PREFACE

The teaching of Science has shown sustained growth at the secondary school level in the past decade, and in order to maintain such growth, the Level 7 curriculum guide has been developed by a team of curriculum science specialist.

The curriculum guide has objectives which are achievable targets of skills, knowledge, understanding and attitudes. The guide has also identified unites, topics, content and strategies to be used, developed and reinforced.

It is the duty of the heads of department to prepare general schemes, which they can use to better inform the teachers in their departments in order to write a more detailed year/term plan.

There is no set format for the writing of schemes of work. This may vary from school to school and even teacher to teacher. However the scheme of work for any academic year must be broken down into term schemes. Further, the term schemes can be broken up into a weekly outline, which identifies objectives to be completed each week.

In the curriculum process, feedback is a necessary condition for change and improvement, and I would urge all of our science teachers to provide such feedback to the curriculum staff at NCERD and also as they visit to provide support that will enhance your classroom teaching.

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TABLE OF CONTENTS

UNIT		PAGE
1	**HOW A SCIENTIST WORKS**	
	• Looking at things in the laboratory	1
2	**MEASURING IN SCIENCE**	
	• Measurement of length/height in mm, cm, m and km	2
	• Measurement of mass in g and kg	3
	• Measurement of area	4
	• Measurement of volumes of solids	4
	• Measurement of volumes of liquids	5
	• Measurement of temperature	6
3	**LIFE**	
	• Living and non-living things	7
	• Characteristics of living things	7
	• Looking at organisms in our environment	8
	• Grouping organisms according to their structure	9
	• Collecting, storing and classifying organisms	12
	• Adaptations of structures in plants	12
	• Adaptations of structures in animals	12
	• Structure of flowers	13
	• Structure of a seed	14
	• Germination of a seed	14
4	**MIXING AND SEPARATING**	
	• Solutions	15
	• Separating techniques	17
5	**PROPERTIES AND CHANGE**	
	• Physical properties	19
	• Chemical properties	19
	• Physical changes	19
	• Chemical changes	20

UNIT		PAGE
6	**ENERGY AND MATTER**	
	• Types of energy	21
	• Sources of energy	21
	• Interconversion of common forms of energy	21
	• The relationship between energy and force	21
	• Conservation of energy	22
	• Conservation of mass	22
	• Conduction of electricity	22
	• What is matter	23
	• Changes of states	24
	• Effects of heat on the states of matter	26
	• Diffusion of matter	27
	• Air pressure and its applications	29
7	**OUR SOLAR SYSTEM**	
	• The solar system	30
	• Seasons of the earth	32
	• Moon phases and tides	33
	• Structure of the earth	35
	• Wind	36

Note to teachers

This bit of information is to inform you the valued user of this curriculum guide about the manner in which the objectives are presented in the guide. Information is also provided on the relevant resource materials that are available for you the educator.

Here is an explanation of how the objectives have been presented.

- **Skills –** this involves DOING. In order to minimize unnecessary repetition the skills listed are applicable to the contents of the entire page
- **Knowledge –** the prefix phrases 'KNOW THAT or BE AWARE OF' are used before the statements that fall under the column for Knowledge.
- **Understanding –** the prefix phrases ' KNOW HOW, WHY or UNDERSTAND THAT' are used, where possible, before the statements that appear under the column for understanding. However, if this is not possible the other words are used for clarity.
- **Attitudes –** this is the behaviour the students are expected to exhibit as a result of the skills, knowledge and understanding that they would have attained.

The TEACHERS' MANUAL, PRACTICAL ACTIVITY GUIDE and the TEXT BOOKS- Science in Daily Life 1, Integrated Science for the Caribbean 1-3 and Exploring Science an Integrated Guide for the Caribbean 1-3, should provide the relevant support that is needed in delivering the curriculum.

It is advised that you use these materials as your support in order to avoid providing students with information that may be too advanced for them.

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FOREWORD

It is acknowledged that thorough planning is essential for effective teaching and learning. Such planning is even more critical today when one considers the limited resources, both human and material, which are available.

The Ministry of Education, through the Secondary School Reform Project (SSRP), has developed curriculum materials that have been designed to improve the quality, equity and efficiency of secondary education. The curriculum materials include Levels 7-9 Curriculum Guides and Teacher's Guides for Language Arts, Mathematics, Science, Social Studies, Reading and Practical Activity Guides for Science. These materials have been tested in all secondary-aged schools nationwide and are considered useful in providing teachers with a common curriculum framework for planning, monitoring and evaluating the quality of teaching and learning. The curriculum materials also provide a basis for continuous student assessment leading to the National Third Form Examination (NTFE).

The initial draft curriculum materials have been subjected to evaluation, by respective Heads of Departments, form all ten Administrative Regions and Georgetown and they have been subsequently revised to reflect the views expressed by teachers.

The revised curriculum materials are now published as National Curriculum documents to provide consistency and support for teachers in the process of planning for an effective delivery of the curriculum. All secondary teachers must ensure that they make good use of these curriculum materials so that the quality of and learning can improved in all schools.

