NATIONAL STANDARDS CURRICULUM

GRADE 7 INTEGRATED SCIENCE

	GRADES 7-9 SCOPE AND SEQUENCE		
	TERM 1	**TERM 2**	**TERM 3**
GRADE 7	• Working Like a Scientist 1 • Matter • Cells & Organisms	• Energy • Plant Reproduction • Sexual Maturity, Reproduction and Personal Hygiene	• Sexually Transmitted Infections and Drugs • Climate Change
GRADE 8	• Working Like a Scientist 2 • Photosynthesis and Energy Relationships • More about Matter	• Human Nutrition • Physical and Chemical Changes • Forces & Motion	• Respiration & Gas exchange • Space science • Water and the Earth's atmosphere
GRADE 9	• Working Like a Scientist 3 • Transport in Humans & Plants	• Electricity and Magnetism • Chemical Bonding, Formulae and Equations	• Sensitivity and Coordination • Acids and Alkalis • Sexual reproduction and birth Control

UNITS OF WORK GRADE 7 TERM 1 UNIT 1: WORKING LIKE A SCIENTIST

About the Unit

In this unit students will explore the relationship between science and technology. Through practical approaches, they will learn about the methods of scientific investigation, while learning about safety practices involved in scientific work. Students will study the approaches taken by prominent Jamaican scientists and explore the various science associated careers.

Range of Content

- Relationship between science and technology
- Methods of scientific investigation
- Works of some Jamaican Scientists
- Safety in scientific work
- Careers in science

GUIDANCE FOR THE TEACHER

Science is a body of knowledge, as well as skills and attitudes that helps man to understand, appreciate and make use of his environment in a sustainable way.

Prior Learning
Check that students:
Know the functions of signs and symbols in their environment.

UNIT TITLE: Working like a scientist 1.1

Theme: Science Exploration, Application and Design Practice

Attainment Target(s):

- Apply scientific knowledge and processes to the solution of real world problems.
- Use mathematics as a tool for problem-solving, and as a means of expressing and/or modelling scientific theories.
- Appreciate the influence and limitations of science with consideration for ethical issues.
- Demonstrate a positive attitude towards the use of scientific language.
- Demonstrate positive interpersonal skills in order to foster good working relationships.

Benchmark(s):

- Apply scientific skills, processes and methods in everyday situations and be aware of safety precautions involved in scientific work.
- Use scientific principles in the design of solutions to a problem taking into account potential impacts on man and the natural environment.
- Appreciate the importance of scientific methods.
- Demonstrate objectivity by seeking data and information to validate observations and explanations.

Objectives
Students will:

- Identify specific situations in the home, classroom and science laboratory which may be potentially dangerous
- Describe ways in which potentially dangerous situations may be corrected
- Formulate safety rules for selected working environments
- Apply safety rules to selected working environments
- Predict the consequences that may result from not following safety rules
- Work cooperatively in groups

• Demonstrate concern for safety of self and others. • Demonstrate curiosity, objectivity and perseverance in their approach to scientific activities. **Topic:** Safety Precautions in Exploring the Environment **Duration:** 2.5 hours **COMMUNICATION AND COLLABORATION - Students use technology to communicate ideas and information, and work collaboratively to support individual needs and contribute to the learning of others.** **RESEARCH, CRITICAL THINKING AND DECISION MAKING- Students use digital tools to design and develop creative products to demonstrate their learning and understanding of basic technology operations.** **DESIGNING AND PRODUCING – Students use appropriate digital tools and resources to plan and conduct research, aid critical thinking, manage projects, solve problems and make informed decisions.** **DIGITAL CITIZENSHIP - Students recognise the human, ethical, social, cultural and legal issues and implications surrounding the use of technology and practice online safety and ethical behaviour.**	

Suggested Teaching and Learning Activities	**Key Skills**	**Assessment**
Students will:		
Brainstorm signs and symbols that they come across in their daily lives. Discuss the importance of these signs and symbols.	Communicate, think critically	
In groups examine pictures and/or online/offline video tutorials of work areas in the home, school classroom/laboratory, on the streets and workplace to identify and record at least five possible dangers and five safe practices. Discuss and record possible outcomes of the potentially dangerous situations identified, and the benefits of carrying out the safe practices in the	Collaborate, communicate, observe, record, infer, think critically Conduct Internet search	At least five (5) logical dangers and five (5) valid safety practices identified. Possible outcomes/benefits relate to potentially dangerous

Suggested Teaching and Learning Activities	Key Skills	Assessment
pictures/videos. Share and discuss the information with the class.		situations/safe practices
In groups develop rules that would help to reduce potentially dangerous situations in the community, home and classroom environments. Create a chart/multimedia presentation to promote awareness of the consequences and solutions to dangerous situations. Share their creation with the class. Evaluate the rules they developed for the community, home and classroom to determine their appropriateness.	Collaborate, communicate, create, think critically manipulate digital content	Chart/presentation content is accurate Chart/presentation is creative and communicates information effectively
Examine caution/warning labels found on chemical containers, such as bleach, pesticide found in the home, laboratory and/or vehicles that transport chemicals. Make drawings and/or take pictures of the safety symbols (colour codes included) and explain what each of the safety symbols/colours mean. Write a paragraph on the importance of caution/warning labels. Collate the information and use it to create a safety manual (electronic/non-electronic) on warning labels. As a class, develop a checklist to evaluate the safety manuals and use it to make improvements to them.	Collaborate, communicate, create, observe, draw, interpret, think critically Create digital images	Manual contains accurate information on caution/warning labels.

Learning Outcomes

Students who demonstrate understanding can:

- ✓ Apply appropriate safety precautions in various environments
- ✓ Display respect for safety of self and others
- ✓ Use graphic organizers software and multimedia software to communicate information on the environment and safety precautions
- ✓ Create and publish original documents using graphic organizers software and multimedia software

Points to Note	**Extended Learning**
The charts made by student should be prominently displayed in the class/laboratory for constant reference. Encourage creativity in the sharing/presentation of scientific information. Encourage the development of scientific literacy	Identify persons who implement rules e.g. police officers, traffic wardens, food inspectors. Explain why these persons are important and how they help to improve the quality of life for people. Research occupational health guidelines. Write a short composition about how any one of these guidelines protects employees.
Resources Materials for making charts Pictures/videos depicting safe/unsafe scenes Computers, Internet, speaker, multimedia projector, interactive video tutorials, CDs/DVDs, graphic organizer and multimedia software	**Key vocabulary** precaution, pesticide, safety, danger
Links to other subjects Technical vocational education, social studies, English language	

Prior Learning
Check that students can:
explain what constitutes a fair test.

UNIT TITLE: Working like a scientist 1.2

Theme: Science Exploration, Application and Design Practice

Attainment Target(s):

- Apply scientific knowledge and processes to the solution of real world problems.
- Use mathematics as a tool for problem-solving, and as a means of expressing and/or modelling scientific theories.

Benchmark(s):

- Apply scientific skills, processes and methods in everyday situations and be aware of safety precautions involved in scientific work.
- Use scientific principles in the design of solutions to a problem taking into account potential impacts on man and the natural environment.
- Appreciate the influence and limitations of science with consideration for ethical issues.
- Demonstrate a positive attitude towards the use of scientific language.
- Demonstrate positive interpersonal skills in order to foster good working relationships.

Topic: Scientific Methods

Duration: 5 hours

- **COMMUNICATION AND COLLABORATION - Students use technology**

Objectives
Students will:

- Explain how science and technology are related.
- Describe the work of a named Jamaican and an international scientist/innovator.
- Explain the stages in the scientific method
- Apply the scientific method to formulate explanations about observed occurrences
- Write a report of a laboratory investigation.
- Explain the stages in the engineering design process
- Apply the engineering design process to solve everyday problems
- Write a report of an engineering design project.
- Identify careers related to science.
- Show respect for another person's idea.

to communicate ideas and information, and work collaboratively to support individual needs and contribute to the learning of others. • **RESEARCH, CRITICAL THINKING AND DECISION MAKING- Students use digital tools to design and develop creative products to demonstrate their learning and understanding of basic technology operations.** • **DESIGNING AND PRODUCING – Students use appropriate digital tools and resources to plan and conduct research, aid critical thinking, manage projects, solve problems and make informed decisions.** • **DIGITAL CITIZENSHIP - Students recognise the human, ethical, social, cultural and legal issues and implications surrounding the use of technology and practice online safety and ethical behaviour.**	

Suggested Teaching and Learning Activities **Students will:**	**Key Skills**	**Assessment**
In groups brainstorm definitions of the term 'science'. Use a variety of media (on-line/off-line) to research definitions of science. Participate in teacher guided class discussion on what is science. In groups, describe examples of science in the home, school, community and industry (national and international) and share examples with the class in a variety of ways.	collaborate, communicate, research, create, analyse	At least two correct examples of science given for each category: home, school, community and industry.
In groups, describe ways in which science is used to improve the quality of life (example communication, transportation, medicine, manufacturing etc.). Discuss the application of science in each description and present to the class in a variety of ways e.g., using graphic organizer, digital story presentations. In class discussion, formulate a definition of technology. Research definitions of technology and compare with their formulated definitions. In groups, describe at least ten technologies that can be found in Jamaica.	collaborate, communicate, define operationally, record, make comparisons Create digital content	Appropriate descriptions of how science has improved the quality of life. At least ten technologies, found in Jamaica, described.

Suggested Teaching and Learning Activities **Students will:**	**Key Skills**	**Assessment**
Examine a case study and/or watch video on a scientist at work. Identify the various steps, skills and attitudes displayed by the scientist. In groups carry out research (online/offline) on assigned eminent Jamaican and international scientists (e.g. T.P Lecky, Prof. Manley West, Albert Einstein) and make a presentation to the class in a variety of ways.	Communicate, collaborate, create, research	Correct information presented on Jamaican scientists and their work.
Write down, step by step, what they think they would do to solve a simple everyday problem. For example, if they woke up one morning and could not find a particular pair of shoes they needed that day. Share and discuss their answers to the question posed. As a class, discuss the application of problem solving procedures in everyday situations. Discuss the fact that scientists apply particular methods in the solution of problems. Discuss the Scientific Method and the Engineering Design Process as two such methods. In groups research the steps involved in the Scientific Method and the Engineering Design Process. Compare the methods and suggest reasons for the differences the methods. Create displays (electronic/non-electronic) depicting the steps involved in the scientific method and engineering design process. Present the display to class for discussion. Mount the display in the class. Use the Scientific Method and Engineering Design Process to solve a variety of real-world problems identified by the teacher/class.	collaborate, research, manipulate, communicate, create, make comparisons, solve problems,	Displays contain the basic steps in the scientific method and engineering design process, and steps are correctly sequenced.
In class discussion, explore the process skills that are employed in scientific work (observe, manipulate, classify, communicate, measure, infer, predict, question etc.). In groups, examine scenarios provided by the teacher identifying the process skill(s) being used. Share information with class. Examine several scenarios to identify which ones are fair tests. Justify their choices using simple scientific language. (*Teacher should emphasize the importance of identifying and controlling variables to ensure fair testing.*)	Analyse, communicate, collaborate Think critically, communicate,	Process skills correctly identified in each scenario. An acceptable sequence of skills used to solve problems is outlined. Fair tests correctly identified. Appropriate justifications given, using appropriate scientific

Suggested Teaching and Learning Activities **Students will:**	**Key Skills**	**Assessment**
Be given reports, one on a scientific experiment and the other on an engineering design projects. In groups, identify and compare the main components of each report (e.g. hypothesis, procedure, results etc.). Be given partially completed reports and asked to complete them. As a class, discuss the processes involved in experimenting and engineering solutions to problems.	collaborate, analyse, communicate communicate	language, for fair tests identified. Completed reports with correct information and logically sequenced. Experimental reports properly completed.
Be provided with various simple problems (e.g. what will affect how fast a pendulum swings), and discuss with the aid of the teacher the logical sequence of steps that would lead to a solution. Based on the solutions developed, carry out experiments to solve the problems and write a report on the experiment, using an appropriate format/template decided by the class.	predict, formulate hypotheses, plan and design, manipulate materials, observe, analyse, communicate	Report correctly reflects the scientific method. Report is done in the correct format.

