

# **Information Technology**

# **Units of Work**

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Jamaica

# GRADE 7

## UNITS

### TERM 1

#### Introduction

Computing Education is constantly being reshaped. New thinking and new technologies continue to influence this. It is critical that the distinction be made among the three most common areas of computing education.

Each of these areas is known by various names in different jurisdiction, however in our context we call them:

- Information Technology
- Computer Science
- Educational Technology / Information and Communication Technology (ICT)

### **Defining key Terminologies**

In its computing curriculum 2005: the overview report, the Association of Computer Machinery (ACM) and Institute of Electrical and Electronics Engineers (IEEE) Computing Society recognises the following:

#### **Information Technology (IT)**

Information Technology is “the proper way of technologies by which people manipulate and share information in its various forms.”It involves learning about computers, and emphasizes the technology itself. Information Technology specialists assume responsibility for selecting appropriate hardware and software products, integrating those products with organizational needs and infrastructure, and installing, customizing, and maintaining those resources. Information Technology, therefore, focus on:

- installing, securing, and administrating computer network;
- installing, maintaining, and customizing software;
- managing and securing data in physical and virtual worlds;
- managing communication systems ;
- designing implementing, and managing multimedia resources and other digital media

#### **Computer Science (CS)**

Computer Science is the study of computers and algorithmic processes, including their principles, their hardware and software designs, their application and their impact on society. Computer Science spans a wide range of computing activities, from theoretical foundations to robotics, intelligent systems, and bioinformatics and it is concentrates on designing, creating, modifying, and verifying computing tools.

#### **Difference between Information Technology and Computer Science**

IT is an applied field of study, driven by the practical benefits of its knowledge, while computer science adds scientific and mathematical, as well as practical, dimensions. Some of the practical, dimensions of computer science are shared with IT, such as working with text, graphics, sound, and video. IT concentrates on learning how to use and apply these tools while computer science is concerned with learning how these tools are designed and why they work. Computer science and IT have a lot in common, but neither one is fully interchangeable.

#### **Educational Technology / Information and Communication Technology (ICT)**

Educational Technology / ICT integration can be defined as using technology tools across the curriculum, or more specifically, using computer technology (hardware and software) to learn about other disciplines. For example, a science teacher may use computer simulations to provide students with a better understanding of a lesson on genetics, or a Social Studies teacher may use a digital story or Webquest to help students understand the middle passage.

### **Information Technology Literacy and Information Technology Fluency**

There are two other terms that is emerging in computing education these are Information Technology Literacy and Information Technology Fluency. A study published in 1999, defines IT fluency as something more comprehensive than IT literacy. Whereas IT literacy is the capability to use today's technology in one's field, the notion of IT fluency adds the capability to independently learn and use new technology as it evolves throughout one's professional life time. Moreover, IT fluency also includes the active use of computational thinking (including programming) to solve problems, whereas IT literacy does not.

### **Aim of Information Technology (IT):**

The 21<sup>st</sup> century learner lives in a technologically charged environment and IT will provide them with the requisite knowledge and skills to understand the underpinnings of current technology and to prepare them for utilizing new and emerging technologies. The Grades 7 - 9 Information Technology (IT) curriculum will introduce students to the opportunities afforded by this dynamic field and begin to prepare them for a wide range of rewarding careers as well as for personal use. IT is relevant as it incorporates a wide range of problem solving techniques and skills that is needed for life-long learning. The fundamental purpose of the IT curriculum is to provide students with knowledge, skills and attitudes that will enable them to achieve success at every stage of life be it personal, professional or academically.

### **The goals of the IT curriculum are to enable students to:**

- ☞ achieve an understanding of IT concepts
- ☞ develop essential skills such as critical thinking skills, research and enquiry skills and to communicate information effectively, accurately and ethically
- ☞ utilize the knowledge, skills and attitudes acquired through the study of IT to a variety of learning tasks in other subject areas
- ☞ develop life-long learning habits that will assist students in adapting to new and emerging technologies
- ☞ become aware of the wide range of career options available to individuals with IT skills

### **ROLES AND RESPONSIBILITIES OF THE DELIVERY OF THE IT CURRICULUM**

In order for the delivery of this curriculum to be effective all key stakeholders must be aware of their roles and responsibilities.

### **STUDENTS**

Students are responsible for their learning. It is clear that there is a relationship between student's effort and achievement. Students are encouraged to motivate themselves to learn. Teacher's encouragement can motivate any student to learn. Taking the learning experience outside of the classroom will extend

and enrich their understanding of the content. These may include becoming members of a computer club, subscribing to magazines and other online resources; attend Technology conferences and competitions to learn of new and emerging technologies.

### **PARENTS/GUARDIANS**

Parents/guardians have a critical responsibility in supporting their child/ward learning experience. By becoming knowledgeable about the curriculum they determine what is taught and can determine best to support their child/ward. Parents/guardian can assist their child/ward by attending school's consultation sessions and encouraging them to do extended work outside the classroom.

### **TEACHERS**

Teachers and students responsibilities complement each other. Teachers are responsible for developing culturally relevant instructional technologies to achieve learning outcomes as well as appropriate methods for assessment and evaluations. Joining professional technology societies, subscribing to technology magazines and other online resources, attend Technology conferences to be aware of new and emerging technologies as well as teaching strategies.