Ed Caesar
Chief Education Officer

UNIT: HOW A SCIENTIST WORKS

Topic	Learning Objectives				Content	Activities/ Methods/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
Looking at things in the laboratory.	Observe the features of laboratory equipment.	Types of equipment found in the laboratory include: beakers, measuring cylinders, Bunsen burners		Willingness to observe safety rules.	Safety rules. Looking at things in the laboratory.	Demonstration Discussion	Can students: identify laboratory equipment?	**Math** Using tables. **Art** Drawing
	Draw equipment found in the laboratory.	The function of each type of equipment.	How various laboratory equipment are used.	Show due care of handling apparatus/ materials before use.		Group work- Presentation of report	match equipment and function?	**Language**- Reporting
	Classify equipment according to the materials from which they are made.	Equipment is made of various materials e.g. glass, metal, plastic, wood, rubber etc.			Laboratory apparatus - Composition and purpose.	Group work	plan and arrange an exhibition of science equipment?	**Life Skills.**

UNIT: MEASURING IN SCIENCE

Topic	Learning Objectives				Content	Activities/ Methods/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
Measuring in Science **a) Measurement of length/height in mm, cm, m and km.**	Estimate the length/ height of objects.	The units for measuring length/ height in the metric system are: 1cm = 10mm 1cm = 1/100m 100cm = 1m 1000m = 1km 1000mm = 1m	Reasons for the use of standardized units of measurement.	Appreciate that it is worthwhile to acquire for everyday use, the skills of estimation and accurate measurement of length/height.	Measurement of length/height by estimation.	Discussion Group work	Can students:	**Math** Problems involving the first four rules and conversion to smaller and larger units of length.
	Measure lengths of objects using a ruler/tape measure. Place the eye and instrument graduations in the correct position when using the ruler/tape measure. Record measurement using the appropriate units.	0.62 miles = 1km	Conversion of: mm, cm, m, and km to smaller/larger units; imperial to metric. Solve simple everyday problems in linear measurements.		Measurement of length/height using a ruler/tape measure. Record measurement using the appropriate units. The metric table for length. Conversions- Large units to small one and vice versa, imperial to metric.	Group work Discussion Group work- Presentation of chart.	measure accurately and manipulate equipment? solve problems involving conversions using worksheets?	**Language** Discussion on the need for measurement of length by standard units. **Social Studies** Making grids of cm squares for graph work on rainfall.

UNIT: MEASURING IN SCIENCE

Topic	Learning Objectives				Content	Activities/ Methods/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
b) Measurement of mass in mg, g and **kg.**	Estimate the mass of objects.		Reasons for the use of balances.	Appreciate that accurate measurement of mass is very in our daily lives.	Measurement of mass by estimation. Record the estimations using appropriate units.	Discussion	Can students:	**Language** Discussion.
	Measure mass using a variety of balances/ Scales.	Units for measuring mass in the metric system are: 1g = 10 mg 100cg = 1kg 1000g = 1kg 2.2lbs = 1kg	The difference between estimated results and the scale readings.	Appreciate the importance of accurate measurements in daily life.	Measurement of mass using various balances - triple beam - electronic - lever - spring	Group work Discussion Activity	measure mass using a balance?	**Home Economics** Weighing ingredients as per recipe.
	Record the measurement of mass using the appropriate units.		Conversion of mg, cg etc. to smaller/ larger units, imperial to metric.	Appreciate that the metric system is easier to use.	Metric tables for mass. Conversions: Smaller /larger metric units and vice versa, N to kg, lbs to kg.	Activity Discussion . Group work	make accurate conversions?	**Mathematics** Problems involving conversions. Use of decimals **Art** Graphics
	Design and construct an improvised balance.			Willingness to share ideas and work together.		Group work Presentation of report	make an Efficient Balance?	

UNIT: MEASURING IN SCIENCE

Topic	Learning Objectives				Content	Activities/ Methods/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
Measurement of area.	Measure areas of regular shapes using a metre rule/tape measure. Calculate the areas of squares, rectangles, triangles and circles from formulae. Measure areas of an irregular shape e.g. a hibiscus leaf.	Area is the measurement of surface in square units. The formulae for calculating the areas of squares: l x b rectangles: l x b, triangles h/2b and circles πr^2.	The metre rule/ tape measure can be used to find the areas of regular shapes The areas of regular and irregular shapes are measured.	Appreciate that technology makes abundant the use of area and volume. Appreciate the importance of areas in daily life.	Areas of regular shapes- Squares and rectangles. Areas of triangles and irregular shapes.	Discussion Problem solving Practical activities: Discussion Problem solving Practical activities:	Can students: use equipment to make accurate measurements? solve problems on areas?	**Math** Areas of regular shapes. **Social Studies** Finding areas **Agri. Science** Areas of regular farms **Math** Areas of irregular shapes**.** **Agri. Science** Areas of irregular farms
Measurement of volumes of solids.	Measure volumes of regular solids e.g. cubes.	Volume is the measurement of space in cubic units. The formula for finding the volumes of regular solids is l x b x h	The volumes of regular solids are measured.	Appreciate the importance of volumes in daily life.	Volumes of regular solids e.g. cubes, cuboids, cylinders.	Discussion Problem solving Practical activities:	solve problems on volumes?	**Math** volumes of regular shapes **Social Studies** Volumes of liquid products