Learning Outcomes

Students who demonstrate understanding can:

- ✓ explain how science and technology has led to advancement in society
- ✓ use the scientific method to solve problems
- ✓ use the engineering design process to solve problems
- ✓ prepare simple scientific reports
- ✓ Communicate information using productivity tools (e.g. presentation software, graphic organizer, word processing)
- ✓ Conduct electronic search for kinds of information e.g. text images, audio and video

Points to Note	Extended Learning
• Special emphasis should be place on the development of skills and attitudes throughout the units. • Technology is defined as the application of science to improve the quality of life. • Information on Jamaican scientists can be obtained from University of the West Indies or the Scientific Research Council. • Basic steps in the scientific method: Question → research → hypothesis → experiment → analyse results → communicate findings) • Basic steps in the engineering design process: Problem → research → specify requirements → generate solutions and create best one → build prototype → test and redesign if necessary → communicate results) Use digital graphic organisers to structure, analyze and evaluate information and aid problem solving and decision making processes Recognise some of the dangers associated with internet use and demonstrate safe online behaviours.	Select a problem in their school/community and use the engineering design process to solve it.
Resources Information sheets/multimedia materials containing scenarios in which science skills are used. Books/magazines/newspaper articles on Jamaican scientists Computers, internet Computers, Internet, speaker, multimedia projector, interactive video tutorials, CDs/DVDs, multimedia, word processing and graphic software tools	**Key vocabulary** Science , technology, hypotheses, variables, design requirements, problem specification, observe, manipulate, classify, communicate, measure, infer, predict
Links to other subjects Technical vocational education – AT1, AT2 and AT3	

Prior Learning
Check that students can:
Identify common measuring instruments

UNIT TITLE: Working like a scientist 1.3

Theme: Science Exploration, Application and Design Practice

Attainment Target(s):

- Apply scientific knowledge and processes to the solution of real world problems.
- Use mathematics as a tool for problem-solving, and as a means of expressing and/or modelling scientific theories.

Benchmark(s):

- Apply scientific skills, processes and methods in everyday situations and be aware of safety precautions involved in scientific work.
- Use scientific principles in the design of solutions to a problem taking into account potential impacts on man and the natural environment.
- Appreciate the influence and limitations of science with consideration for ethical issues.
- Demonstrate a positive attitude towards the use of scientific language.
- Demonstrate positive interpersonal skills in order to foster good working relationships.

Topic: Basic Quantities and Laboratory Apparatus

Objectives
Students will:

- List the fundamental quantities and their base SI units
- Identify and correctly use instruments to measure the fundamental quantities
- Show safety consciousness for self and others when doing practical activities

Duration: 2.5 hours **COMMUNICATION AND COLLABORATION - Students use technology to communicate ideas and information, and work collaboratively to support individual needs and contribute to the learning of others.** **RESEARCH, CRITICAL THINKING AND DECISION MAKING- Students use digital tools to design and develop creative products to demonstrate their learning and understanding of basic technology operations.** **DESIGNING AND PRODUCING – Students use appropriate digital tools and resources to plan and conduct research, aid critical thinking, manage projects, solve problems and make informed decisions.** **DIGITAL CITIZENSHIP - Students recognise the human, ethical, social, cultural and legal issues and implications surrounding the use of technology and practice online safety and ethical behaviour.**	

Suggested Teaching and Learning Activities	**Key Skills**	**Assessment**
Students will:		
In groups, identify some physical quantities that are measured in the home, school and community, and their associated units. Record their findings in a table (possibly using word processing software) and share with class. (*In class discussion teacher should introduce the concept of fundamental quantities – time, temperature, current, length and mass – and guide students to associate the quantities with their base units. Note that a quantity may have several units but only one base unit.*)	collaborate, classify, observe, communicate, infer	Table contains correctly identified quantities. Correct units given for quantities. Table meets appropriate criteria: neatly drawn, title, headings etc.
In groups, examine the labels of various household items (e.g. aluminium foil, medicines, food packaged for microwave, TV, battery, radio and CD players) to identify the various quantities present on them. List the quantities identified and their units, e.g. soda – litres, tin mackerel- grams. Discuss and give two importance of units of measurements, and present findings to the class, possibly using online collaborative writing tools e.g., class Wiki and Pinterest. *(Teacher should emphasize the need for standard measurements and relate these to the SI system of units.*) Create a list of ten units of measurement used in the SI/metric system.	Observe, classify, communicate, Collaborate online	Two logical importance given for units. Correct metric units listed.

Suggested Teaching and Learning Activities	Key Skills	Assessment
Identify various apparatus used to measure different quantities (including all the fundamental quantities – length, mass, time, temperature, electric current) and suggest possible situations in which they may be used.	Communicate, infer, interpret, observe,	In tabular form or otherwise correctly associate each apparatus with quantity it is used to measure.
After observing teacher demonstration on the use of some apparatus (e.g. measuring cylinder, balance, thermometer), in groups, use the apparatus to measure the relevant quantities for various objects provided by the teacher. Share measurements with class. Draw, label and describe the use of selected apparatus and/or use digital drawing tools to draw and label images. Complete a teacher prepared worksheet.	Draw, measure, manipulate, communicate, work in groups Create digital images	Instruments correctly used Measurements correctly stated with units. Accurate drawings of apparatus and correct labelling.

Learning Outcomes

Students who demonstrate understanding can:

- ✓ Identify and use metric units
- ✓ Measure various quantities using appropriate instruments.
- ✓ Communicate and collaborate using online writing tools.
- ✓ Use digital drawing tools to create and format images.

Points to Note	Extended Learning
The objective which shows safety consciousness for self and others when doing practical activities should be constantly highlighted throughout the unit. Balance the sample of apparatus to include those related to biology, chemistry and physics. Demonstrate safe, respectful, responsible and clear online communication	Construct a simple measuring equipment that can be used in home or school e.g. a simple balance
Resources Various laboratory instruments: balance, thermometer, measuring cylinder, ammeter, clock, metre rule Computers, Internet, speaker, multimedia projector, interactive video tutorials, CDs/DVDs, digital software tools, class online collaborative Wiki/Pinterest site.	**Key vocabulary** Fundamental quantity, unit, measurement, balance, thermometer, SI/metric system, measuring cylinder, ammeter, clock, metre rule
Links to other subjects Mathematics - measurement	

Prior Learning

Check that students can:

- Identify the steps in the scientific method
- Write a laboratory report
- Use some laboratory apparatus
- Construct simple pie charts, bar and line graphs.

UNIT TITLE: Working like a scientist 1.4

Theme: Science Exploration, Application and Design Practice

Attainment Target(s):

- Apply scientific knowledge and processes to the solution of real world problems.
- Use mathematics as a tool for problem-solving, and as a means of expressing and/or modelling scientific theories.

Benchmark(s):

- Apply scientific skills, processes and methods in everyday situations and be aware of safety precautions involved in scientific work.
- Use scientific principles in the design of solutions to a problem taking into account potential impacts on man and the natural environment.
- Appreciate the influence and limitations of science with consideration for ethical issues.
- Demonstrate a positive attitude towards the use of scientific language.
- Demonstrate positive interpersonal skills in order to foster good working relationships.

Topic: Presentation of Data

Duration: 10 hours

Objectives

Students will:

- formulate criteria for the presentation of observations /data in tabular form
- construct data tables using agreed criteria
- Present observations /data in graphical form using accepted criteria
- formulate criteria for representing observations as drawings/diagrams
- Make drawings/diagrams using agreed criteria
- Apply standard criteria for representing data consistently

Suggested Teaching and Learning Activities **Students will:**	**Key Skills**	**Assessment**
In groups, observe samples of data tables provided by the teacher. Make a list of criteria used in the presentation of data tables. Share criteria with class. As a class, with the aid of the teacher, develop standard criteria for the presentation of data in tabular form. Create data tables to represent data sets provided by the teacher.	collaborate, observe, communicate Communicate: construct tables	 Table reflects agreed criteria.
Observe a member of the class roll their tongue. As a class identify and record the number of students that can and cannot roll their tongues. Individually, record the data in a table. Observe as teacher demonstrates how to construct a bar graph to illustrate data. Record the criteria as given by the teacher. Individually construct a bar graph using the tongue-rolling data. Create simple bar graphs to represent data sets provided by the teacher.	Observe, record, communicate: construct tables Communicate: bar graphs Communicate: bar graphs	Table reflects agreed criteria. Bar graphs reflect agreed criteria.
In groups determine the time a small solid (stone/ball etc.) takes to fall from various heights (at least six heights). Record the data in a table and share the information with the class. Observe as teacher demonstrates how to construct a line graph to illustrate data. Record the criteria as given by the teacher. Individually construct a line graph using the data recorded in the table (Height and time). Create simple line graphs to represent data sets provided by the teacher.	Work in groups, manipulate, measure, record, communicate, construct tables Communicate: line graphs Communicate: line graphs	Table reflects agreed criteria Line graphs reflect agreed criteria.
As a class, participate in teacher led discussions to identify when it is most appropriate to use bar graphs/line graphs to represent data sets. In groups, identify the most suitable type of graph to represent each data set provided by the teacher.	Discuss, assess, communicate: graphs	Correct type of graph matched with each data set.
In groups/as class, examine samples of drawings/diagrams provided by the teacher. List the common features observed in the samples. Share list with	collaborate, observe, create, draw, communicate	Poster contains correct criteria for drawings/diagrams

class. As a class, with the aid of the teacher, develop standard criteria for the presentation of drawings/diagrams. In groups make a poster highlighting the criteria for making labelled drawings/diagrams. Display posters in class. Individually, make a labelled drawing of the leaf provided by the teacher. Measure the length of the leaf and the length of the drawing in millimetres. Calculate the magnification of the drawing by dividing the length of the drawing by the length of the leaf ($magnification = \frac{length\ of\ drawing}{length\ of\ specimen}$). Record the magnification next to the title (*mag. x value from calculation, e.g. mag. x15*).	Draw, measure, calculate	Drawing reflects agreed criteria. Magnification accurately calculated and represented.

Learning Outcomes

Students who demonstrate understanding can:

- ✓ Construct tables, bar graphs and line graphs to required standards
- ✓ Choose the appropriate type of graph (bar/line) to represent data
- ✓ Make labelled drawings/diagrams to required standards

Points to Note	**Extended Learning**
Students must be given as much opportunities to practise the construction of tables, bar graphs and line graphs.	Make a pamphlet/brochure on 'Data Presentations in Science'.
Resources Graph sheets, small solid object (ball/stone etc.), tape measure/metre rule, 30 cm ruler	**Key vocabulary** Data, table, bar graph, line graph, x-axis, y-axis, variable, title, label
Links to other subjects Mathematics - statistics	

UNITS OF WORK GRADE 7 TERM 1 UNIT 2: THE NATURE OF MATTER

About the Unit

In this Unit students will learn about matter and the particulate nature of matter. They will also be exposed to information about different states of matter and use experiment to investigate the effect of heat on matter.

Range of Content

- Matter and the particulate nature of matter
- states of matter
- Effects of temperature on matter

GUIDANCE FOR THE TEACHER

"Science" is a body of knowledge, as well as skills and attitudes that helps man to understand, appreciate and make use of his environment in a sustainable way.

The KWL approach (K-W-L) is an instructional strategy that is used to guide students through a topic. It stands for what I **Know**, what I **Want** to learn, and what I did **Learn**. Students begin by brainstorming everything they Know about a topic. This information is recorded in the K column of a K-W-L chart. Students then generate a list of questions about what they Want to Know about the topic. These questions are listed in the W column of the chart. During or after the lesson, students answer the questions that are in the W column. This new information that they have Learned is recorded in the L column of the K-W-L chart. (***http://www.nea.org/tools/k-w-l-know-want-to-know-learned.html***)

K-W-L Chart TOPIC: _____		
KNOW	WANT	LEARN

Prior Learning
Check that students can:
Identify examples of materials as solids, liquids and gases

UNIT TITLE: Matter

Theme: Energy, Forces and Matter

Attainment Target(s):

- Understand the existence of materials such as solids, liquids and gases, the particulate nature of matter, and simple chemical reactions that change one material into another.
- Apply scientific knowledge and processes to the solution of real world problems.
- Use mathematics as a tool for problem-solving, and as a means of expressing and/or modelling scientific theories.
- Appreciate the influence and limitations of science with consideration for ethical issues.
- Demonstrate a positive attitude towards the use of scientific language.
- Demonstrate positive interpersonal skills in order to foster good working relationships.