### **SUGGESTED TEACHING AND LEARNING ACTIVITIES**

The suggested teaching and learning activities indicates the minimum content to be covered per term. The sequence of the content listed per term **is not prescribed**. Teachers are encouraged to design their own sequence per term to deliver the content in an appropriate sequence and pace given their circumstances.

The topics should be presented in an integrated manner as much as is possible. Some content from one topic may strengthen and underpin the content of another. It is recommended that this approach be applied throughout grade 7 – 9 where applicable.

**Innovators Challenge:** *STEM education is an approach to teaching and learning that integrates the content and skills of science, technology, engineering and mathematics. STEM Education is a teaching and learning methodology that prepares individuals:*

- *For successful employment, post-secondary education, or both that require different and more technically sophisticated skills including the application of science, technology, engineering, and mathematics skills and concepts, and*
- *To be competent, capable citizens in our technology-dependent, democratic society.*

***The Innovators Challenge is to be used as a main STEM activity. It is to be used during the academic year. Teachers are at liberty to create other challenges to develop STEM methodology.***

**The Strands**

There are three (3) strands in Information Technology as follows:

<p><b>STRAND 1:</b></p> <p><b>Computer Components and Operations/ Foundations of Hardware and Software</b></p> <p><b>STANDARD</b></p> <p>Students demonstrate an understanding of how computers work as well as develop competence in the use of hardware devices and software tools.</p> <p><i>(Guided by ISTE and CSTA Standards)</i></p>	<p><b>STRAND2:</b></p> <p><b>Digital Citizenship STANDARD</b></p> <p>Students demonstrate an understanding of the human, cultural and societal issues related to technology and practice responsible, moral and safe practices while applying information and communication technologies, and operating and maintaining computer systems in everyday life.</p> <p><i>(Guided by ISTE and CSTA Standards)</i></p>	<p><b>STRAND3:</b></p> <p><b>Computational thinking and practice STANDARD</b></p> <p>Students use critical thinking and analytical skills to solve problems by selecting and applying relevant strategies and tools.</p> <p><i>(Guided by CSTA Standards)</i></p>
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<b>Information Technology Strands and Standards</b>	<b>STRAND 1:</b> <b>Computer Components and Operations</b>  <b>STANDARD</b> Students demonstrate an understanding of how computers work as well as develop competence in the use of hardware devices and software tools.  <i>(Guided by ISTE and CSTA Standards)</i>			<b>STRAND 2:</b> <b>Digital Citizenship</b>  <b>STANDARD</b> Students demonstrate an understanding of the human, cultural and societal issues related to technology and practice responsible, moral and safe practices while applying information and communication technologies, and operating and maintaining computer systems and careers in everyday life.  <i>(Guided by ISTE and CSTA Standards)</i>			<b>STRAND 3:</b> <b>Computational thinking and practice STANDARD</b>  Students use critical and creative thinking and analytical skills to solve problems by selecting and applying relevant strategies and tools.  <i>(Guided by CSTA Standards)</i>	
	<b>Foundations of Hardware and Software:</b>  Students demonstrate an understanding of the concepts of computing, computer systems and their architecture	<b>Data Communication and Networking and Internet</b>  Students demonstrate an understanding of using a wide range of technologies, standards and protocols involved in the electronic transmission of data within various configurations	<b>Productivity tools and multimedia authoring</b>  Students apply knowledge of a wide range of productivity and multimedia authoring tools to create a variety of products	<b>Health, safety and environmental issues</b>  Students demonstrate an understanding by practising health and safety, ethics and moral principles when using computer systems	<b>Computing Careers</b>  Students demonstrate an understanding of different computing and technology careers	<b>Computer Ethics and Research</b>  Students apply principles of different risks and ethical issues when using the internet to conduct research	<b>Problem Solving</b>  Students identify problems encountered in everyday life and understand the fundamentals of logic in solving real-world problems  Decompose a problem by defining input, output and processing component	<b>Algorithm Development</b>  Students develop algorithms to solve simple problems.  Evaluate different algorithms for solving the same problem