UNIT: MEASURING IN SCIENCE

Topic	Learning Objectives				Content	Methods/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
	Measure volumes of irregular objects by the displacement method.	Volume is determined by the amount of space an object occupies.	The volume of an irregular solid can be measured.		Volume of irregular solids e.g. a stone.	Discussion Problem solving Practical activities:	Can students: adhere to procedures?	**Math** Solution of problems on volume.
Measurement of volumes of liquids.	Measure volumes of liquids using the measuring cylinder.	Volume is measured in cubic units.		Willingness to use the metric system.	Volume of liquids.	Discussion Practical activities:	measure and manipulate equipment efficiently?	**Home Ec.** Liquid components of recipes
	Design and construct a measuring cylinder - Use to measure volume	The use of a measuring cylinder .	Why certain materials are used in the construction of the measuring cylinder. How surface area and volume relate to the properties of the states of matter Explain the importance of surface area to volume ratio to living organisms	Appreciate the importance of improvising in Science. Willingness to adhere to procedure	Surface area to volume ratio	Group work Presentation of reports Discussion Practical activities Group report	construct a measuring cylinder and present information on its construction? calculate surface area to volume ratios	**Language** Written/Oral report **Art & Craft** Graphics **Math** Calculation of ratios

UNIT: MEASURING IN SCIENCE

Topic	Learning Objectives				Content	Activities/ Methods/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
Measurement of temperature.	Draw and label the parts of a liquid thermometer.	The parts of a thermometer. The names of liquid substances used in thermometers. The common name for mercury in Guyana is quick silver.	How the alcohol and mercury thermometers are used. Uniform expansion occurs in thermometers The thermometer is useful in our daily lives. Mercury can be harmful to man and his environment.	Appreciate that the thermometer is a very useful invention. Take care to use the thermometer carefully.	- The liquid thermometer. - Liquids used in thermometers - Importance of the thermometer in daily living.	Discussion Activity Discussion	Can students: compare the properties of the alcohol and mercury in thermometers?	**Language** Discussion, Oral/Written report.
	Estimate the temperature of various substances Read the temperature of various substances and present readings in graphical form.	K is the S.I unit for temperature, but ^{0}C is more commonly used. The melting point of ice is 0 ^{0}C and water is 100 ^{0}C.	Convert ^{0}C to K and vice versa.		Measuring temperature. - Boiling point of water. - Melting point of ice. - Average temperature of the human body.	Activity Discussion	manipulate equipment and make accurate readings? make accurate conversions?	**Math** Conversions.
	Construct and use an improvised thermometer. - Report on how it is constructed.		Explain the principle by which the improvised thermometer works.			Construct a thermometer using improvised materials.	construct a thermometer efficiently?	**Craft** Hand crafting.

UNIT: LIFE

Topic	Learning Objectives				Content	Activities/Materials Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
Characteristics of living things	Observe, manipulate, draw, predict, evaluate, record	The characteristic of living organisms. The environment should be cared for so that life and species could be conserved	Each of the characteristics is important in maintaining the life of the organism How any two characteristics of living organisms relate to man and another organism observed	Show due care and respect for living organisms Takes care to maintain the environment so that the organisms are not harmed Willingness to share ideas and work together.	The characteristics of living things	Activity Reporting Discussion Completion of file which should include sketches and descriptions	Can students: use hand lens correctly to observe organism in their environment? name and define each characteristic of living organism? complete accurately files showing sketches of organisms and description of any two visible characteristic?	**Agricultural Science** Plants and Animals **Social Studies** Care of the environment **Art**: Drawing living things **Language** Reporting

UNIT: LIFE

Topic	Learning Objectives				Content	Activities/Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
Looking at organisms in our environment	Observe, record	The names of plants and animals in the community Some insects should be handled carefully because they can cause harm	Animals differ from plants. Organisms can be grouped into two kingdoms	Use of the environment with due care and consideration for all organisms Show concern for i) the habitat of organisms ii) safety of organisms	Living things are grouped as plants and animals	Activity Reporting Discussion	Can students record accurately observations made using tables diagrams and drawings? recognize that organisms can be grouped as plants and animals? recognize that the environment contains many different kinds of organisms?	**Agriculture Science** Classification of living things **Math** The use of tables **English** Written and oral reporting **Art/Craft** Drawing

UNIT: LIFE

Topic	Learning Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
Grouping organisms according to their structure	Record, observe, draw, communicate, classify	Types of flowering and non-flowering plants Features of leaves for monocotyledonous and dicotyledonous plants	Reasons for similarities and differences between: i) flowering and non-flowering plants ii) monocotyledonous with dicotyledonous plants	Demonstrate an interest in caring for the organisms in our environment	Types of plants: i) Flowering ii) Non-flowering iii) Dicotyledonous iv) Monocotyledon-ous	Field trip, Oral questioning Class discussion, Making charts/posters Reporting	Can students: record accurately observations made using tables , sketches and diagrams? compare flowering and non-flowering plants and monocotyledons and dicotyledons? design charts/posters showing classification of plants?	**Agricultural Science** Plants **Social Studies** Group work **Math** Tables **Language** Reporting **Art/Craft** Drawing