Benchmark(s):

- Explore the various properties of matter and know that atoms are the basic unit of structure, and that atoms form molecules, elements and compounds.
- Know that mixtures represent a physical change and are either heterogeneous or homogenous.

Objectives:

- Classify materials as solids, liquids and gases
- Demonstrate that solids and liquids are made up of tiny particles
- Relate the arrangement of tiny particles to the states of matter
- Compare the three states of matter in terms of physical properties
- Plan and design an investigation to show how matter changes state
- Formulate a working definition of matter
- Work cooperatively in groups

• Appreciate the importance of scientific methods. • Demonstrate objectivity by seeking data and information to validate observations and explanations. • Demonstrate concern for safety of self and others. • Demonstrate curiosity, objectivity and perseverance in their approach to scientific activities. **Topic:** The Nature of Matter **Duration:** 8 hours **ICT Attainment Targets:** **COMMUNICATION AND COLLABORATION -** Use technology to communicate ideas, information and understandings for a variety of purposes. **RESEARCH, CRITICAL THINKING AND DECISION MAKING-** Use technology to develop a logical process for decision making and problem solving. **DESIGNING AND PRODUCING –** Use technology to design and produce multimedia products to demonstrate their creative thinking. **DIGITAL CITIZENSHIP -** Follow guidelines to promote healthy use of ICT tools	

Suggested Teaching and Learning Activities **Students will:**	**Key Skills**	**Assessment**
Review the terms 'solid', 'liquid' and 'gas'. Be presented with a range of materials to classify as solid, liquid and gas. (*Teacher should include some materials that students will find difficult to classify, e.g. paper, sand, petroleum jelly, jam, toothpaste.*)	Classify, think critically	Materials correctly classified.
In groups carry out some short activities which will help them explain why solids, liquids and gases behave differently, e.g.	Classify, manipulate, investigate, observe, think critically,	Logical explanations given for observations.

Suggested Teaching and Learning Activities **Students will:**	**Key Skills**	**Assessment**
• comparing the masses of identically-sized blocks of two or three different materials such as wood, glass and metal • putting one small coloured crystal into a beaker of cold water and one into a beaker of hot water • trying to fit a metal bar into a gauge before and after strong heating • opening a perfume bottle at arm's length • heating one end of a metal rod that has paperclips attached by petroleum jelly • trying to depress the plungers of three sealed syringes, one containing a solid, one a liquid and one a gas Discuss what they observe and try to explain what has happened. Present, describe and explain their observations in a variety of ways to the class. Discuss and compare their own ideas with those of others. (*Teacher may introduce the concept of diffusion here, however it should be done in a simple way. Do NOT talk about 'concentration gradients'.*)	communicate, make comparisons	
In groups, grind a stick of chalk into dust and use a hand lens to view the powder and record observations. Observe dust particles in a beam of light. Discuss and make inferences from their observations. Write simple explanations. Share their observations and explanations with the class in a variety of ways. Ask pupils to make annotated diagrams to describe the arrangement and movement of particles in solids, liquids and gases.	Manipulate, communicate, collaborate, observe, record	Explanations infer that solids and liquids are made up of tiny particles.
Use a KWL chart to arrive at a definition for matter. View a video on matter to complete the L-column of the KWL chart. Share and discuss findings with class to arrive at a common understanding of what is matter. Record what they understand the term matter to mean.	Collaborate, communicate, think critically	Acceptable working definition of matter.

Suggested Teaching and Learning Activities **Students will:**	**Key Skills**	**Assessment**
(*Teacher should emphasize that matter is made of tiny particles, occupies space, and has mass. Do NOT introduce the atom/molecules at this point, unless students mention it.*)		
In small groups read literature/research/watch video on the states of matter and make a four-page booklet on their understanding of solids liquids and gases (use word processing/graphic software if available). Booklet should contain the following: • Page1-Cover page: design a suitable cover page with colours and diagrams, suitable title, name, date, etc. • Page2-Solids Page- neatly type/write the characteristics of solid matter. Then, search through old magazines and newspapers for pictures of solid matter. Cut out the pictures and neatly glue them to the page and label each picture. Include five or more pictures of solid matter. • Page 3 (Liquid Page) and Page 4(gas page) should be done like the solid page Combine pages into a neat looking booklet and staple the pages together.	collaborate, communicate, interpret data, create, think critically Navigate and manipulate digital content Create and format document	Cover Page includes the title, name, date and illustration Solids page has characteristics of a solid correctly written and includes labelled pictures. Liquids page has characteristics of a liquid correctly written and includes labelled pictures. Gases page has characteristics of a gas correctly written and includes labelled pictures. Booklet is neat and presentable.
In groups plan, design and carry out an investigation on how matter (e.g. water) changes from solid to liquid to gas. Make inferences from observations, provide simple explanations. Write a report on your investigation, paying special attention to method, observations and conclusions, and share with class. As recap, view videos showing how matter changes from one state to another. List and provide a working definition for the processes involved in the various state changes (freezing, evaporation, melting, and condensation). Represent the processes on a diagram (this could be done using an appropriate software).	investigate, communicate, manipulation, collaborate, make inferences, plan and design Make observations, define operationally, communicate, think critically	Plan reflects a fair test. Logical explanations offered for observations. Conclusion consistent with observations. Acceptable working definitions. Diagram correctly represents processes.

Learning Outcomes Students who demonstrate understanding can: ✓ Give physical characteristics of solids ,liquids and gases: shape, volume, particle arrangement and particle movement ✓ Define condensation, evaporation, melting and freezing ✓ Plan and design investigations which incorporate fair tests ✓ Publish original documents

Points to Note	**Extended Learning**
• Demonstration to investigate sublimation should be carried out in a well ventilated laboratory. • Publish original documents using word processing software and other technology tools • Recognise some of the dangers associated with internet use and demonstrate safe online behaviours.	Describe how the behaviour of tiny particles of matter can be used to explain 'diffusion'.
Resources Newspaper, magazines, ice, heating apparatus, measuring cylinder, ammonium chloride/naphthalene, dry ice, perfume, chalk, multimedia material on state changes and the atom, iodine crystals, solid air fresheners computer, Internet, multimedia projector, word processing and graphic organizer software, CDs/DVDs	**Key vocabulary** Matter ,condensation, evaporation, freezing, melting, particles
Links to other subjects Grade 8 (Physical and Chemical Changes)	

UNITS OF WORK GRADE 7 TERM 1 UNIT 3: CELLS AND ORGANISMS

About the Unit

In this Unit students will learn that the cell is the unit of structure and function of all living organisms. By examining plant and animal cells using a light microscope, they will make labelled drawings to compare both types of cells. Students examine diagrams and study a range of specialised plant and animal cells and relate the changes in their structure to their specific functions. They will describe how cells work together and contribute to the formation of tissues, organs, organ-systems and the whole organism and explore a variety of examples in each category. They will investigate diffusion and osmosis as methods by which substances move into and out of cells and identify some examples of these processes in both plants and animals.

Range of Content

- The cell is the unit of structure and function of living organisms
- Plant cells are different from animal cells
- Cells are specialised to carry out unique functions
- Cells work together and are organised as tissues, organs, and organ-systems in an organism
- Substances move into and out of cells by diffusion and osmosis

GUIDANCE FOR THE TEACHER

1. Cell structure must be focused only on those visible under the light microscope.
2. Cell structures to include only: cell wall, cell membrane, nucleus, vacuole, cytoplasm and chloroplasts.
3. Mitochondria, though not usually visible under the light microscope, should be discussed.
4. Discuss guidelines for making appropriate scientific drawings.
5. Self-made posters and hand-outs must reflect the guidelines for scientific drawings.
6. Models of cells can be exhibited as a mini expo in which all Grade 7 classes showcase their work.
7. Micro projector/multimedia projector may be used to support teaching of cells/cell structure (particularly for students with poor/limited manipulative skills or in cases where classes are too large for the number of available microscopes).

Prior Learning

Check that students can:

- Recall the characteristics of living things
- Identify organs and organ systems of plants and animals

UNIT TITLE: Cells and Organisms	
Theme: Living Things, Life Processes and the Environment **Attainment Target(s):** • Understand the importance of the life processes in plants and animals, their interdependence, their interaction with the environment, and how lifestyles determine health and well-being. • Apply scientific knowledge and processes to the solution of real world problems. • Use mathematics as a tool for problem-solving, and as a means of expressing and/or modelling scientific theories. • Appreciate the influence and limitations of science with consideration for ethical issues. • Demonstrate a positive attitude towards the use of scientific language. • Demonstrate positive interpersonal skills in order to foster good working relationships. **Benchmark(s):** • Know that the cell is the basic unit of structure and function of all living organisms and be aware of the differences between plant and animal cells. • Understand the hierarchical relationship from cells to organism. • Apply scientific skills, processes and methods in everyday situations and be aware of safety precautions involved in scientific work. • Use scientific principles in the design of solutions to a problem taking	**Objectives:** **Students will:** • Define the cell as the basic unit of structure and function of living organisms • Examine plant and animal cells using the light microscope • Draw and label diagrams of generalised plant and animal cells as seen under the light microscope • Relate selected cell structures/organelles to their specific functions • Compare the structure of typical plant and animal cells as seen under the light microscope • State that organisms can be unicellular or multicellular and give examples of each • Compare specialised plant and animal cells and state their basic functions – e.g. red blood cells transport oxygen around the body and root hair cells absorb water and mineral salts from the soil • Define cells, tissues, organs, organ-systems and organisms and show their hierarchical relationship • Describe the functions of selected basic tissues, organs and organ systems (e.g. blood as tissue – transports substances)

into account potential impacts on man and the natural environment. • Appreciate the importance of scientific methods. • Demonstrate objectivity by seeking data and information to validate observations and explanations. • Demonstrate care and concern for living things and the environment. • Demonstrate concern for safety of self and others. • Demonstrate curiosity, objectivity and perseverance in their approach to scientific activities. • Demonstrate sensitivity to others who are different. **Topic :** Cells and cellular organisation **Time:** 7 hours	
ICT Attainment Targets: 💻 **COMMUNICATION AND COLLABORATION -** Use technology to communicate ideas, information and understandings for a variety of purposes. 💻 **RESEARCH, CRITICAL THINKING AND DECISION MAKING-** Use technology to develop a logical process for decision making and problem solving. 💻 **DESIGNING AND PRODUCING –** Use technology to design and produce multimedia products to demonstrate their creative thinking. 💻 **DIGITAL CITIZENSHIP -** Follow guidelines to promote healthy use of ICT tools	

Suggested Teaching and Learning Activities **Students will:**	**Key Skills**	**Assessment**
View picture of *Rhoeo* cell as seen under the light microscope or digital graphic display. Visit different work stations each set up with a specimen of *Rhoeo* (Purple water grass) and a magnifying instrument (e.g. binoculars, spectacles, hand lens, microscope). View the specimens and select the most appropriate instrument for observing cells.	Observe, evaluate Manipulate digital content	
Make a simple microscope using a thin piece of wire and petroleum jelly. Twist the ends of the wire to form a loop then wipe petroleum jelly around loop. Dip loop in water so that a drop is formed (*this is a water drop lens*). Use the water drop lens to read writing on a page. Describe their observations.	Manipulate, observe, infer	Instructions accurately carried out - the water drop lens worked! Correct inferences drawn
Examine a light microscope and using a teacher prepared hand-out/chart of a microscope, identify the main parts and state their function(s). Complete a worksheet on the basic structure and function of the light microscope.	Make observations	Main parts correctly identified and functions accurately stated
View posters/hand-outs/ interactive tutorials/power point etc. of generalised plant and animal cells and identify their main parts/organelles. Discuss the basic functions of the structures identified through a teacher-led discussion. Compare the two cell types (similarities and differences) and record the information in a table (this could be done using a word processing program). Draw and label diagrams from posters/hand-outs/text books of generalised plant and animal cells. [All diagrams/drawings must meet the accepted guidelines for scientific presentation]	communicate, compare, observe, infer, make drawings Create and record information in table	Table constructed accurately – title, straight lines, headings - rows and columns, Contents recorded correctly Diagrams/drawings accurately represented in PENCIL ONLY- clean continuous lines; label lines – straight, no arrow heads, do not cross each other, drawn to right of drawing; title below diagram/drawing in capitals and underlined; Labels – accurate, written in script entirely in lower case
Observe teacher-created /interactive presentations/digital graphic display on the structure and basic function of selected specialised cells and comment on	Identify patterns, compare Communicate information using	