	Computer Components and Operations			Digital Citizenship			Computational thinking and Practice
Sub Theme	Foundations of Hardware and Software	Data Communication and Networking and Internet	Productivity Tools and multimedia authoring	Health and Safety	Computing Careers	Computer Ethics and Research	Problem- Solving and Algorithm Development
Grade 7	<p>Examine the components of the computer system.</p> <p>Understand the characteristics of hardware components</p> <p>Investigate the different types of computers and their uses.</p> <p>Discuss the advantages and disadvantages of each type of computer.</p> <p>Explore the historical development of computers.</p> <p>Assist peers in the use of computer hardware devices</p> <p>Know the different types of software</p>	<p>Know the terminologies associated with data communication and networking</p> <p>Understand the fundamentals of computer networks such as LAN and WAN</p> <p>Display knowledge of resources available on the World Wide Web</p> <p>Know basic Internet terminologies and demonstrate an ability to use Internet-related software</p>	<p>Manipulate Word processing and Desktop publishing software.</p> <p>Be aware of various multimedia management software</p> <p>Use and manipulate presentation software to create multimedia presentation.</p> <p>Know file and desktop management and use an operating system to organize computer files</p>	<p>Discuss issues of risks and safety while operating the computer system.</p> <p>Understand and practise proper care and maintenance of computer equipment</p> <p>Understand ergonomics and how it affects computer related disorders</p> <p>Evaluate the negative effects of computers on the environment</p>	<p>Discuss the emergence of new careers as a result of computing</p> <p>Identify careers related to computing and technology</p>	<p>Understand Internet terminologies and use Internet-related software.</p> <p>Demonstrate an awareness of relevant information on the Internet by using the successful search strategies, with little teacher intervention.</p> <p>Know appropriate safety measures when using the Internet.</p> <p>Understand and practise moral and ethical approaches when using information on the Internet</p>	<p>Understand the terminologies associated with problem solving</p> <p>Identify the steps in solving problems in the real world context.</p> <p>Demonstrate an ability to solve real world problems</p> <p>Understand the terminologies associated with algorithms and program development</p> <p>Know the different types or methods of documenting algorithms</p> <p>Divide problems into smaller parts</p> <p>Create a simple app and other programs using programming concepts</p>



**OVERVIEW OF SUBJECT CONTENT GRADE7**

SUBJECT	TERM 1	TERM 2	TERM 3
INFORMATION TECHNOLOGY	<p><b>Unit I: Health and Safety</b></p> <p>Demonstrate health and safety practices while operating the computer system</p> <ul style="list-style-type: none"> <li>● The impact of the use of computers on the environment and on human health</li> <li>● Safety (Correct use)</li> <li>● Ergonomics</li> <li>● Health (care and use)</li> </ul> <p><b>Unit II: Foundations of Hardware and Software:</b></p> <p>Develop an appreciation for the development and use of computers. Demonstrate competence in the use of hardware devices, and software productivity tools.</p> <ul style="list-style-type: none"> <li>● History of Computers</li> <li>● Computer Hardware</li> <li>● Computer Software</li> <li>● Productivity Tools (Word Processing and Presentation Software)</li> </ul>	<p><b>Unit III: Data Communication, Networking and Internet</b></p> <p>Understand the application of communication technologies in everyday life</p> <ul style="list-style-type: none"> <li>-Basic data communication, networking and internet terms</li> <li>-Components of data communication</li> <li>-Communication Device – Modem</li> </ul> <p><b>UNIT IV: Computer Ethics and Research:</b></p> <p>Demonstrate a responsible, moral and ethical approach to using (for example downloading and uploading) online and offline information and suitable resources on the Internet.</p> <ul style="list-style-type: none"> <li>- Identifying bibliography from sources</li> <li>- Investigate characteristics of online or offline credible sources</li> <li>- Citing sources and using APA and MLA referencing using websites and books</li> </ul> <p><b>UNIT V: Computing Careers</b></p> <p>Understand the importance of Computing careers in everyday life.</p> <p>Traditional Computing careers</p>	<p><b>UNIT VI: Desktop Publishing</b></p> <p>Demonstrate competency in using Desktop Publishing software.</p> <p><b>UNIT VII: Problem-Solving</b></p> <p>Use critical thinking and analytical skills to develop simple algorithms to solve problems</p> <ul style="list-style-type: none"> <li>● Identify Problems</li> <li>● Steps in Problem solving</li> </ul>

## Unit 1: HEALTH AND SAFETY

### **Range and Content**

Students will learn:

- Rules governing the use of the computer laboratory and electronic devices. For example, place chairs under desk when not in use; no food or liquid in the computer laboratory; eject flash drive correctly before removing it from computer system, exercise care when connecting or disconnecting cables to the computer system.
- Appropriate health and safety practices when using a computer system
  - Injuries which may arise from the prolonged use of computer systems (Repetitive Strain Injury, Carpel Tunnel Syndrome, Computer Vision Syndrome and lower back pain)
  - Methods to prevent/reduce the impact of these injuries ( correct posture, taking breaks away from the computer, proper lighting, top of monitor at or just below eye level, head and neck balance in line with torso, shoulders relax, elbows close to body and supported, wrists and hands in- line with forearm, feet flat on the floor)
  - About the negative effects that the use of electronic devices may have on the environment
- Definition of Ergonomics
- Ergonomics guidelines for use of computer systems. For example, chairs designed to support back, wrist/palm rest designed to help support wrists, monitors designed to adjust brightness and position of screen, adjustable keyboards that allow the user to change the positions and angles of the keyboard, armrests should be removable and the distance between them should be adjustable, armrests should be padded and soft, a mouse should match the curve of your hand and have sufficient cord length to allow its placement next to the keyboard, wrist rest should match the front edge of the keyboard in width, height, slope, and curve

### **About the Unit**

There are several health risks associated with the improper use of the computer laboratory and electronic devices. This unit should provide an overview and understanding of health and safety guidelines governing their proper use. It will also highlight the methods of prevention/reduction that should be followed to ensure that these risks are minimized or eliminated.

### **Guidance to Teacher**

Some of the content of health and safety should be integrated with other topics and therefore should not only be confined to this unit. Teachers may create computer laboratory rules in collaboration with the students taking into consideration the school's culture. Teachers should observe/supervise students and constantly encourage them to engage in proper health and safety practices while operating computer systems. Teacher should endeavour to expose students to ergonomically designed equipment and furniture.