UNIT: LIFE

Topic	Learning Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitude**				
Grouping organisms according to their structure (cont'd)	Observe, classify, draw	Names of organisms belonging to the five classes of vertebrates	The characteristics of living things as they relate to classes of vertebrates identified	Appreciate that there are variations in organisms	Classes of :- i) Vertebrates ii) Invertebrates	Field trip Group work Presenting (written/oral) field trip report	Can students identify and classify vertebrates according to their external structure?	**Art/Craft** Drawing **Language** Reporting
		Names of warm and cold blooded animals.	The environment affects cold and warm blooded animals	Demonstrate an awareness of the dangers associated with certain animals.	Cold and warm blooded animals		explain how the environment affects cold and warm blooded animals	**Agricultural Science** Animals
		Names of organisms belonging to the main groups of invertebrates:- • Insects • Spiders • Segmented worms • Slugs • Crabs • Jelly fish			A simple classification key	Designing chart/poster Group work activity Presenting group work activity	name the main groups of invertebrates? design charts /posters to show the organism in relation to their characteristic and usefulness?	**Social Studies** Group work

UNIT: LIFE

Topic	Learning Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
Collecting storing and classifying organisms	Manipulate, plan, design, communicate	Equipment needed for collecting and storing living organisms.		Appreciate the need for selecting and/or making the appropriate choice of equipment Consider the safety of other persons and the environment	Method of collection	Planning for field trip Making equipment Field trip Presenting field trip report Class discussion	Can students: make and collect equipment needed for the field trip? explain how the equipment was made?	**Language** Reporting **Industrial Arts** Making equipment **Art/Craft** Drawing
		Items used in the preservation of a flowering twig.	The process involved in collecting and storing a flowering twig	Willingness to avoid the unnecessary killing of organisms Appreciate that some parts of organisms can be preserved without harming them	Method of preservation	Reporting Class discussion	preserve a flowering twig? explain how a flowering twig can be preserve?	**Social Studies** Group work

UNIT: LIFE

Topic	Learning Objectives				Content	Activities/Materials /strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
Classification of organisms Adaptation of structures in plants	Observe, draw, record	The features of a plant in relation to the specific characteristic of living organisms e.g. i) Nutrition ii) Reproduction	The specific features of an organism (plant or animal) are related to a particular function (s)	Appreciate the value of specialization to the organism's survival	External features in relation to i) Nutrition as in plants (roots and leaves) ii) reproduction as in a) flowers and seeds b) parts of plants	i) Displaying exhibits of adaptation in plants ii) Discussing exhibits iii) Field trip Presenting and discussing field trip report	Can students: correctly label diagram of external features of i) plants ii) animals? list the features of plants and animals as related to the specific characteristics?	**Agricultural Science** Plants **Language** Reporting **Social Studies** Group work **Art/Craft** Drawings
Adaptation of structures in animals		The features of animals in relation to the specific characteristics of living organisms			External features in animals related to i) nutrition ii) movement iii) reproduction: as in hatching and giving birth.	i) Displaying and discussing exhibits of adaptation in animals ii) Field trip iii) Discussing field trip	relate a specific feature to a particular function?	

UNIT: LIFE

Topic	Learning Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
Structure of flowers	Manipulate equipment, observe, communicate, draw	The parts of a complete flower. The function of each part of the flower. The male and female part of a flower.	Each part of a flower has a specific function. The structure of a flower is relates to its function Reasons for flowers being in the environment.	Appreciate the value of plants to the environment.	Structure of a complete flower	Demonstration: dissection Group activity Discussion	Can students:- identify and explain the functions of each part of the flower? dissect the flower? identify the male and female parts of the flower? label diagram of longitudinal section of the flower?	**Language** Reporting **Agriculture Science** Flowers **Social Studies** Group work

UNIT: LIFE

Topic	Learning Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
Structure of a seed	Manipulate, draw, record, experiment, observe, communicate, hypothesise, predict.	The parts of a dicotyledonous seed.	The function of each part of a seed is related to its structure	Appreciate that each part of the seed has a particular role or function	Structure of a seed	Group activity Discussion	Can students:- use hand lens correctly to observe seed structure? draw and label seed structure correctly? record observations accurately using tables and drawings?	**Language** Reporting **Social Studies** Group work
Germination of a seed		The parts of a germinating seed. The conditions necessary for germination.	The importance of each part of a germinating seed	Willingness to suggest reasons for the results obtained Appreciate that every scientific experiment must have a control	Germination Functions of the major parts of seedlings	Experiment Observation over time	state conditions necessary for germination?	**Art** Drawing **Agriculture Science** Seeds