Suggested Teaching and Learning Activities **Students will:**	**Key Skills**	**Assessment**
how they compare with the generalised plant and animal cells.	digital graphic displays	
collect information and pictures of cells, tissues, organs and organ systems in plants and animals from books/magazines or by navigating digital content on websites and storage devices, and create posters defining the terms and demonstrating the hierarchical relationship from cells to organism. Present and display posters (Posters may be created using graphic organizers/presentation software).	create, communicate Navigate digital content Create, format, present multimedia content	Definitions convey understanding of terms. Correct sequencing of hierarchy
Work In groups to construct models of cells (generalised plant or animal or specialised cells) using available resources – plastic bag, balloon, newspaper (papier-mâché) or fabric. Set up class exhibition and make presentation on cell models to the class.	Manipulate, design, create, collaborate	Model accurately represents selected cell

Learning Outcomes

Students who demonstrate understanding can:

- ✓ make labelled drawings of generalised plant and animal cells
- ✓ distinguish between generalised plant and animal cells
- ✓ distinguish between specialised and generalised plant and animal cells
- ✓ explain the hierarchy of cellular organisation
- ✓ Use digital graphic organisers to structure, analyse and evaluate information and aid problem solving and decision making processes
- ✓ Collect, edit and organize images to represent information
- ✓ Organize data in tables
- ✓ Create multimedia presentation to communicate information

Points to Note	Extended Learning
1. Examples of tissues, organs and organ systems that should be considered include: • Animal tissues – epithelial, blood, nerve • Plant tissues – epidermis, xylem, phloem • Animal organs - sense organs, stomach, heart, lungs, kidney, ovaries, testes, • Plant organs - root, stem, leaf, flower • Animal systems - digestive, circulatory, respiratory, excretory, reproductive, skeletal, nervous • Plant systems – transport, reproductive 2. Additional examples of selected specialised cells – red blood cells, nerve, sperm, egg, guard cells, epidermal cells	Survey the history of the microscope. Compare the use of the electron and light microscopes. Critique the use of tissue/organ transplants in the health services.
Resources: Microscopes, slides and cover-slips, chart showing specialisation of cells, binoculars, hand lens, spectacles, *Rhoeo*, computer, multimedia projector, graphic organizer software, interactive presentation, CDs/DVDs	**Key vocabulary** Cell wall, cytoplasm, cell membrane Organelles - chloroplast, nucleus, vacuole, mitochondria Hierarchy - tissue, organ, organ-system, organism, microscope, specialisation multicellular organism
Links to other subjects Mathematics – scale factor, geometry (links to the calculation of magnification of drawings)	

UNITS OF WORK GRADE 7 TERM 2 UNIT 1: ENERGY

About the Unit

In this unit students will explore energy conversions through a variety of hands-on activities. They will classify energy forms and examine the need for alternative energy solutions in Jamaica and the Caribbean. They will be provided opportunities to demonstrate the efficient use of energy and energy conservation practical applications.

Range of Content

- Energy forms and conversions
- Renewable and non-renewable energy sources
- Significance of alternative energy to Caribbean society

GUIDANCE FOR THE TEACHER

Science is a body of knowledge, as well as skills and attitudes that helps man to understand, appreciate and make use of his environment in a sustainable way.

Alternative energy sources are not derived from fossil fuels (oil, coal, and natural gas)

Potential energy should be introduced as stored energy and kinetic as the energy possessed by moving objects.

Note that alternative energy can be replenished and is environmentally safe.

Prior Learning
Check that students:
Know that energy is the ability to do work
Know some forms and sources of energy

UNIT TITLE: Energy	
Theme: Energy, Forces and Matter **Attainment Target(s):**	**Objectives** Students will: • Recall that energy is the ability to do work • Differentiate between energy forms and energy sources

• Understand natural laws as they apply to motion, forces, and energy transformations. • Understand the importance of energy in our everyday life, the range of available energy sources and some environmental impacts of utilising these resources. • Apply scientific knowledge and processes to the solution of real world problems. • Use mathematics as a tool for problem-solving, and as a means of expressing and/or modelling scientific theories. • Appreciate the influence and limitations of science with consideration for ethical issues. • Demonstrate a positive attitude towards the use of scientific language. • Demonstrate positive interpersonal skills in order to foster good working relationships. **Benchmark(s):** • Be familiar with the nature of energy transformations, the various types of energy sources and the importance of energy. • Understand the importance of energy to society, and know how alternative energy sources are harnessed. • Appreciate the importance of scientific methods. • Demonstrate objectivity by seeking data and information to validate observations and explanations. • Demonstrate concern for safety of self and others. • Demonstrate curiosity, objectivity and perseverance in their approach to scientific activities. • Demonstrate concern for the preservation of natural resources. • Demonstrate concern for man's impact on the environment. **Topic:** Alternative Energy	• Investigate the energy conversions occurring in some devices • Use the terms kinetic energy and potential energy in describing energy transformations. • Differentiate between renewable (alternative) and non-renewable sources of energy • Assess the advantages and disadvantages of using renewable and non-renewable sources of energy • Evaluate the importance of alternative energy solutions to Jamaica and the Caribbean • Investigate ways in which alternative energy sources are harnessed • Work cooperatively in groups • Show respect for the ideas of their peers

Duration: 12 hours **ICT Attainment Targets:** • **COMMUNICATION AND COLLABORATION -** Use technology to communicate ideas, information and understandings for a variety of purposes. • **RESEARCH, CRITICAL THINKING AND DECISION MAKING-** Use technology to develop a logical process for decision making and problem solving. • **DESIGNING AND PRODUCING –** Use technology to design and produce multimedia products to demonstrate their creative thinking. • **DIGITAL CITIZENSHIP -** Follow guidelines to promote healthy use of ICT tools	

Suggested Teaching and Learning Activities **Students will:**	**Key Skills**	**Assessment**
Participate in a teacher led discussion in order to recap the meaning of the term energy. Discuss the between energy forms and sources of energy. In groups, identify various forms of energy and give an example of a source in each case. Tabulate the information, possibly using word processing software, and share with the class.	collaborate, communicate, record Create table Record information	Table contains correctly identified forms of energy. Correct examples given for forms of energy identified.
Be given rubber bands and asked to hold and stretch them as tightly as possible without breaking. Then let go of the rubber bands -- pointing them at the wall and not at each other. In groups or pairs, discuss the activity and state whether or not the elastic bands possessed energy when stretched and when moving. Share and discuss their thoughts with the class. (*Teacher should use the opportunities provided by the class discussions to introduce the terms kinetic energy and potential energy.*) As a class formulate a simple working definition for kinetic and potential energy. (*Teacher should build awareness only; no formal definitions of, or formulae for kinetic energy and potential energy should*	Investigate, communicate, collaborate, define operationally, think critically	

Suggested Teaching and Learning Activities **Students will:**	**Key Skills**	**Assessment**
be introduced at this time.) Group forms of energy as kinetic and potential.	Classify, think critically	Forms of energy correctly classified as potential and kinetic.
In groups, examine some simple devices that transform energy e.g. flashlight, radio, iron, electric kettle, yo-yo, solar calculator, battery-operated/spring operated toy car. Identify how energy changes occurring in the device when it is being used and record the energy transformation (e.g. flashlight: chemical → light). Describe the energy conversions involved in the different complex systems, provided by the teacher (e.g. energy conversions in a car). In groups, using the Engineering Design Process, develop a plan for and build a device that transforms energy, such as a wind mill or solar cooker, using available resources.	collaborate, think critically, record, communicate think critically collaborate, investigate, communicate, construct models, manipulate, create, think critically	Correct descriptions of energy conversions Correct transformations stated Plan reflects the Engineering Design Process Device meets design requirements
In groups brainstorm the meaning of the terms alternative/renewable and non-renewable energy, and write down their thoughts. View a video on, or research alternative/renewable and non-renewable energy sources. Be given a list of energy sources to categorize as renewable and non-renewable. Present the information to the class in a variety of ways. In groups discuss the advantages and disadvantages of renewable and non-renewable energy sources. Participate in panel discussion on the advantages and disadvantages of renewable and non-renewable energy sources as it relates to uses in the home, school and the country. (*The panel should consist of at least one member from each group.*) In groups create a leaflet/poster (electronic/non-electronic), for distribution in the school, on the different types of alternative/renewable and non-renewable energy sources and their pros and cons.	Observe, collaborate, communicate, think critically, research, classify, Collaborate, communicate, think critically, create	Energy sources correctly classified as renewable and non-renewable. Leaflet/poster contains correct information on the different types of energy sources and their pros and cons.
In groups, read the information provided by teacher on energy use in various industries in the Caribbean. Summarise the information and present it to the	Collaborate, think critically, communicate, synthesise	Information presented accurately summarise information provided.

Suggested Teaching and Learning Activities **Students will:**	**Key Skills**	**Assessment**
class in a variety of ways, including multimedia presentations. As a class, discuss the importance of energy to Caribbean societies and identify challenges (cost, availability, accessibility etc.) faced by these countries in meeting their energy needs (*Teacher should guide discussion*). In groups, propose ways to address the energy problems faced by Caribbean countries. Present proposal to the class and discuss. (*Teacher should highlight the use of alternative energy and energy conservation as means of addressing the energy issues*). In groups, create a list of energy conservation practices. Share list/ideas with class in a variety of ways (electronic/non-electronic). Participate in a class debate on the moral and social issues related to energy use in the Caribbean. (*This could involve the use of 'role cards', e.g. the views of scientists of different specialisms, of consumers, members of conservation organisations.*)	Create multimedia content Collaborate, communicate, think critically collaborate, communicate, create communicate, collaborate, think critically	 Proposal contains logical solutions for addressing the energy problems List contains acceptable energy conservation practices Arguments presented are scientifically sound, that is, supported by relevant data.
Visit a wind farm/hydroelectric power station/view a solar energy system display/watch videos on the generation of electricity from various types of alternative energy resources. Compile a simple report (electronic/non-electronic) on how electricity is generated from one or more renewable energy sources.	record, communicate, report	accurate information presented in report
In groups use the Engineering Design process to plan, design and/or build a model energy efficient house.	collaborate, construct models, measure, manipulate, plan and design, communicate, create, think critically, research	Model reflects at least three energy efficient considerations.

Learning Outcomes

Students who demonstrate understanding can:

- ✓ Justify the need for alternative energy solutions
- ✓ Identify sources of renewable/alternative and non- renewable in Jamaica and the Caribbean
- ✓ Suggest relevant solutions to energy problem in Jamaica and the Caribbean
- ✓ Contribute a view or appropriate evidence to a debate
- ✓ Create digital content using word processing and multimedia software
- ✓ Communicate and collaborate using class email and wiki

Points to Note	**Extended Learning**
Objectives 1 and 2 are for the purpose of recap. Allow students to formulate their own solutions for the problems presented, as much as is possible. Follow guidelines to promote healthy use of ICT tools Class email account and wiki site will be teacher created Guided communication and collaboration in using class email and wiki, to facilitate respectful, responsible and clear online communication	Research the use of alternative energy resources globally.
Resources Energy conversion devices, e.g. flashlights, buzzers, radios, materials to build model energy efficient house computer, Internet, multimedia projector, word processing and multimedia software, CDs/DVDs, class email account, class wiki site	**Key vocabulary** Renewable energy, non- renewable energy, alternative energy, energy conservation, energy transformation
Links to other subjects Technical Vocational Education – Energy	

UNITS OF WORK GRADE 7 TERM 2 UNIT 2: PLANT REPRODUCTION

About the unit

In this unit students will learn about sexual and asexual reproduction in plants. They will review the reproductive structures of a typical flower and explore the adaptations of selected flowers in order to classify them as wind or insect pollinated. They will trace the events from pollination to fertilisation and fruit formation. They will also compare seeds and fruits and make annotated drawings of selected samples of both.

