies	Suggested Assessment Strategies
	Pupils will be able to:			
1. The Earth contains useable resources	i describe differences between minerals and rocks.	Observe different types of rocks. Classify rocks.	Pupils observe a variety of rocks. They draw these rocks and discuss the differences among them. They group them. Pupils may visit a quarry or view a related video clip to reinforce ideas. They may view a variety of local rocks at the National Science Centre.	Pupils explain differences between rocks and minerals. Make a rock collection. Display a rock collection.
	ii. discuss the importance of local mineral resources.	Make inferences on the importance of minerals.	Identify some minerals and discuss their importance. Invite personnel from Geological Society of Trinidad and Tobago, to share experiences with pupils.	Pupils collect pictures/information about minerals/mineral product.
	iii explain the uses of petroleum and natural gas.	Make inferences on the importance of petroleum and natural gas to Trinidad and Tobago.	Organize visit to a Petroleum based industry e.g. Petrotrin, Atlantic LNG, BpTT. Invite personnel from the Society of Petroleum Engineers of Trinidad and Tobago to share relevant information with pupils or present a display.	Imagine what would happen if there was no petroleum or natural gas available for one week. Describe the scenario. Pupils research the uses of petroleum and natural gas. Develop a portfolio on Earth Resources.

ACKNOWLEDGEMENT

The Ministry of Education wishes to express its appreciation to the following members of the Curriculum Team who participated in the Review and Revision of the Primary School Science Syllabus.

Officers with an asterisk (*) after their names were directly involved in the refinement of the Draft Science Syllabus Standard 2 – Standard 3

1. Henry Saunders (*), Curriculum Coordinator, (Science, Mathematics, Computer Science)
2. Claudette Ible, (*), Curriculum Officer, Biology
3. Doltan Ramsubeik , Curriculum Officer, Integrated Science
4. Hollis Sankar (*), Curriculum Officer, Physics
5. Terrance Manwah (*), Curriculum Officer, Chemistry
6. Ramsundar Seenath (*), Curriculum Facilitator – Science, Caroni Education Division
7. Cheryl Bowrin, Teacher III, Fyzabad Anglican Secondary
8. Bisram Ramesar, Science Teacher Educator, Valsayn Teachers' College
9. Kishore Lal, Science Teacher Educator, Corinth Teachers' College
10. Ahmad Yusuff Ali, Teacher, Longdenville Presbyterian
11. Sherma Joseph, Teacher, St. Mary's Anglican School
12. Christophine Paul, Principal I, Princes Town Methodist School
13. Vernon Aqui, Principal I, Castara Government Primary School, Tobago (former Science Curriculum Facilitator).

CONSULTANTS

Dr. Charly Ryan, Senior Lecturer in Science Teacher Education,
School of Education, King Alfred's College, Winchester, United Kingdom.

Fr. Steve A. West, Lecturer, Faculty of Medical Sciences,
University of the West Indies, St. Augustine, Trinidad, West Indies.