UNIT: MIXING AND SEPARATING

Topic	Learning Objectives				Content	Activities/ Methods/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
Solutions	Manipulate materials/ equipment, observe and record. Identify the solvent and the solute in a named solid in liquid solution.	The definition of solution, solute, solvent, insoluble, dissolve, soluble as found in the resource materials relating to level 7 Science The properties of solutions. An example of a solid in liquid solution.	Any material (solid, liquid, or gas) can be either a solute or solvent. Solutions are mixtures	Willingness to explore mixtures involving solids, liquids and gases.	Solutions Solid in liquid	Activity Discussion	Can students: demonstrate and explain the properties of solutions?	**Home Ec.** Making solid in liquid solutions
	Identify the solvent and the solute in a named liquid in liquid solution.	An example of a liquid in liquid solution.			Liquid in liquid		name examples of liquid in liquid solutions and identify the solute and the solvent?	**Home Ec.** Making liquid in liquid solutions
	Identify the solvent and the solute in a named gas in liquid solution.	An example of a gas in liquid solution.			Gas in liquid		name examples of gas in liquid solutions and identify the solute and the solvent?	**Home Ec.** Aerated drinks
	Identify the solvent and the solute in a named gas in gas solution.	An example of a gas in gas solution. Substances in mixtures can be soluble or insoluble.			Gas in gas		name examples of gas in gas solutions and identify the solute and the solvent?	**Social Studies** The atmosphere

UNIT: MIXING AND SEPARATING

Topic	Learning Objectives				Content	Activities/ Methods/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
		Alloys are mixtures of metals e.g. steel Some uses of alloys.	Alloys are used in everyday life.	Appreciate the uses of alloys in daily life e.g. steel, gold	Solid in solid	Activities Discussion	Can students: name three alloys and state their uses in society?	**Art and Craft** Making jewellery
		What a saturated solution is. What the term saturation point means.			Saturated solutions		identify the saturation point of various solutions at room temperature. (solid in liquid)?	**Home Ec.** Saturated solutions Reading thermometers
	Manipulate materials/ equipment to investigate the solubility of a solute over a range of temperature. Collecting data, drawing and interpreting a solubility graph.	What the phrase 'solubility of a solute' means. The rate of solubility depends on temperature. Hot water dissolves more solute than cold water.	Temperature affects the solubility of a substance.		Solubility		draw and interpret a solubility graph from data obtained?	**Math** Drawing graphs **Agri.Science** Solubility of fertilizers **Home Ec.** Solubility and temperature

UNIT: MIXING AND SEPARATING

Topic	Learning **Objectives**				Content	Activities/ Methods/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
Separating Techniques	Set up apparatus, record observations, manipulate, hypothesise,	Evaporation as defined in level 7 resources. Evaporation occurs at various temperatures The factors that speed up evaporation. Distillation and distillate as defined in level 7 resource materials. The two types of distillation are simple and fractional The role of simple (alcohol) and fractional (production of kerosene gasoline) distillation in industry Chromatography as defined in level 7 resource materials. The role of chromatography in medicine and science.	The process of filtration. The factors speed up the process of evaporation Distillation can be used to obtain both the solute and the solvent. The difference between simple and fractional distillation. Explain why the colours separate in paper chromatography	Appreciate the importance of filtration, distillation and chromatography in industry. .	Separation Techniques Filtration Evaporation Distillation Chromatography	Activity Discussion	Can students: use filtration to separate a mixture? explain how a named factor affects the rate of evaporation? separate the solute and solvent from a named mixture? separate the colours in black/coloured ink?	**Home Ec.** Filtration of mixture **Home Ec**. Evaporating solutions. **Home Ec.** **Art and Craft** Separation of colours.

UNIT: MIXING AND SEPARATING

Topic	Learning Objectives				Content	Activities/ Methods/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
	Set up apparatus, record observations	What an immiscible liquid is. What the term 'emulsion' means.	A separating funnel can separate two immiscible liquids.	Willingness to accept that some liquids do not dissolve in other liquids.	Separating funnel	Activity and Discussion	Can students: separate two immiscible liquids using a separating funnel?	**Home Ec.** Separating immiscible liquids.
		Sedimentation as defined in level 7 resource materials.	A centrifuge causes sedimentation	Appreciate the role of the centrifuge as a separation technique in modern industry.	Sedimentation		separate suspended matter in a liquid by (i) the centrifuge method (ii) the decanting method?	**Home Ec.** Separating and decanting **Social Studies** Centrifuge in industry.
	Design and make a chart to show the separation techniques used in the rice and sugar industries.	The separation techniques used in the rice and sugar industries.	Some separation techniques are used in the rice and sugar industries	Appreciate the use of separation techniques in the rice and sugar industries.	Separation techniques used in the (i) rice and (ii) sugar industries		design a flow chart to show the separation techniques used in the (i) rice and (ii) sugar industries?	**Social Studies** Separation of mixtures in local industries
	Manipulate equipment, observing and recording		A particular solvent (e.g. water, alcohol, kerosene) is used to remove a specific stain	Use water as a universal solvent	Removal of stains using solvents.		select a suitable solvent to remove a named stain?	**Home Ec.** Removal of stains.