Students will learn that asexual reproduction takes place in vegetative parts of the plant – root, leaf and stem – not in specialised reproductive cells. They will examine asexual reproduction in selected plants (root stem and leaf).

Students will compare sexual and asexual reproduction in plants.

Range of Content

- The flower is the sexual reproductive structure/shoot of flowering plants.
- Flowers are specially designed for sexual reproduction
- Wind and insects are two common agents of pollination
- Flowers are specially adapted to their pollinating agent
- Pollination is important for fertilisation of gametes and development of the seeds and fruits
- After fertilisation the ovule develops into the seed and the ovary into the fruit.
- A seed contains an embryo (young plant) with a radicle (root) and a plumule (shoot).
- A seed can grow into a young plant or seedling.
- Some plants can reproduce without making seeds – asexual reproduction.
- Asexual and sexual reproduction are different.

GUIDANCE FOR THE TEACHER

Prior Learning
Check that students can:
Name the reproductive organs of a flowering plant
State the functions of selected parts of the flower
State that pollen grains contain the male sex cells
State that the female sex cells are found in the ovary

UNIT TITLE : Reproduction in Flowering Plants

Theme: Living Things, Life Processes and the Environment

Attainment Target(s):

- Understand the importance of the life processes in plants and animals, their interdependence, their interaction with the environment, and how lifestyles determine health and well-being.
- Gain an understanding of the components and structure of the universe, and how advances in science and technology have enabled space exploration.
- Apply scientific knowledge and processes to the solution of real world problems.
- Use mathematics as a tool for problem-solving, and as a means of expressing and/or modelling scientific theories.
- Appreciate the influence and limitations of science with consideration for ethical issues.
- Demonstrate a positive attitude towards the use of scientific language.
- Demonstrate positive interpersonal skills in order to foster good working relationships.

Benchmark(s):

- Understand the impact of climate change on living things and on the

Objectives:
Students will:

- Dissect and draw the reproductive structures of a flower
- Describe the process and list the agents of pollination
- Compare the structure of wind and insect pollinated flowers
- Explain the process of fertilisation
- Describe what happens after fertilisation to form seeds and fruits
- Relate the structure of seeds and fruits to the structure of the flower
- Make annotated drawings of the external and internal structure of seed and fruit
- Differentiate between seed and fruit
- Identify the main parts of a seed (testa, hilum, cotyledons, micropyle)
- Perform activities in a safe and tidy way
- Use cutting instruments correctly and with care
-

environment.

- Know that the cell is the basic unit of structure and function of all living organisms and be aware of the differences between plant and animal cells.
- Understand the hierarchical relationship from cells to organism.
- Understand the process of sexual maturity, and reproduction, in plants and animals.
- Understand the importance of maintaining a healthy lifestyle.
- Apply scientific skills, processes and methods in everyday situations and be aware of safety precautions involved in scientific work.
- Use scientific principles in the design of solutions to a problem taking into account potential impacts on man and the natural environment.
- Appreciate the importance of scientific methods.
- Demonstrate objectivity by seeking data and information to validate observations and explanations.
- Demonstrate care and concern for living things and the environment.
- Demonstrate concern for safety of self and others.
- Demonstrate curiosity, objectivity and perseverance in their approach to scientific activities.
- Demonstrate concern for the preservation of natural resources.
- Demonstrate concern for man's impact on the environment.
- Demonstrate sensitivity to others who are different.

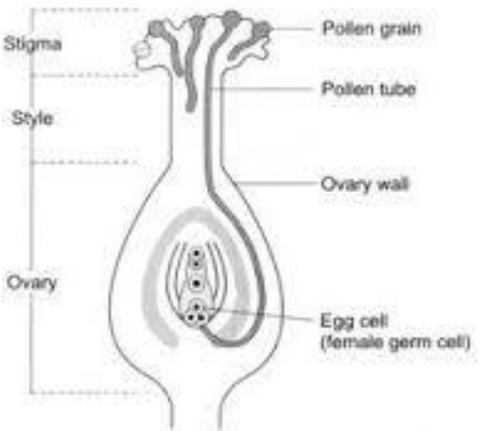
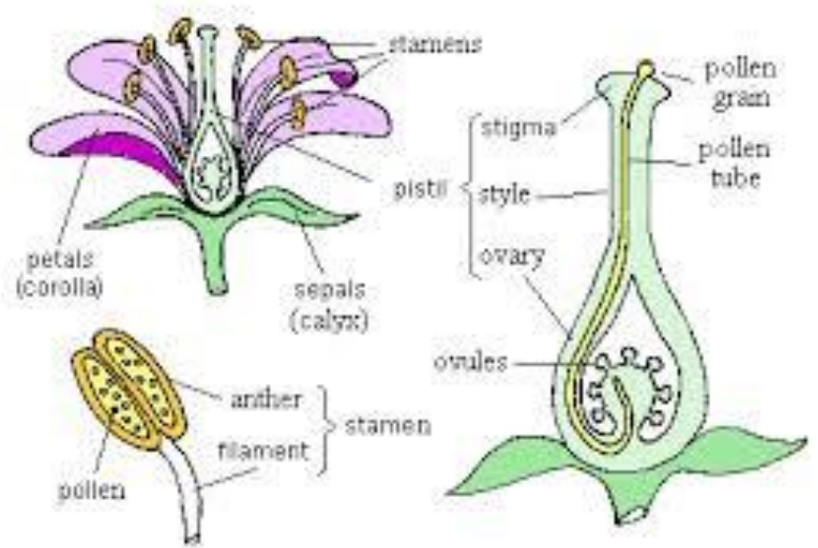
Duration: 10 Hours

ICT Attainment Targets:

- **COMMUNICATION AND COLLABORATION - Students use technology to communicate ideas and information, and work collaboratively to support individual needs and contribute to the learning of others.**
- **RESEARCH, CRITICAL THINKING AND DECISION MAKING- Students use digital tools to design and develop creative products to demonstrate their learning and understanding of basic technology operations.**
- **DESIGNING AND PRODUCING – Students use appropriate digital tools and resources to plan and conduct research, aid critical thinking, manage projects, solve problems and make informed decisions.**

DIGITAL CITIZENSHIP - Students recognise the human, ethical, social, cultural and legal issues and implications surrounding the use of technology and practice online safety and ethical behaviour.	

Suggested Teaching and Learning Activities	**Key Skills**	**Assessment**
In groups, use a hand lens to examine the flower of Poinciana, Pride of Barbados, Poor man's orchid or *Hibiscus*. Identify and make labelled drawings of the male and female reproductive organs.	Collaborate, observe, construct drawings	Acceptable presentation of drawings. Drawings accurately labelled
In groups, under the guidance of the teacher and after teacher demonstration, make a longitudinal section (L/S) of the ovary of chosen flower. Identify the ovules using a hand lens. Make a labelled drawing of the L/S ovary to show the ovules. Use a hand lens to examine pollen grains from a mature anther from the same flower. In a teacher led discussion, arrive at a simple working definition for pollination.	Collaborate, manipulate, construct drawings, define operationally	Acceptable presentation of drawings. Drawing accurately labelled Acceptable definition of pollination
In groups, collect at least 10 different types of flowers from their local environment. Examine each flower using a hand lens and record all the features observed. Use the information to decide whether each flower is wind- or insect- pollinated and explain how they arrived at the decision. Construct a table comparing wind and insect pollinated flowers. Share the information with the class. Under the guidance of the teacher summarise the similarities and differences between wind and insect pollinated flowers.	Collaborate, observe, tabulate, communicate, think critically	Accurate comparison of wind and insect pollinated flowers Acceptable presentation of table

In a teacher led discussion describe the events taking place in the diagram/poster/chart etc., similar to the one provided. Generate a simple working definition for fertilisation. In groups, Use the diagram provided to compose a song about pollination and fertilisation and share with the class  Germination of pollen grains on stigma and fertilization  	Collaborate, communicate, define operationally, create	Acceptable definition of fertilisation given Song includes accurate information on pollination and fertilisation

Explore how flowers develop into fruits using the flowering shoot of Pride of Barbados or Poinciana or Gungo peas. Observe the top of the flowering shoot and identify the buds, the opened flowers and the green fruits/pods. Examine one of the large green fruits/pods. Carefully open the fruit/pod, identify the structures and make an annotated drawing.	Investigate, annotate drawings, collaborate, communicate,	Acceptable presentation of drawings. Drawing accurately annotated
In groups, develop a flow diagram showing the sequence of events from pollination to fruit formation and share with the class in a variety of ways.	Communicate, collaborate, create	Flow diagram accurately represents events
Examine a soaked pea or bean seed to identify the testa and hilum. Gently squeeze the seed between finger and thumb and observe what happens. (Teacher should inform students that the drop of water that is observed identifies the position of the micropyle.) Make an annotated drawing of the external structure of the seed. Calculate the magnification of the drawing.	Manipulate, observe, annotate drawings, calculate magnification	Magnification accurately calculated and presented on drawing Drawing accurately annotated
Open the bean seed down the middle and identify the embryo (plumule –shoot and radicle-root) and cotyledons. Make an annotated drawing of the internal structure of the seed. Calculate the magnification of the drawing.	Manipulate, observe, annotate drawings, calculate magnification	Magnification accurately calculated and presented on drawing Drawing accurately annotated
Examine selected fruits (e.g. lime/orange, tomato, mango, cucumber, coconut, peanut, etc.). Cut a transverse/cross section through the middle of one of the fruits, examine and draw the half fruit. Label the fruit wall and the seeds.	Manipulate, observe, draw and label, calculate magnification	Magnification accurately calculated and presented on drawing Drawing accurately labelled

Learning Outcomes

Students who demonstrate understanding can:

- ✓ describe the reproductive structures of a flower
- ✓ differentiate between wind and insect pollinated flowers
- ✓ Explain the process of fertilisation
- ✓ Trace the development of seeds and fruits
- ✓ Make annotated drawings of the external and internal structure of seed and fruit
- ✓ Calculate the magnification of a drawing
- ✓ Use cutting instruments correctly and with care

Points to Note	**Extended Learning**
Care must be taken when using flowers that produce large amounts of pollen as some students have allergic reactions to different pollen. Ensure flowers are not shaken so pollen does not become airborne. Remind students to wash hands thoroughly after handling flowers and seeds. Calculate magnification of a drawing using the formula: Magnication = size of drawing / size of specimen Magnification is written beside the Title of the drawing and calculated to one decimal place. E.g. Drawing showing External Features of the Pea x1.2 Magnification MUST be included on **ALL** future drawings Ensure students use cutting instruments correctly and with care	Research the development of the fruits of strawberry, pineapple and soursop and banana. Research and prepare a presentation on the classification of fruits.
Resources Hand lens, posters, charts, scalpel, white tiles/petri dishes	**Key vocabulary** Gamete, ovule, pollination, fertilisation, fruit, seed, micropyle, hilum, cotyledon, testa, plumule, radicle,
Links to other subjects	

UNIT TITLE : Reproduction in Plants

Theme: Living Things, Life Processes and the Environment

Attainment Target(s):

- Understand the importance of the life processes in plants and animals, their interdependence, their interaction with the environment, and how lifestyles determine health and well-being.
- Apply scientific knowledge and processes to the solution of real world problems.
- Use mathematics as a tool for problem-solving, and as a means of expressing and/or modelling scientific theories.
- Appreciate the influence and limitations of science with consideration for ethical issues.
- Demonstrate a positive attitude towards the use of scientific language.
- Demonstrate positive interpersonal skills in order to foster good working relationships.