**UNITS OF WORK GRADE 7 TERM 1 (14 weeks)**

**Prior Learning**  
Check that students:

- Understand what is a computer system
- Can use a computer system

<p><b>Unit 1: HEALTH AND SAFETY</b> <b>(2 weeks)</b></p>	
<p><b>Attainment Target(s):</b> Students understand health and safety procedures applied to the use of a computer system.</p> <p>Students demonstrate health and safety practices while operating the computer system.</p>	<p><b>Objectives:</b> <b>Students will:</b></p> <ul style="list-style-type: none"><li>● Display safe and healthy behaviours in the computer lab and while operating the computer system</li><li>● Discuss Ergonomics and how it affects computer related disorders</li><li>● Discuss various computer related disorders/illnesses and methods to prevent them.</li><li>● Apply and adapt appropriate health and safety practices while using a computer system</li><li>● Examine the negative effects of electronic devices on the environment</li><li>● Collaborate in group activities</li></ul>

Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p>Students will:</p> <p>In groups, discuss and develop a list of computer lab rules and use available resources to present these rules. Dramatize selected rules listed to demonstrate their knowledge of computer lab safety operations</p> <p>Review literature to discover the meaning of ergonomics and record definition in their own words.</p> <p>View a video on ergonomically designed equipment and furniture and discuss its importance to computer usage.</p> <p>Take a tour of their school computer lab(s)/office and identify ergonomically safe and unsafe practices. Use image capturing device to record images. Create a digital story or picture collage depicting safe and unsafe practices observed</p> <p>View pictures of computer system usage and classify them into categories based on ergonomically safe or unsafe practices and justify decision.</p> <p>In groups conduct a guided review on Carpal Tunnel Syndrome, Lower back pain, Repetitive Strain Injury and Computer Vision Syndrome as they relate to computer usage highlighting the cause and effect and suggest preventative measures. Use various methods to present their findings such as a project, podcasts, essay or blog.</p> <p>Use dramatization or any other presentation style to communicate comparisons between correct and incorrect usage of computers.</p> <p>List and discuss safety procedures observed at home when there is a power outage while using a computer system.</p>	<p>Collaborate in groups Discuss and share ideas Use appropriate media to present information Perform and present information</p> <p>View for information Discuss and share ideas</p> <p>Create digital story or picture collage Observe to collect information</p> <p>View for information Critique and classify information Discuss ideas</p> <p>Work collaboratively in groups Select and use appropriate presentation methods Read for information</p> <p>Demonstrate to present information Observe dramatization</p> <p>Discuss ideas</p> <p>Assessing scenario</p>	<p>Media appropriately used to communicate pertinent computer lab rules Dramatization satisfactorily demonstrated an understanding of computer lab safety operations.</p> <p>Digital story or picture collage created accurately highlighted ergonomically safe and unsafe practices</p> <p>Pictures correctly classified as ergonomically safe or unsafe practices.</p> <p>Project, podcast, essay or blog correctly depicted evidence of computer related disorders/illnesses, cause and effect and suggested preventative measures.</p> <p>Presentation portrayed evidences of correct and incorrect usage of computers.</p>

<p>Discuss safety procedures to be observed in a computer lab. Read the following scenario and discuss do's and don'ts that Jane should have observed. "Jane entered the computer lab with her lunch to complete an assignment. She powered on the PC but observed that it was not booting even though it was plugged into an electrical outlet. She realised that the printer was on, she decided to plug out the printer from its outlet in the wall in order to connect her computer. The cords ran across the walk way.</p> <p>Conduct an offline or online research to evaluate the negative effects of electronic devices on the environment. Present their findings project form.</p> <p>Create a 3-D model lab from material in your environment. The model should highlight elements of ergonomics and safety in the computer lab.</p>	<p>Reading to draw conclusion Apply knowledge</p> <p>Research to gather information</p> <p>Apply knowledge from STEAM areas to create model</p>	<p>Correctly applied health and safety principles in analysis of scenario</p> <p>Project satisfactorily captures the negative effects of electronic devices on the environment</p> <p>3-D model satisfactorily captures elements of ergonomics and health and safety in a computer lab</p>
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<p><b>Learning Outcomes</b> Students will be able to:</p> <ul style="list-style-type: none"> <li>● Articulate the importance of correct ergonomically safe practices</li> <li>● Explain the consequences associated with the improper use of computers</li> <li>● Discuss different methods to reduce adverse effects associated with the improper use of computers.</li> <li>● Model correct health and safety behaviours when using computer systems.</li> <li>● Articulate the negative effects of the electronic devices on the environment</li> </ul>		
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<b>Points to Note</b>	<b>Extended Learning</b>
<p>Teachers are encouraged to reinforce established rules for the care, use and maintenance of computer lab and equipment</p> <p>Teacher must keep abreast of new developments in Computer related disorders/illnesses.</p> <p>Dramatization could can be recorded using image capturing devices and played back for class discussion</p>	<p>Students can collaborate to design an ergonomic equipment/furniture.</p> <p>Students can develop guidelines for facilitating a safe environment at home when using a computer system.</p>
<p><b>Resources</b></p> <p>Personal computers</p> <p>Internet access</p> <p>Multimedia presentation kit</p> <p>Photographs of persons using the computer</p> <p>Video on Ergonomics</p> <p>Resource books/CDs</p>	<p><b>Key vocabulary</b></p> <p>Health, safety, ergonomics, carpal tunnel syndrome, repetitive strain injury, computer lab rules, eye strain, back strain, shoulder pain, lower back pain, computer vision syndrome, emergency procedures.</p>
<p><b>Links to other subjects</b></p> <p>Link with Language Arts in Grade 7 Attainment Target 1 “Speaking and Listening” and Target 2 “Reading”</p> <p>Link with Technical Vocational Education in Grade 7 Attainment Target 2 “Exploring methods and procedures” and Target 3 “Applying Solutions”</p> <p>Link with “Integrated Science”</p>	