UNIT: PROPERTIES AND CHANGE

Topic	Learning Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
Physical Properties	Manipulate equipment/ materials, observe and record	The physical properties of substances.	i) Physical changes are reversible and chemical changes are irreversible	Willingness to carefully observe materials to identify physical properties	The physical properties of substances.	Demonstration group Activities Discussion	Can the students identify some physical properties of given substances? compare some physical properties of substances?	**Home Economics** Food materials
Chemical Properties		The chemical properties of substances. Substances have both physical and chemical properties.	ii) Differentiate between physical and chemical properties of substances	Use relevant equipment/ materials to determine the chemical properties of materials	The chemical properties of substances		demonstrate chemical properties of given substances?	**Home Economics** Household chemicals
Physical Changes	Set up apparatus Record observations	What a physical change is.		Appreciate the importance of physical changes in daily life	Physical changes		demonstrate examples of physical changes?	**Home Economics** Digestion

UNIT: PROPERTIES AND CHANGE

Topic	Learning Objectives				Content	Activities/Materials /Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
Physical Changes (cont 'd)	Manipulate equipment and materials, record observations	Physical changes are reversible Examples of physical changes	How physical changes occur		Physical changes do not produce new substances	Demonstration Group work Discussion of reports Activity	Can students: name examples of physical changes?	**Language** Reading and discussion of reports
Chemical Changes	Set up apparatus Record observations	What a chemical change is. Chemical changes result in the formation of new substance.	i) Differentiate between physical and chemical changes ii) Demonstrate examples of chemical changes	Appreciate the role of physical chemical changes in our daily life	Chemical changes		demonstrate examples of chemical changes?	**Home Economics** Digestion
		Chemical changes are difficult to reverse Examples of chemical changes Writing simple word equations for chemical reactions.	How chemical changes occur Use word equations for chemical changes		Chemical changes produce new substances		describe an occurrence of a chemical change?	**Home Economics** Cooking **Language** Discussion of reports

UNIT: ENERGY AND MATTER

Topic	Learning Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
Types of energy	Set up apparatus Record observations	The law of conservation of energy E_P – potential energy and E_K - kinetic energy	Explain the energy changes that occur in the pendulum $E_P \leftrightarrows E_K$ apply to daily life	Willingness to work together and share ideas about energy related issues.	Inter-conversion of energy $E_P \leftrightarrows E_K$	Discussion Student demonstration Teacher demonstrations	Can students set up a pendulum and describe the conversion of energy? $E_P \leftrightarrows E_K$?	**Home Economics** E_P in foods → E_K
Sources of energy	Compile information on sources of energy	Sources of energy	Reasons for the sun being the primary source of energy		Sources of energy		name various sources of energy?	**Home Economics** Energy foods
Inter conversions of common forms of energy		Energy changes occur in sequence Energy changes in sequence in the human body e.g. potential →kinetic→ mechanical →heat Common forms of energy	Energy changes occur in the human body	Appreciate the importance of energy conversions to man. Appreciate the need to conserve energy	Inter-versions of the common forms of energy.		describe energy changes? explain in sequence energy changes in the human body?	**Home Economics** Electrical appliances
The relationship between energy and force	Set up experiment Record observations	Difference between energy and force	Differentiate between energy and force	Appreciate the importance of energy and force in daily life	Energy and force		differentiate between energy and force?	**Home Economics** Boiling water

UNIT: ENERGY AND MATTER

Topic	Learning Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
Conservation of energy	Set up apparatus Record observations	Conservation of energy as defined in Level 7 resource materials Examples of conservation of energy	Explain conservation of energy in terms of energy not being created nor destroyed	Willingness to take action to conserve energy	Energy cannot be created nor destroyed it merely changes into other forms.	Group work activity. Discussion	Can students: explain what is meant by conservation of energy?	**Social Studies** Conservation of energy. **Language**: Discussion of reports
Conservation of mass		The total mass of reactants in a chemical reaction is the same as the total mass of the products.	Explain the law of conservation of mass in terms of the total number of particles remaining the same		The total mass of the reactants is equal to the mass of the products.		describe a demonstration of conservation of mass?	**Mathematics** Calculating masses **Language** Writing reading and discussion of reports
Conduction of Electricity	Set up apparatus, draw, observe record	What an electrical circuit is. The components of a simple circuit What the terms 'conductors and insulators' mean. Examples of conductors and insulators.	How to set up a simple circuit Explain what is a i) conductor ii) non-conductor (insulator). Explain why the conduction of electricity is a physical property	Take care when handling electrical equipment Appreciate the role of conductors and insulators in daily life.	Simple series circuit Conductors and non-conductors (insulators)		draw a given circuit using the correct Symbol? use a circuit to classify substances as electrical conductors and insulators?	**Industrial Arts and Art and Craft** Drawing circuits **Home Economics** Electrical appliances **Industrial Arts** Electrical appliances

UNIT: ENERGY AND MATTER

Topic	Learning Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
What is matter?	Observe, manipulate apparatus, record, hypothesise, predict.	Definition of matter and mass as found in Level 7 resource materials Matter has mass and takes up space. Matter is made up of particles. The properties of a i) solid ii) liquid iii) gas Solids, liquids and gases have volume, occupy space and have mass.	Explain that matter exists as solids liquids and gases	Appreciate that matter exists as solid, liquid or gas. Appreciate that humans are also made up of matter	Matter exists as solid, liquid and gas. Properties of i) solids ii) liquids iii) gases	Activities Discussion Demonstration	Can the students: explain that matter is made up of particles? demonstrate that matter exist in three states / phases? identify a substance that can exist as solid, liquid, as well as a gas? compare the properties of solids, liquids and gases?	**Language** Oral expression **Home Economics** Heating substances **Mathematics** Calculating volumes