Benchmark(s):

- Understand the process of sexual maturity, and reproduction, in plants and animals.
- Apply scientific skills, processes and methods in everyday situations and be aware of safety precautions involved in scientific work.
- Use scientific principles in the design of solutions to a problem taking into account potential impacts on man and the natural environment.
- Appreciate the importance of scientific methods.
- Demonstrate objectivity by seeking data and information to validate observations and explanations.
- Demonstrate care and concern for living things and the environment.
- Demonstrate concern for safety of self and others.
- Demonstrate curiosity, objectivity and perseverance in their approach to scientific activities.
- Demonstrate sensitivity to others who are different.

Duration: 10 Hours

Objectives:

Students will:

- Identify and list some plants that can reproduce without making seeds.
- Describe ways in which new plants can be grown without seeds
- Investigate asexual reproduction in selected plants
- compare asexual and sexual reproduction in plants
- demonstrate caring for plants
- make and record observations using a range of methods

ICT Attainment Targets: • **COMMUNICATION AND COLLABORATION - Students use technology to communicate ideas and information, and work collaboratively to support individual needs and contribute to the learning of others.** • **RESEARCH, CRITICAL THINKING AND DECISION MAKING- Students use digital tools to design and develop creative products to demonstrate their learning and understanding of basic technology operations.** • **DESIGNING AND PRODUCING – Students use appropriate digital tools and resources to plan and conduct research, aid critical thinking, manage projects, solve problems and make informed decisions.** • **DIGITAL CITIZENSHIP - Students recognise the human, ethical, social, cultural and legal issues and implications surrounding the use of technology and practice online safety and ethical behaviour.**	

Suggested Teaching and Learning Activities	**Key Skills**	**Assessment**
In groups, predict what they think will happen when a leaf is removed from the *Leaf of life* plant and placed in a cup containing water. Share ideas with the class. Place a leaf from the *Leaf of life* (*Bryophyllum*) plant into a small container such as a Styrofoam cup or box drink carton with water. Make daily observations for two weeks. Record and explain their observations in writing and drawing/photos. Relate observations to predictions. Present findings to the class.	Collaborate, investigate, communicate, draw, observe, infer, think critically	Conclusions reflect predictions and observations
In groups, cut ends from a sweet potato and place them in a container with water. Observe for two weeks and record their observations in a variety of ways. Summarise and present their observations to the class.	Collaborate, investigate, communicate, draw, observe, infer, think critically	Conclusions reflect observations

In groups carefully cut 3-5 pieces with 'eyes' from the Irish potato provided. Press each piece of potato with eye upright onto the surface of moist paper towel/saw dust/potting soil in a suitable container and cover with cling film. Place the container in a cool place and record observations each day for 2 weeks. Summarise and present their observations to the class.	Collaborate, investigate, communicate, draw, observe, infer, think critically	Conclusions reflect observations
In groups, use the information gained from the previous activities to arrive at a working definition for asexual reproduction. In a teacher led discussion derive a common definition for asexual reproduction.	Collaborate, communicate, define operationally, think critically	Acceptable definition of asexual reproduction developed
As a class, compare sexual and asexual reproduction and summarise the information in a suitable table. Complete a teacher developed worksheet on asexual reproduction in plants.	Collaborate, communicate, think critically, tabulate	Acceptable presentation of table. Accurate information recorded.

Learning Outcomes

Students who demonstrate understanding can:

- ✓ Give examples of some plants that can reproduce without making seeds.
- ✓ Explain some ways in which new plants can be grown without seeds
- ✓ Describe asexual reproduction in selected plants
- ✓ Differentiate between asexual and sexual reproduction in plants
- ✓ Present observations and data using appropriate methods
- ✓ show caring for plants

Points to Note	**Extended Learning**
	Research asexual reproduction in commercial farming and horticulture (e.g. the use of ratooning and replanting of Sugar cane; bananas, pineapple).
Resources Styrofoam cups , drink cartons, plates, potting soil, paper towel, cling film	**Key vocabulary** Asexual reproduction
Links to other subjects	

UNITS OF WORK GRADE 7 TERM 2 UNIT 3: SEXUAL MATURITY, REPRODUCTION, AND PERSONAL HYGIENE

About the Unit

In this Unit students will learn about puberty and adolescence and identify the physical and emotional changes that take place in males and females. They will relate the changes to the sex hormones and to the overall sexual reproductive process. Students will describe how male and female sex cells (gametes) meet and fuse during fertilisation to produce a zygote which will develop into an embryo then into a foetus. They will learn that the menstrual cycle in females consists of several phases controlled by hormones. They will recognize that good personal hygiene is an important part of a healthy lifestyle.

Range of Content

- Physical and emotional changes take place at different rates in males and females during puberty and adolescence
- Puberty and adolescent changes are controlled by hormones
- During sexual reproduction egg and sperm fuse to produce a zygote
- During pregnancy the zygote develops into an embryo and later into a foetus
- The monthly menstrual cycle in females is controlled by hormones
- Personal hygiene is important for healthy living

GUIDANCE FOR THE TEACHER

Handle topic very carefully with sensitivity considering students who are shy. Reassurance about the range of different secondary sexual characteristics can alleviate students' concerns and sensitivities about their stage of development. Many students are sensitive about their weight. Sensitivity is needed with height because a small but significant number of children have growth problems. Height/weight charts used by health professionals illustrate the range of expected heights and weights. These can be used to reassure students at the extremes of the range. Teachers should be aware of the need for sensitivity to students who may mature earlier or later than the majority of their peers.

Prior Learning

Check that students can:

Identify the main parts of male and female reproductive systems

State the functions of the main parts of the male and female reproductive systems

Recall that organisms are made up of cells and that cells are specialised for their functions

UNIT TITLE: Sexual maturity and reproduction in humans	
Theme: Living Things, Life Processes and the Environment **Attainment Target(s):** • Understand the importance of the life processes in plants and animals, their interdependence, their interaction with the environment, and how lifestyles determine health and well-being. • Apply scientific knowledge and processes to the solution of real world problems. • Use mathematics as a tool for problem-solving, and as a means of expressing and/or modelling scientific theories. • Appreciate the influence and limitations of science with consideration for ethical issues. • Demonstrate a positive attitude towards the use of scientific language. • Demonstrate positive interpersonal skills in order to foster good working relationships. **Benchmark(s):** • Understand the process of sexual maturity, and reproduction, in plants and animals. • Apply scientific skills, processes and methods in everyday situations	**Objectives:** **Students will:** • Describe the human life cycle in terms of infancy, childhood, adolescence, maturity and ageing • Distinguish between puberty and adolescence • identify the changes in males and females during puberty • identify the hormones that initiate puberty in males and females • relate the structure of the main parts of male and female reproductive systems to their function • relate the structure of the male and female sex cells (gametes) to their function • explain the process of sexual reproduction in humans • describe the main changes that occur during the menstrual cycle • explain the importance of personal hygiene

and be aware of safety precautions involved in scientific work. • Use scientific principles in the design of solutions to a problem taking into account potential impacts on man and the natural environment. • Appreciate the importance of scientific methods. • Demonstrate objectivity by seeking data and information to validate observations and explanations. • Demonstrate concern for safety of self and others. • Demonstrate curiosity, objectivity and perseverance in their approach to scientific activities. • Demonstrate sensitivity to others who are different. **Duration:** 10 Hours	
ICT Attainment Targets: **COMMUNICATION AND COLLABORATION -** Use technology to communicate ideas, information and understandings for a variety of purposes. **RESEARCH, CRITICAL THINKING AND DECISION MAKING-** Use technology to develop a logical process for decision making and problem solving. **DESIGNING AND PRODUCING –** Use technology to design and produce multimedia products to demonstrate their creative thinking. **DIGITAL CITIZENSHIP -** Follow guidelines to promote healthy use of ICT tools	

Suggested Teaching and Learning Activities **Students will:**	**Key Skills**	**Assessment**
Respond to questions on the human life cycle, e.g. infancy, childhood, adolescence, puberty and adulthood. Use pictures to create a poster depicting the stages in the human life cycle, in the correct sequence. Be provided with a series of statements about the human life cycle and asked to sort these in the correct stage of the human life cycle. Use the grouped statements to summarise what happens at each stage in the cycle.	Create, classify, think critically, summarise, communicate	Poster contains correct sequence of all stages in the human life cycle. Statements correctly matched to stages in the life cycle. Summary captures the main events at each stage.
View videos/posters/charts on changes during puberty and adolescence. Guided by teacher led discussion, generate working definitions for the terms puberty and adolescence. List some of the main changes (physical and emotional) that occur during puberty and adolescence in males and females (e.g. mood swings, hair on pubic areas, widening of hips in females, deepening of voice and broadening chest in males), and name the hormones that initiate these changes.	communicate, define operationally, collaborate, think critically	Acceptable definitions given for the terms puberty and adolescence. Changes in males and females during adolescence correctly identified. Male and female hormones correctly identified
Be asked to recall times when they grew rapidly in primary school and identify the main ways in which they changed. Use secondary data of height at different ages to plot growth charts and identify the main periods of time when rapid growth takes place. In groups collect data on the heights (cm) of a sample of boys/girls aged 12 and another sample of boys/girls aged 16. Calculate the average height of the students of both age-groups and/or sexes. Record data in a table and construct a bar graph of the results. Write a report on the investigation paying special attention to height, gender and age. Participate in teacher led discussion of the findings.	Plot line graphs, think critically, communicate Investigate, measure, collect and record data, communicate, draw conclusions, think critically, collaborate	Line graphs correctly plotted Main periods of growth correctly identified Acceptable presentation of data in table Bar graph correctly constructed Inferences supported by data
Examine models or view poster / chart/ video (online/offline) of human male and female reproductive systems. Identify specific parts of the male and female reproductive system [ovary, fallopian tube/oviduct, uterus/womb, vagina, testes, scrotum, penis], and relate these to their basic functions. Label diagrams of the reproductive system on prepared worksheets and include the basic functions of these reproductive structures.	Communicate, thinking critically, annotate diagrams	Parts and functions are correctly matched on completed worksheets

Suggested Teaching and Learning Activities **Students will:**	**Key Skills**	**Assessment**
Use pictures or video clips of sperm and egg cells to review cell specialisation. Compare them and suggest how they are specially adapted for their functions. Draw and describe, or annotate drawings, of egg and sperm cells identifying their main features.	Think critically, annotate drawings	Acceptable drawings of egg and sperm cells. Annotations contain correct information about labelled structures.
In a teacher-led discussion, talk about what they know of human egg cells, e.g. where they are produced, how often they are produced, and how a woman might know if she is pregnant or not. (*Teacher should use students' suggestions and video or CD-ROM simulation to introduce the stages of the monthly cycle.*) With the aid of the teacher, construct a diagram of the days in the cycle, marking when menstruation and ovulation might occur and when the lining of the uterus/womb is thickening. Use Menstrual Cycle Wheel, provided by the teacher, along with guided discussion to identify the main changes that occur and relate each stage of the cycle to its significance in sexual reproduction. Complete worksheet on the phases of the Menstrual Cycle.	Communicate Draw diagrams Think critically, communicate, collaborate Think critically	Diagram correctly represents the events of the menstrual cycle The role of each stage in sexual reproduction is correctly described. Worksheet correctly completed.
View video/charts outlining the process of sexual reproduction in humans. In a teacher-led discussion, establish that fertilisation involves the fusion of a male cell (sperm) with a female cell (egg). Recap that sperm are produced in testes and eggs in ovaries. Talk about sperm being deposited in the vagina and having to move to where the egg is, and the egg moving down the oviduct. (*Teacher can illustrate, for example, with video and software simulations*.) Draw, or label, and sequence pictures or diagrams illustrating ovulation, fertilisation, and implantation. OR In groups to sequence cards, or manipulate interactive tutorial, bearing	communicate, sequence, collaborate Create and format multimedia presentations Make drawings/label diagrams, sequence Collaborate, sequence,	Correct sequence of stages of sexual reproduction Sequence of pictures or diagrams or cards correctly depicts the events of reproduction

Suggested Teaching and Learning Activities **Students will:**	**Key Skills**	**Assessment**
pictures or words depicting the stages of sexual reproduction. Display cards for critique. OR May also create multimedia presentation depicting the stages of reproduction	communicate	
create and perform songs/poems about hygiene. Discuss their creations and identify ways in which good personal hygiene is depicted or not depicted. As a class, discuss the importance of good personal hygiene during puberty/adolescence. Record the main points from the discussions in a variety of ways.	Think critically, create, communicate, collaborate, record	Main points about personal hygiene practices captured
Individually create kits for personal hygiene (*Teacher should recognise that a variety of hygiene products are used in different cultures and parts of the country and these are acceptable*). Display and critique the kits using a checklist generated by the class.	critique, create, design, observe	Kit contains appropriate products that address each area of personal hygiene
In groups, use the Engineering Design Process to create a product that can be used to improve personal hygiene (example: comb, soap, lotion, powder). Design a marketing campaign to advertise the product.	create, investigate, design ,plan, think critically, manipulate, communicate, problem solve	marketing campaign effectively executed Product meets design requirement

Learning Outcomes

Students who demonstrate understanding can:

- ✓ Identify the phases of the human life cycle
- ✓ name, locate and describe the functions of the reproductive structures
- ✓ describe fertilisation in terms of the fusion of egg cells and sperm cells
- ✓ describe the changes in the menstrual cycle

- ✓ Describe the observable changes that occur in males and females during puberty/adolescence
- ✓ recognise that reproductive organs mature during puberty as a consequence of growth and circulating hormones
- ✓ Recognise that good personal hygiene is important for healthy living
- ✓ Navigate and manipulate online tutorials/simulations on the stages of sexual reproduction in humans
- ✓ Communicate and collaborate using wiki

Points to Note	**Extended Learning**
Highlight that the menstrual cycle varies from person to person and may be shorter or longer than 28 days. Teacher created class wiki may be used for communication and collaboration Follow guidelines to promote healthy use of ICT tools	Discuss factors that contribute to irregular menstrual cycles. Research issues related to adolescence and puberty (e.g., religious, social and cultural).
Resources videos, pictures, songs, charts/ posters, presentation software, worksheets on structure of the male and female reproductive systems computer, Internet, multimedia projector, word processing and spreadsheet software, CDs/DVDs, class wiki site	**Key vocabulary** Puberty, adolescence, menstrual cycle, oestrogen, testosterone, ovary, testis, fertilisation, sexual reproduction, hormone, hygiene, ovulation, , fallopian tube/oviduct, uterus/womb, vagina, testes, scrotum
Links to other subjects Link with HFLE Grade 6 : Sexuality and Sexual Health, Religious Education	

UNITS OF WORK GRADE 7 TERM 3 UNIT 2: SEXUALLY TRANSMITTED INFECTIONS AND DRUGS

About the Unit

In this Unit students will learn about some common sexually transmitted infections, their causative agents, symptoms, modes of transmission and treatment. They will explore the dangers of drug misuse, abuse and addictions, through the study of some commonly abused drugs, and learn about the effects of these on the human body, mind and society at large.

Range of Content

- Diseases can be transmitted during sexual intercourse
- The effects of drug misuse, abuse and addiction on the human body and society
- Responsible sexual behaviour is important for healthy living

GUIDANCE FOR THE TEACHER

Presentation methods include: PowerPoint, songs, poems, role play, panel discussions, interviews, editorial, video, brochures, posters, displays, picture story, etc.

Teachers should make reference to the Health and Family Life Education (HFLE) programme.

Always be aware of the need for sensitivity to the personal circumstances of students and their families.

Prior Learning

Check that students can:

- Explain the process of sexual reproduction in humans
- Identify the main reproductive organs and describe their functions.

UNIT TITLE: Sexually Transmitted Infections and Drug Abuse

Theme: Living Things, Life Processes and the Environment

Attainment Target(s):

- Understand the importance of the life processes in plants and animals, their interdependence, their interaction with the environment, and how lifestyles determine health and well-being.
- Apply scientific knowledge and processes to the solution of real world problems.
- Use mathematics as a tool for problem-solving, and as a means of expressing and/or modelling scientific theories.
- Appreciate the influence and limitations of science with consideration for ethical issues.
- Demonstrate a positive attitude towards the use of scientific language.
- Demonstrate positive interpersonal skills in order to foster good working relationships.

Benchmark(s):

- Understand the importance of maintaining a healthy lifestyle.
- Apply scientific skills, processes and methods in everyday situations and be aware of safety precautions involved in scientific work.

Objectives

Students will:

- explain the importance of responsible sexual behaviour
- evaluate risks associated with irresponsible sexual behaviour
- formulate a definition of the term sexually transmitted infection.
- identify common diseases that are transmitted sexually (E.g. gonorrhoea, syphilis, genital herpes, HIV/AIDS, chlamydia, yeast, Human Papilloma Virus (HPV)), and their effects on the body.
- identify the causative agent (pathogen), main symptoms, treatment and methods of prevention of selected STIs
- show respect for another person's idea.
- present observations and data using appropriate methods, including tables and graphs
- interpret observations and data
- draw conclusions from observations, measurements and data

• Use scientific principles in the design of solutions to a problem taking into account potential impacts on man and the natural environment. • Appreciate the importance of scientific methods. • Demonstrate objectivity by seeking data and information to validate observations and explanations. • Demonstrate concern for safety of self and others. • Demonstrate curiosity, objectivity and perseverance in their approach to scientific activities. • Demonstrate sensitivity to others who are different. **Duration:** 5 Hours 💻 **COMMUNICATION AND COLLABORATION - Students use technology to communicate ideas and information, and work collaboratively to support individual needs and contribute to the learning of others.** 💻 **RESEARCH, CRITICAL THINKING AND DECISION MAKING- Students use digital tools to design and develop creative products to demonstrate their learning and understanding of basic technology operations.** 💻 **DESIGNING AND PRODUCING – Students use appropriate digital tools and resources to plan and conduct research, aid critical thinking, manage projects, solve problems and make informed decisions.** 💻 **DIGITAL CITIZENSHIP - Students recognise the human, ethical, social, cultural and legal issues and implications surrounding the use of technology and practice online safety and ethical behaviour.**	

Suggested Teaching and Learning Activities **Students will:**	**Key Skills**	**Assessment**
view a video or a chart that introduces the concept of sexually transmitted diseases. In groups, brainstorm and formulate a simple definition for the term	collaborate, communicate, think critically, define operationally	Acceptable definition given for STIs.

Suggested Teaching and Learning Activities **Students will:**	**Key Skills**	**Assessment**
'Sexually Transmitted Infection'. List some common sexually transmitted infections.		At least 5 STIs listed.
As a class view videos (online/offline) and/or listen to songs on responsible sexual behaviours. Discuss the importance of responsible sexual behaviour, and then write a letter to an imaginary friend who is sexually active telling them about the dangers of STIs and the consequences of irresponsible sexual activities. Create a class portfolio using the letters. **ICT Integration** The letter may be done using word processing software and attached to the class email, if available. E-portfolios may be used to store the compiled letters.	Communicate, collaborate, create, think critically Create and format word processing document Send email with attachment	Letter contains correct information about the dangers of STIs and the consequences of irresponsible sexual activities.
Conduct research in small groups to gather information on a specific or assigned STI. Include the name of the STI, its causative agent (pathogen), symptoms, treatment, preventative measures and statistics on the number of persons who are infected in Jamaica and the Caribbean. Use the information to launch an STI Awareness Day in which each group will display their research findings using various methods e.g. banners, posters, videos, songs and poems. Invite resource personnel to address the subject of STIs. Complete a worksheet on STIs.	Research, collaborate, create, communicate	Accurate information on STIs presented Worksheets completed correctly
Acquire data on incidence of STIs among different groups, e.g. age, gender etc., in Jamaica and the Caribbean. Examine the data for trends and patterns. Represent the data in tables and graphs. Summarise their findings and draw conclusions. Share and discuss their findings with the class. As a class, develop a promotional activity (e.g. a STI exposition, a STI awareness day/hour, lunch-hour presentation) to sensitise the rest of the school to STIs and the importance of responsible sexual behaviours. ICT Integration	Analyse, communicate, think critically, summarise, draw conclusions Collaborate, create, communicate	

Suggested Teaching and Learning Activities **Students will:**	**Key Skills**	**Assessment**
The promotional activity may include various electronic means of portraying the message, e.g. e-posters, PowerPoint presentations, audio/video messages.		

Learning Outcomes

Students who demonstrate understanding can:

- ✓ Explain the term sexually transmitted infection
- ✓ Identify the causative agent (pathogen), main symptoms, treatment and methods of prevention of selected STIs
- ✓ Argue the importance of responsible sexual behaviour
- ✓ Analyse, interpret and present data.
- ✓ Organise and implement a promotional activity/marketing plan.
- ✓ Create and format word processing document
- ✓ Communicate and collaborate using class email with attachment

Points to Note	**Extended Learning**
Clear up any misconceptions or superstitions that emerge from discussions or work presented by students. Refer to Guidance Department, if necessary. STI data may be obtained from the websites of various government and non-governmental organisations, e.g. the World Health Organisation (WHO), ministries of health, the Centre for Disease Control (CDC) etc.	Research the incidence of STI s among school children in the Caribbean. Interview members of the community to find out common myths relating to STIs (e.g., transmission, treatment, prevention and cure). Prepare a summary of the findings for class discussion. Role-play the HIV epidemic – 'HIV Acting'.

Recognise some of the dangers associated with internet use and demonstrate safe online behaviours.	Research policies that exist to prevent discrimination against HIV infected individuals.
Resources Video/chart on STIs, worksheet Computers, Internet, speaker, multimedia projector, interactive video tutorials, CDs/DVDs, class email account	**Key vocabulary** symptom, transmission, sexual transmitted infection, pathogen
Links to other subjects Social Studies, Health and Family Life Education	

Prior Learning

Check that students can:

- Differentiate between useful and harmful drugs.
- Describe some of the harmful effects of drug use and misuse

UNIT TITLE: Sexually transmitted infections and drug abuse	
Theme: Living Things, Life Processes and the Environment **Attainment Target(s):** • Understand the importance of the life processes in plants and animals, their interdependence, their interaction with the environment, and how lifestyles determine health and well-being. • Apply scientific knowledge and processes to the solution of real world problems. • Use mathematics as a tool for problem-solving, and as a means of expressing and/or modelling scientific theories. • Appreciate the influence and limitations of science with consideration for ethical issues. • Demonstrate a positive attitude towards the use of scientific language. • Demonstrate positive interpersonal skills in order to foster good working relationships. **Benchmark(s):** • Understand the importance of maintaining a healthy lifestyle. • Apply scientific skills, processes and methods in everyday situations and be aware of safety precautions involved in scientific work. • Use scientific principles in the design of solutions to a problem taking into account potential impacts on man and the natural environment. • Appreciate the importance of scientific methods. • Demonstrate objectivity by seeking data and information to validate observations and explanations. • Demonstrate concern for safety of self and others. • Demonstrate curiosity, objectivity and perseverance in their approach to scientific activities. • Demonstrate sensitivity to others who are different. **Duration:** 5 Hours	**Objectives** **Students will:** • distinguish between drug use, misuse and abuse • describe the dangers and effects of commonly abused and misused drugs (alcohol, nicotine, marijuana, cocaine, caffeine, aspirin, paracetamol, antibiotics etc.) • explain the term drug addiction. • evaluate the effects of drug abuse on the human body and society. • explain ways in which addicted persons can be rehabilitated • recognise that there are ethical issues involved in research and development of drugs • select and make effective use of secondary sources of information about health, indicating how strongly evidence supports or does not support a conclusion

▪ **COMMUNICATION AND COLLABORATION - Students use technology to communicate ideas and information, and work collaboratively to support individual needs and contribute to the learning of others.** ▪ **RESEARCH, CRITICAL THINKING AND DECISION MAKING- Students use digital tools to design and develop creative products to demonstrate their learning and understanding of basic technology operations.** ▪ **DESIGNING AND PRODUCING – Students use appropriate digital tools and resources to plan and conduct research, aid critical thinking, manage projects, solve problems and make informed decisions.** ▪ **DIGITAL CITIZENSHIP - Students recognise the human, ethical, social, cultural and legal issues and implications surrounding the use of technology and practice online safety and ethical behaviour.**	

Suggested Teaching and Learning Activities **Students will:**	**Key Skills**	**Assessment**
view videos on drug use, misuse and abuse. In small groups, brainstorm and record what they think is meant by the terms drug abuse, use, misuse and addiction. Share the information with the class. Discuss and compare their definitions with that provided by the teacher.	Collaborate, communicate, define operationally, think critically	Acceptable explanations given for the terms drug abuse, misuse, use and addiction.
be provided a list of well-known substances, e.g. paracetamol, cannabis, tobacco, penicillin, antiseptic. Sort the list into drugs and other substances, then categorise the drugs into different groups. Explain the criteria or reasons for their categories.	Think critically, classify, create	Drugs and other substances correctly classified. Criteria or reasons justified.
in groups, discuss their perceptions of the dangers of drugs (e.g. widely used, side effects, addictive, likely to cause death). Use secondary sources (e.g.	Collaborate, communicate, research	Accurate information on the dangers of drugs presented.