UNIT: ENERGY AND MATTER

Topic	Learning **Objectives**				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
Changes of state	Draw diagrams and/or charts Record observations Draw a chart	The arrangement of particles in solids, liquids and gases. A state of matter depends on the arrangement of the particles As particles change some heat energy is transformed into mechanical energy (motion) Cooling is a result of a loss of heat energy. Particles in any state are moving. Heat causes particles to move about more freely and the loss of heat energy causes substances to contract.	The addition or removal of heat energy affects the arrangement of the particles	Willing to participate in role play	The arrangement of particles in solids liquids and gases The addition or removal of heat energy can result in a change of state	Role play activity Discussion Demonstration Activity	Can students: describe and compare the arrangement of particles in solids, liquids and gases? explain how the addition or removal of heat energy affects the arrangement of the particles?	**Art/Craft** Drawing diagrams/charts **Social Studies** Role play **Home Economics** Effects of heating

UNIT: ENERGY AND MATTER

Topic	Learning Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	Knowledge	Understanding	Attitudes				
Matter (cont'd)	Reading the thermometer accurately Manipulating apparatus	Definition of boiling and melting point as found in Level 7 resource materials The change liquid $\rightarrow$ gas occurs at fixed temperatures for various substances The change solid $\rightarrow$ liquid occurs at fixed temperatures which is specific for that substance	Temperature affects the change of state Melting and boiling point are affected by impurities and atmospheric pressure.	Appreciate that a change of state is affected by environmental conditions	Boiling point Melting point	Demonstration Activity Discussion	Can students: define boiling point? heat rain water to B.P and compare B.P when salt is added. define melting point? use a cooling curve to measure M.P	**Home Economics** Effect of heat on substances **Home Economics**

UNIT: ENERGY AND MATTER

Topic	Learning Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
Effects of heat energy on states of matter.	Make and test predictions Manipulate apparatus Measure Observe and record	Positive and negative effects of heat energy on solids Positive and negative effects of heat energy on liquids Heating results in an increase in the movement and volume of matter State that gases expand most when heated. Solids expand the least when heated Uses of expansion of materials	Materials expand when heated	Appreciate the usefulness of expansion of materials in daily life	Expansion of solids, liquids and gases Uses of expansion in daily life	Activity Role play Discussion	Can students: explain why solids expand when heated? explain what happens to the particles of a liquid when it is heated? explain how heat energy causes gases to expand?	**Home Economics** **Industrial Arts** **Home Economics** **Home Economics** The pressure cooker.

UNIT: ENERGY AND MATTER

Topic	Learning Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
Diffusion of Matter	Manipulate apparatus Observe and record Draw and label diagrams	Definition of diffusion as found in Level 7 resource materials Particles move at random in liquids and gases The movement of colours in a liquid is due to the movement of the particles in the liquid. Use of diffusion in maintaining life ▪ gaseous exchange ▪ absorption of digested food ▪ mixtures of liquids/ gases The sense of smell depends on the diffusion of gas particles.	Diffusion occurs to spread particles equally across a given area/volume	Appreciate the value of diffusion in maintaining life.	Diffusion of liquids. Diffusion of gases	Activity Discussion	Can students: demonstrate and explain diffusion in a liquid? demonstrate and explain diffusion in gases?	**Home Economics** Dyes **Agricultural Science** Diffusion in roots **Art** Drawing **Agricultural Science** Photosynthesis and respiration.

UNIT: ENERGY AND MATTER

Topic	Learning Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
Diffusion of Matter (cont'd)	Manipulate materials Predict Make a chart	The use of a diffusion gradient in describing the movement of particles The role of diffusion gradient in daily life. The factors that influence the rate of diffusion e.g. temperature, concentration	The rate of diffusion is affected by increased - quantity - temperature - movement	Willingness to use diffusion gradient to explain life processes (absorption) Appreciate that the rate of diffusion can vary.	Use of diffusion in daily life Rate of diffusion	Activity Discussion	Can students: draw and explain a diffusion gradient? explain how the rate of diffusion is affected by one named factor?	**Art** Drawing **Home Economics** The smell of foods **Math** Sketch of gradient **Home Economics** The smell of foods **Agricultural Science** Rates of diffusion in plants

UNIT: ENERGY AND MATTER

Topic	Learning Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
Air Pressure and its Applications	Manipulate apparatus Draw labelled diagrams	What air pressure is. Air particles exert a pressure on surfaces Devices which make use of air pressure The meaning of i) compression ii) expansion as found in Level 7 resource materials. Devices make use of pressure/ volume relationship	Air pressure decreases with altitude How a named device makes use of air pressure	Appreciate the importance of devices which make use of air pressure and pressure /volume relationship Use equation to solve problems	Air pressure Devices that use air pressure Pressure/ volume relations for air $P_1V_1 = P_2V_2$	Demonstration Group activity Discussion	Can students: explain what causes air pressure? explain how a named device makes use of air pressure? Solve problems using the equation $P_1V_1 = P_2V_2$	**Math** Area **Social Studies** Weather **Art** Drawing devices **Math** Use of equation $P_1V_1 = P_2V_2$

UNIT: OUR SOLAR SYSTEM

Topic	Learning Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
The Solar System	Design and make a chart of the solar system	The names of the members of our solar system. Definition of sun , planet satellite (natural –moon and artificial) asteroids, comet, meteor, shooting stars as found in Level 7 resource materials	The sun is a star	Willingness to share ideas and information	The members of the solar system	Discussion on folder-kit on the members of our solar system	Can students: explain why the sun is classified as a star? name the members of the solar system?	**Art and craft** Making chart **Language** Oral expression
	Make a chart/model (scale model)	The names of terrestrial and gaseous planets	The planets orbit the sun and rotate on their axes Explain how the forces keep an object in orbit	**Show an interest in collecting information on the solar system**	The planets of the solar system	Role play Discussion	name planets and state some of their characteristics compare the planets: size, moons atmospheric conditions, surface?	**Art and Craft** Making a chart, model **Language** Oral expression
	Set up apparatus to show the forces on a body in orbit Draw a diagram showing the direction of the forces	The directions of the forces which keep an object in orbit			The directions of the forces which keep objects in orbit	Demonstration Discussion	indicate the direction of the forces?	**Art and Craft** Making a chart **Language** Oral expression

UNIT: OUR SOLAR SYSTEM

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
The Solar system	Design a chart showing the shape of the galaxy Make a model of the Galaxy	What a galaxy and a spiral galaxy is. The position of our solar system in the galaxy	How our galaxy appears when viewed from earth.	Appreciate that the solar system is a part of the milky way galaxy and moves round its centre	The milky way Galaxy	Role play Discussion	Can students: define a galaxy and explain what is a spiral galaxy?	**Social Studies** Role play **Art and Craft** Making a chart **Language** Oral expression
	Making an improvised rocked	What the term 'light year' means. The difference between mass and weight	Special suits are needed in outer space How a rocket functions Objects are weightless in outer space	Appreciate the vast distance in space Appreciate that gravity affects weight but not mass Willingness to share ideas and information about the solar system and space travel	Space travel	Discussion Demonstration Presentation of folder/kit on the Solar System	explain the need for special suits in space? demonstrate and explain rocket propulsion?	**Art and Craft** Making an improvised rocket **Language** Oral and written expression

UNIT: OUR SOLAR SYSTEM

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
Seasons of the Earth	Make a model to show how the seasons change in the northern and southern hemisphere	The names of the four seasons When the northern hemisphere experiences winter, it is summer in the southern hemisphere	The four seasons influence vegetative growth	Willingness to share ideas and information	The four seasons in the northern and southern hemisphere	Demonstration Discussion	Can students: compare the four seasons in relation to vegetative growth?	**Art and Craft** Making a model **Language** Oral expression
	Make a model to show solstices and equinoxes	Definition of solstice and equinox as found in Level 7 resource materials	The earth's shape, revolution, and inclination influences the seasons		The solstices and equinoxes in both hemisphere	Demonstration Discussion	use the model to indicate when solstice and equinox occur	**Art and Craft** Making a model
	Make model to show why the tropics do not experience the four seasons	The seasons of the tropics The position of the sun in relation to the earth during the year	The tropics do not experience the four seasons		The tropical seasons	Group activity	name and give reasons why the tropics do not experience the four seasons? determine the position of the sun?	**Art and Craft** Making a model **Social Studies**

UNIT: OUR SOLAR SYSTEM

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
		The periods of the wet and dry seasons Activities in the dry and wet seasons	The human and economic activities change with the season	Willingness to plan for the rainy and dry seasons.	The effects of the seasons in Guyana on human and economic activities	Group work Oral/Written presentation of report	Can students: compare activities of the dry and wet seasons?	**Social Studies** Seasons
Moon phases and tides	Make a chart/model	The phases of the moon	How moon phases are caused	Appreciate that plans should be made for the effects of the moon	The four phases of the Moon	Demonstration Discussion	explain how the phases of the moon are caused?	**Social Studies** phases of the moon
	Mark a chart to show spring and neap tides	Definition of spring and neap tides as found in Level 7 resource materials.	How spring and neap tides are caused.	Appreciate the importance of tides to coastal people	Spring and neap tides	Demonstration	explain the causes of spring and neap tides?	**Art and Craft** Making a chart **Social Studies** Tides

UNIT: OUR SOLAR SYSTEM

Topic	Objectives				Content	Activities/ Materials/ Strategies	Evaluation	Areas of Integration
	Skills	**Knowledge**	**Understanding**	**Attitudes**				
	Make a model to show how strong winds cause rise in tides	Strong winds cause high tides in the Caribbean	Strong winds can cause a rise in tides	Show an interest in the effects of strong winds and tides	Strong winds and tides	Demonstration Discussion	Can students: explain how a strong wind can cause a high tide?	**Social Studies** Tides
		Tides influence social and economic activities	Explain how tides affect social and economic activities on the coast of Guyana	Willingness to share ideas an information on the effects of tides on the coast of Guyana	Social and economic activities and tides	Discussion	explain how tides affect human and economic activities on the coast?	**Social Studies**