Suggested Teaching and Learning Activities **Students will:**	**Key Skills**	**Assessment**
magazines, internet, resource persons) to check the accuracy of their perceptions of drugs. With the aid of the teacher, present their findings in a variety of ways for use by students in other classes.		
in groups conduct research on drugs and their use, misuse and abuse. Include the dangers and effects on the human body, the social and economic implications and methods and opportunities for rehabilitation of persons who are addicted. Present their findings using a variety of methods. Peer-assess the presentations using a rubric they developed. **ICT Integration** Presentations may include class Wiki and blogs	Collaborate, research, communicate, create, analyse, Collaborate and communicate using class Wiki	Accurate information is presented in research. Rubric contains relevant criteria.
Depict through role-play scenarios related to drug use and abuse. As a class discuss the issues raised.	Create, communicate, think critically	Role-play acceptably portrays drug use and abuse.
Collect a variety of pictures from the internet, newspaper, magazines that depict drug abuse and arrange the pictures in a sequential order so that they tell a story about the effects of drug abuse. Display picture stories on school notice board. ICT Integration Digital story software may be used to create and display the picture stories.	Create, communicate, analyse Create, edit, format, display digital stories	Picture story acceptable.
Visit rehabilitation centres or listen to resource persons (e.g. speakers from the National Council of Drug Abuse, Public Health nurses or persons who have managed to give up drugs) on the types of rehabilitation services available in Jamaica. Summarise and display information gleaned from the presentation/visit.	Communicate, summarise, think critically	Summary includes a variety of rehabilitation options.

Learning Outcomes

Students who demonstrate understanding can:

- ✓ Explain drug abuse, misuse and addiction
- ✓ Explain the effects of drugs on the human body and mind
- ✓ Describe some social and economic problems associated with drug abuse.
- ✓ Identify some methods used/are available to help rehabilitate persons addicted to drugs.
- ✓ Create and format, digital display using digital story software
- ✓ Collaborate and communicate information on drug abuse using class Wiki and blogs.

Points to Note	**Extended Learning**
Students may hold ideas about the effects of the use of some drugs that may be erroneous. It is important that the teacher identify and address these "myths". Sensitivity must be exercised when addressing the cultural or ritualistic use of certain drugs. Emphasize the importance of making responsible choices in order to maintain a healthy lifestyle. Pay attention to the effects on drug use, misuse and abuse on unborn babies. Recognise some of the dangers associated with internet use and demonstrate safe online behaviours.	Research and present information on the use of performance enhancing drugs in sports. Research the medical uses of marijuana and present findings in a variety of ways (flyer, poster, brochure, song, etc.). Write a letter to a friend or family member who is a chronic cigarette smoker, advising him/her of the dangers of the habit to health. Read publicly available leaflets on drugs.

Resources: Computers, internet, magazines, newspapers, videos, resource personnel, charts, sample rubric for presentation Computers, Internet, speaker, multimedia projector, interactive video tutorials, CDs/DVDs, concept mapping software, class Wiki and blog sites	**Key vocabulary** Drug, drug abuse, drug misuse, addiction, rehabilitation
Links to other subjects Social Studies, Health and Family Life Education	

UNITS OF WORK GRADE 7 TERM 3 UNIT 2: CLIMATE CHANGE

About the Unit

In this Unit students will learn about climate and climate change. Students will also learn about the impact human activities such as the burning of fossil fuel have on climate and how they can minimize the impact on their lives.

Range of Content

- climate change
- human activities

GUIDANCE FOR THE TEACHER

The following greenhouse gases should be treated carbon dioxide, methane, nitrous oxide, fluorinated gases (e.g. chlorofluorocarbons, CFCs) and sulphur dioxide.

Prior Learning
Check that students can:
Identify climate change as an environmental problem

UNIT TITLE: Climate Change

Theme: Living Things, Life Processes and the Environment

Attainment Target(s):

- Understand the importance of the life processes in plants and animals, their interdependence, their interaction with the environment, and how lifestyles determine health and well-being.
- Apply scientific knowledge and processes to the solution of real world problems.
- Use mathematics as a tool for problem-solving, and as a means of expressing and/or modelling scientific theories.
- Appreciate the influence and limitations of science with consideration for ethical issues.
- Demonstrate a positive attitude towards the use of scientific language.
- Demonstrate positive interpersonal skills in order to foster good working relationships.

Benchmark(s):

- Understand the impact of climate change on living things and on the environment.
- Apply scientific skills, processes and methods in everyday situations and be aware of safety precautions involved in scientific work.
- Use scientific principles in the design of solutions to a problem taking into account potential impacts on man and the natural environment.
- Appreciate the importance of scientific methods.
- Demonstrate objectivity by seeking data and information to validate observations and explanations.
- Demonstrate care and concern for living things and the environment.

Objectives:
Students will:

- Explain the meaning of the term 'greenhouse effect'
- Recall what is meant by climate change
- Identify some effects of climate change in the Caribbean
- Identify selected greenhouse gases and their sources
- Deduce the relationship between the greenhouse effect and global warming
- Evaluate the impact of at least three effects of climate change on living organisms and the environment
- Explain ways in which human practices contribute to climate change
- Describe at least three ways in which people can reduce the impact of climate change on their lives
- Formulate plans to reduce the production of major greenhouse gases
- Critique initiatives developed by environmental protection agencies to reduce the harmful effects of climate change
- Interpret data which illustrates the impact of climate change

• Demonstrate concern for safety of self and others. • Demonstrate curiosity, objectivity and perseverance in their approach to scientific activities. • Demonstrate concern for the preservation of natural resources. • Demonstrate concern for man's impact on the environment. • Demonstrate sensitivity to others who are different. **Duration:** 5 hours **COMMUNICATION AND COLLABORATION - Students use technology to communicate ideas and information, and work collaboratively to support individual needs and contribute to the learning of others.** **RESEARCH, CRITICAL THINKING AND DECISION MAKING- Students use digital tools to design and develop creative products to demonstrate their learning and understanding of basic technology operations.** **DESIGNING AND PRODUCING – Students use appropriate digital tools and resources to plan and conduct research, aid critical thinking, manage projects, solve problems and make informed decisions.** **DIGITAL CITIZENSHIP - Students recognise the human, ethical, social, cultural and legal issues and implications surrounding the use of technology and practice online safety and ethical behaviour.**	

Suggested Teaching and Learning Activities	**Key Skills**	**Assessment**
Students will:		
Carry out an investigation to show the greenhouse effect: Put 50 cm^3 of water into each of two identical transparent glass jars then measure and record the temperature of the water in each. Cover one jar ensuring that it is air-tight. Place both jars in a sunny location/under a light source so that they are equally exposed to the light source. After at least 15	Investigate, manipulate, observe, record, infer, collaborate, define operationally, communicate	Observations appropriately recorded. Logical explanations given for observations. Acceptable definition of

Suggested Teaching and Learning Activities	Key Skills	Assessment
minutes, check on the jars, measure and record the temperature of the water and include any other observations (*e.g. steam in jar*). Discuss and suggest explanations for observations made. Share observations and explanations with class. (*In class discussion teacher should introduce the term 'greenhouse effect' and relate it to the activity.*) In groups, based on the investigation and subsequent class discussions, formulate a definition for the term 'greenhouse effect'. Share definition with class. **ICT Integration** Share observations and definitions using online posting to class wiki or through class email with attachments.	 Collaborate and communicate electronically	greenhouse effect formulated.
View a video to recap the meaning of the term 'climate change'. In groups, explore the possible effects of the 'greenhouse effect' on climate. Produce a podcast on the relationship between the greenhouse effect and climate change. Conduct peer evaluations on the podcast, then share and discuss with the class. Based on the discussions, derive a simple explanation of the term 'global warming'.	collaborate, communicate, create, think critically, evaluate	Acceptable explanation given for global warming.
Conduct research on some greenhouse gases (carbon dioxide, methane, nitrous oxide, sulphur dioxide, and fluorinated gases such as chlorofluorocarbons - CFCs) and list some sources of each. Create a poster to depict the information and display in the science corner. ICT Integration Posters may be created using digital drawing tools	Research, create, communicate Create digital content	Poster depicts accurate information.
In groups, carry out research to assess some effects of climate change on the Caribbean and explain ways in which human practices contribute to these effects (See resource package for Grace Kennedy Annual Lecture 2015 video). Describe at least three ways in which people can reduce the impact of the effects on their lives. Share information with the class/school in a variety of ways.	Research, collaborate, communicate	Descriptions of human practices to reduce climate change are correct.

Suggested Teaching and Learning Activities	Key Skills	Assessment
ICT Integration Information sharing may be done through discussion forums on social networking sites.	Collaborate and communicate information using social network	
In groups, be assigned one major greenhouse gas for which they will plan ways of reducing emissions. Peer-assess the plans to arrive at a class consensus on the best emission reduction methods. As a class, use the consensus information to produce a proposal/booklet on how to reduce greenhouse gas emissions.	Collaborate, think critically, evaluate, create, communicate	Greenhouse gas emission reduction plan is applicable.
In groups, review initiatives developed by environmental protection agencies – such as National Environmental Protection Agency (NEPA), Jamaica Environment Trust (JET), Meteorological Service of Jamaica (Met office) – to reduce the effects of climate change. Assess which initiatives they think are most effective, providing justification for their selection(s). Use the selected initiative(s) to develop a public service campaign.	Collaborate, think critically, evaluate, communicate, create	Justification for selected initiatives is logical.

Learning Outcomes

Students who demonstrate understanding can:

- ✓ Illustrate the greenhouse effect
- ✓ explain the concept of climate change in terms of global warming and the greenhouse effect
- ✓ describe effects of climate change
- ✓ Analyse mitigation methods to deal with climate change
- ✓ Collaborate and communicate electronically using class wiki and/or class email with attachments.
- ✓ Communicate information and collaborate using discussion forums and social networks

Points to Note	**Extended Learning**
Additional information on climate change may be obtained online. Some Effects of Climate Change: 1. Rise of sea and atmospheric temperatures 2. Increase in number and intensity of storms 3. Sea level rise 4. Increased drought 5. Risk of significant loss of biodiversity through species extinction in many tropical areas Teacher created/directed class wiki site, email account and discussion forums through social networking sites.	Research the importance of the ozone layer, the substances that affect it and its impact on organisms and the environment.
Resources Identical transparent glass jars, thermometers, jar lid/plastic wrap to cover container, elastic band, materials for making posters, internet, computers Computers, Internet, speaker, multimedia projector, interactive video tutorials, CDs/DVDs, graphic organizer and multimedia software	**Key vocabulary** Global warming, greenhouse effect, greenhouse gases, carbon dioxide, methane, nitrous oxide, global warming, sulphur dioxide, fluorinated gases
Links to other subjects Social studies: AT1, Climate, grades 8 and 9	