## ***Unit 2: Foundation of Hardware and Software***

### **Range and Content**

Students will learn:

- Definition of fundamental terms associated with the computer system - computer, computer system, hardware, software, data and information, multimedia, word processing, system software and application software.
- The types and function of the main hardware components of the computer system (input, output, processing, storage and communication devices).
- The historical development of computers since the nineteenth century
- Keyboarding and mouse skills such as (correct placement of hands while using the mouse and keyboard, keyboard home keys, correct posture while using the computer system, keyboard keys, mouse buttons)
- To identify examples of the two main categories of software ( system and application)
- Describe the function of each section of the keyboard, Numerical keypads, function keys and alphanumeric and special keys such as the ctrl, shift, caps lock, num lock, etc.
- The different sections of the word processing window
- To use word processing software to create documents, apply formatting to text and page, insert graphics and manipulate tables.
- To create basic multimedia presentation using text, graphics, animation and transition.

### **About the Unit**

This unit provides an opportunity for students to develop an appreciation for the history of computers and its importance to the Information Age. It should enable students to develop an understanding of computer system, hardware and software components including their functions, processes and procedures. In addition, it will seek to equip students with basic computing skills critical for manipulating the computer as a tool to accomplish tasks such as the creation of text documents and multimedia files.

### **Guidance to Teacher**

The foundation of hardware and software unit should help students feel more confident around computers and other computing devices. Hence, teachers are encouraged to modify the tasks to meet the needs and circumstances of their students. The availability of resources such as computers, software and internet connections will determine which tasks are most appropriate. Students' readiness and interest should also be taken into consideration in choosing tasks and teaching aids such as videos to make the unit exciting and relevant for students.

**Prior Learning**

Check that students can:

- explain what is a computer
- perform basic computer operations
- use digital tools to gather and research information

**UNITS OF WORK GRADE 7 TERM 1(14 Weeks)**

<p><b>Unit 2: Foundation of Hardware and Software (12 weeks)</b></p>	
<p><b>Attainment Target(s):</b></p> <p>Students know the hardware and software components that make up computer systems.</p> <p>Students understand the purpose of hardware devices and software productivity tools in computer systems</p> <p>Students demonstrate competency in the use of computer hardware devices.</p> <p>Students demonstrate competency in the use of computer software productivity tools.</p>	<p><b>Objectives:</b> <b>Students will:</b></p> <ul style="list-style-type: none"> <li>● Define the terms: computer, computer system, computer hardware, computer software, multimedia</li> <li>● Differentiate between a computer and computer system</li> <li>● Differentiate between data and information</li> <li>● Trace the historical development of computers</li> <li>● Compare the different types of computers and assess their key hardware components and performance levels</li> <li>● Analyse how technology tools impact productivity in homes, schools, community and at the workplace.</li> <li>● Explain the basic functions of the hardware components (input, output, storage and processing)</li> <li>● Classify hardware devices as input, output, storage, processing and communication</li> <li>● Apply concepts of interdependency to hardware and software</li> <li>● Practise keyboarding and mouse skills</li> <li>● Classify software into the two main categories system and application</li> <li>● Appreciate the uses of software</li> <li>● Cooperate in group activities</li> <li>● Investigate the different sections in the layout of a word processing software</li> <li>● Create documents using word processing software</li> <li>● Create multimedia presentation using presentation software and apply animation and transition features to multimedia presentation</li> </ul>



Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p>Students will:</p> <p>On worksheet provided, in pairs, write words/phrases that comes to mind relating to the following terms ‘computer’ ‘computer system’, ‘computer hardware’, ‘computer software’, ‘data’ and ‘information’. Discuss and select two phrases to share with the class.</p> <p>Along with teacher formulate a definition for the terms above and create a glossary or picture dictionary for class use.</p> <p><u>View</u> a video on hardware components of a computer system and their functions. Identify hardware components and classify each component according to its role in the computer system – input, output, storage, and processing.</p> <p>Create a <u>diagram</u> to illustrate (electronically or manually) the relationships among hardware components of the computer system, highlighting input, storage, processing, output and communication.</p> <p>Collect facts from classmates, for example date of birth, name, and address. Organize facts collected to make them meaningful and share with class how the facts were organised.</p> <p>Create a meaningful sentence which represents information from a list of words for example (loves, you, God, care, He, and, about, you). Discuss the difference between data and information.</p> <p>In groups carry out a guided online research to collect royalty free pictures of devices and computers from the 19th century to present. Use the pictures to create a pictorial story-line using a photo sharing application or through a time-line website.</p> <p style="text-align: center;">OR</p> <p>In groups conduct offline research about the history and types of computers and present their findings by creating a scrapbook depicting the timeline or use a performing arts mode (skit/song/poem) portraying different eras of computer development and the types of computers.</p>	<p>Recall knowledge Discuss and share ideas</p> <p>Think critically and express ideas</p> <p>Observe to make comparison Classify components</p> <p>Draw to represent information</p> <p>Gather, record, organize and evaluate facts</p> <p>Think critically and construct new ideas</p> <p>Collaborate in groups to gather, record, organize and present data</p>	<p>Glossary or picture dictionary accurately defined the terms ‘computer’, ‘computer system’, ‘computer hardware’ ‘computer software’, ‘data’ and information’.</p> <p>Video created highlighted hardware components correctly classified according to functions.</p> <p>Model accurately labelled highlighting computer system showing relationships among hardware components. Facts meaningfully organised</p> <p>Accurate differentiation between data and information</p> <p>Diagrams of timeline correctly created to show the development of computers from 19th century to present.</p> <p>Scrapbook, song, skit, poem accurately portrayed the timeline of computer development.</p>

Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p>In groups, visit different companies/organizations within your parish. Capture pictures of the different types of computers that are being used and record what these computers are used for as well as when these computers were invented. Create a storyboard to present findings to class.</p> <p>Prepare and conduct a debate on the moot for example “be it resolved that technology tools negatively impact productivity in homes, schools, community and at the workplace”.</p> <p>In groups select a place of focus for example home, school, community or workplace. Visit at least three of these areas to find out how technology impacts productivity. Record findings and present information using software of their choice.</p> <p>Differentiate among the types of computer systems highlighting their unique characteristics (primary uses, processing power and size)and display findings in a table or any other of presentation style</p> <p>Conduct online/offline guided research to identify the two main categories of software used on a computer system then identify the particular types of programs on the machines in the computer lab and on a personal computer, and create a table separating the examples of software into the two main categories.</p> <p>Use teacher provided worksheet on software examples provided to classify software. JUSTIFY your choice of classification – explain what each software does and why and how you think it should be classified.</p> <p>In groups create puzzles (crossword/word search) of terms and concepts taught in the lessons and exchange among groups to solve.</p> <p>In groups, assembly keyboard puzzle pieces to label and describe the different sections of the keyboard and state their functions;</p>	<p>Collaborate in groups to research and present information</p> <p>Debating moot</p> <p>Compare information to construct new knowledge</p> <p>Research and present information</p> <p>Classifying software</p> <p>Recall knowledge and share information, collaborate in groups to create puzzles</p> <p>Demonstrate ability to assembly keyboard and state functions</p>	<p>Debate satisfactorily presented sound arguments to support points of view</p> <p>Table accurately displayed information on characteristics and performance capabilities of computer systems</p> <p>Accurately prepared table Categorizing software into the two main categories: Application and Systems.</p> <p>Accurately classified and justified software into categories</p> <p>Accurately created and completed puzzles relating to terms and concepts used in the lesson</p> <p>Accurately assembled and labelled keyboard puzzle. Satisfactorily described the functions of the keyboard sections</p>

Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria												
<p>TASK: INPUT, OUTPUT STORAGE, PROCESSING AND COMMUNICATION DEVICES</p> <p>Click, drag and drop each item listed below in the correct column</p> <p><b>Keyboard Scanner Touch Screen Digital Camera Light Pen Barcode Reader</b></p> <p><b>Speakers Joystick OMR Webcam CD/DVD Monitor/Screen CPU Modem</b></p> <p><b>Mouse VDU Laser Printer Dot Matrix Printer USB flash drive Plotters</b></p> <table border="1" data-bbox="109 539 1050 922"> <thead> <tr> <th data-bbox="109 539 392 634">INPUT DEVICES</th> <th data-bbox="392 539 703 634">OUTPUT DEVICES</th> <th data-bbox="703 539 1050 634">STORAGE DEVICES</th> </tr> </thead> <tbody> <tr> <td data-bbox="109 634 392 751"></td> <td data-bbox="392 634 703 751"></td> <td data-bbox="703 634 1050 751"></td> </tr> <tr> <td data-bbox="109 751 392 820">PROCESSING</td> <td data-bbox="392 751 703 820">COMMUNICATION DEVICES</td> <td data-bbox="703 751 1050 820"></td> </tr> <tr> <td data-bbox="109 820 392 922"></td> <td data-bbox="392 820 703 922"></td> <td data-bbox="703 820 1050 922"></td> </tr> </tbody> </table> <p>Use drill and practice software or manual keyboarding exercises to practice, proper finger placement, use of the numeric keypad, and practice the use of special keys such as the ctrl, shift, caps lock, num lock etc. Play educational electronic games using the keyboard and mouse to improve both speed and accuracy.</p> <p>In pairs, discuss what they have used word processing software to do in the past, and share how using this software made their task more efficient</p> <p>Observe two sample documents with similar information; one hand-written and the other typed. From your observation write two advantages and two disadvantages, of typing a document using a word processor as opposed to hand-writing the document.</p> <p>Launch a word processing program, describe the role of the different sections of the displayed word processing interface and draw and label the word processing</p>	INPUT DEVICES	OUTPUT DEVICES	STORAGE DEVICES				PROCESSING	COMMUNICATION DEVICES					<p>Classifying hardware devices</p> <p>Demonstrate proper use of keyboard</p> <p>Discuss and share ideas</p> <p>Observe to compare and contrast</p> <p>Recall and memorize</p>	<p>Accurately dragged and dropped hardware devices in the correct columns</p>
INPUT DEVICES	OUTPUT DEVICES	STORAGE DEVICES												
PROCESSING	COMMUNICATION DEVICES													

Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p>window.</p> <p>Examine a document with various formatting features (bold, italics, underline, font type, font colour, font size, page numbering, headers, and footers); discuss the formatting features observed and use the word processing software to reproduce the document.</p> <p>Discuss the procedure to insert graphics (from online clipart or from local drive) into a word processing document. For example using a digital camera to capture a picture of their school and upload image to their computer; open the file and copy image then place it into a word-processing document.</p> <p>Work in groups to discuss a situation in their school environment and compose a letter addressed to the principal. Type letter in a word processing software using the formatting features introduced previously</p> <p>In groups, investigate to find out some of the problems/issues that students face on a daily basis. Investigation can take the form of interviews or using a digital camera to capture issues at hand. Using the concept of formatting and inserting graphics in a word processing software, create a bulletin to be sent to the principal highlighting your findings.</p> <p>Print a word processing file using different selections (current page, specific pages, entire document)</p> <p>Create a portfolio (electronic or manual) and add their word processing documents to portfolio</p> <p>View hard copy of a document advertising an event (flyer, brochure, invitation). Watch a Multimedia presentation on the same event. Discuss which method of presentation of the information was more effective.</p> <p>OR</p> <p>Through discussion, identify reasons for using presentation software e.g. at a school event, advertising a new product or delivering a lesson.</p> <p>Imitate the creation of a multimedia presentation while viewing activity on video</p>	<p>information</p> <p>Reproduce document using Word Processing Software</p> <p>Discuss and share ideas Demonstrate word processing skill</p> <p>Collaborate in groups to gather, record, organize and present data Critical thinking</p> <p>Use a Word Processing software to print documents</p> <p>Compile and organize data</p> <p>Reflect and evaluate</p> <p>Discuss, share and evaluate ideas</p> <p>Observe and reproduce/model procedures to create multi-</p>	<p>Document accurately reproduced and properly formatted based on instructions</p> <p>Letter satisfactorily created using formatting features of word processing software</p> <p>Document pages printed according to specifications given.</p> <p>Multimedia presentation satisfactorily created with the inclusion of appropriate slide design, transitions and effects</p>

Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p>or demonstration by teacher.</p> <p>Practise creating multimedia presentations – insert new slides, add text, insert tables, insert images, insert sound files, add hyperlinks. Apply basic animation and transition features to multimedia presentations</p> <p>Use multimedia presentation software templates to create a new presentation file and print presentation as a ‘hand-out’</p> <p>Create a multimedia presentation on aspects of Jamaican culture. Add this presentation to their portfolio (electronic or manual).</p> <p><b>Innovators Challenge</b></p> <p><i>The Storage Solution Company Limited is seeking new designs for storage devices because the environmentalists have been complaining about the hazardous effects of damaged devices. This situation as well as recession is causing the company to lose money. They have hired a team of innovators to help them solve the problem and you are a-part of that team.</i></p> <p><b>Focus questions:</b></p> <ol style="list-style-type: none"> <li>1. What is the problem? Provide evidence.</li> <li>2. What are some of the causes of the problem? Explain/justify/defend.</li> <li>3. What would these innovators do to find a solution? Demonstrate the process.</li> <li>4. What is the result of the solution chosen? Showcase and report on the result.</li> <li>5. How successful was the solution used?</li> <li>6. Based on the solution presented how much money will the company expected to earn?</li> </ol> <p><b>Requirements</b></p> <ol style="list-style-type: none"> <li>1. Record all assumptions</li> <li>2. Solution may be unique/original.</li> <li>3. Evidence must be presented of the product and process</li> <li>4. Must be done collaboratively</li> <li>5. Make use of credible research</li> </ol>	<p>media presentation</p> <p>Use multi-media software to create multi-media presentation</p> <p>Review, evaluate, organize and print information</p> <p>Collaborate in groups to discuss, research, record, organize and present solutions</p>	<p>Hand-outs of presentation satisfactorily printed.</p> <p>Problem examined from multiple perspectives to include Sciences, Technology, Engineering and Mathematics</p> <p>The Engineering design process used to arrive at the solution and to implement the solution.</p> <p>Evidence of the integration of Mathematical ideas</p> <p>Most of the problem solving steps observed to include:</p> <ul style="list-style-type: none"> <li>• Define the Problem</li> <li>• Examine possible solutions</li> <li>• Apply Solution and revise</li> <li>• Look Reflectively to revise and make improvement</li> <li>• Communicate solution</li> </ul>

Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p><b>Learning Outcomes</b> Students will be able to:</p> <ul style="list-style-type: none"> <li>● Explain the terms: computer, computer system, hardware, software</li> <li>● Differentiate between a computer and a computer system</li> <li>● Demonstrate an understanding of the development of early computers</li> <li>● Differentiate among the different types of computer systems</li> <li>● Classify hardware devices as Input, Output, Storage, Processing and Communication</li> <li>● Demonstrate competence in the use of keyboard and mouse</li> <li>● Group software into categories</li> <li>● Operate Word Processing and Presentation Software</li> </ul>		
<p><b>Points to Note</b></p>	<p><b>Extended Learning</b></p>	
<p>The worksheet could contain circles with the terms in them and then students be asked to fill the circles with words/phrases relating to the terms. Use of proper technical terms when referring to software and hardware components. Teacher should ensure that students are aware of the difference between ICT and IT. Highlight <i>the difference between a computer and a computer system.</i></p>	<p>Students can build a model of a computer system Student can collect pictures of the basic hardware components and create poster illustrating the names of each component and their role. Students can use their word processing skills to complete their assignments in other subjects such as History, Geography, Language and Literature. Students will use word processor to create a flyer advertising an event.</p>	
<p><b>Resources</b> Personal computers Internet access Samples of hardware devices Resource books/CDs Rubric for grading presentations Multimedia presentation kit Sample memoranda Drill and Practice software Educational electronic games Puzzles Pictures of computers</p>	<p><b>Key vocabulary</b> Computer, hardware, software, peripheral, component, input, output, storage, supercomputer, mainframe, minicomputer, microcomputer, vacuum tubes, transistors, ENIAC, UNIVAC, integrated circuits, processor, CPU, microprocessor, system software, word processor, multimedia, presentation, data, information, speaker system unit, monitor, mouse, keyboard, printer, text, graphics, bold, underline, page number, header, footer, margin, orientation</p>	
<p><b>Links to other subjects</b> Link with Drama in Grade 7 Attainment Target 1 “Exploring and Creating” Link with Technical Vocational Education in Grade 7 Attainment Target 1 “Creativity and Innovation” and</p>		

<b>Suggested Teaching and Learning Activities</b>	<b>Key Skills</b>	<b>Assessment Criteria</b>
Attainment Target 3 “Apply solutions” Link with Visual Arts Grade 7 Attainment Target		

DRAFT

**GRADE 7**

**UNITS**

**TERM 2**

DRAFT



### **Unit 3: Data Communication, Networking and the Internet**

#### **Range and Content**

Students will learn:

- Terms related to data communication: Communication, Data communication, Network, Modem, Internet, Web browser, Web page, Web site , URL, e-mail, Upload, Download
- Components of Communication (Context, Sender, Message, Medium, Receiver and Feedback)
- The components needed for successful electronic communication (receiving and sending device (fax machine, smart phones, laptop, notebook, tablet); communication channel/transmission media (wired: telephone lines, coaxial cable, twisted pair cable, fibre optic cable; wireless: Bluetooth, satellite, infrared, microwave station); communication device (MODEM – Modulator/Demodulator))
- To identify computer-based methods of sending and receiving information, for example, email, videoconferencing, Telephones (voice), internet call, SMS and Multimedia Messaging Service, Broadcasting, Internet Relay Chat.
- Types of Networks (PAN, LAN, MAN, WAN)
- The different resources necessary for connecting to the internet (hardware: sending and receiving devices, communication devices; software: web browser; Internet Service Provider )
- How to perform basic web search using search engines and URLs
- How to upload and download files from different sources such as the internet

#### **About the Unit**

This unit will provide students with an awareness of the various opportunities available for modern communication through the use of new and emerging technological tools. It will develop students understanding of the technical terms used in data communication, networking and the internet. In addition, students' internet skills will be improved tremendously as they will get the opportunity perform web searches as well as upload and download data/information.

#### **Guidance to Teacher**

Some of the content from data communication and networking spans several subject areas; efforts should be made to make relevant and important links. Teachers should use opportunities to demonstrate how data communication works, for example, allowing students to send a file from one device to another. Also, teacher can display to students how computers and devices are connected together in a network. The delivery of this unit will be largely dependent on the resources available; teacher however should find creative and innovative ways to ensure that students benefit from this unit. For example, smartphone (where permissible) can be used to display web search by projecting screen to entire class.

#### **Prior Learning**

Check that students can:

- Identify basic communication devices
- Access services on the internet to share information

**UNITS OF WORK GRADE 7 TERM 2(11 Weeks)**

<p><b>Unit 3: Data Communication, Networking and the Internet (5 Weeks)</b></p>	
<p><b>Attainment Target(s):</b></p> <p>Students understand how computer systems communicate with each other.</p> <p>Students develop an awareness of the application of various forms of communication technologies in everyday life</p> <p>Students evaluate the importance of implementing appropriate security measures when using a network</p>	<p><b>Objectives:</b></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>● Define the following terms as they relate to data communication: Communication, Data communication, Network, Modem, Internet, Web browser, Web page, Web site, , search engine, URL, e-mail, Upload, Download</li> <li>● Describe a Network and highlight the services available in a networked environment</li> <li>● Explain the functions of the hardware required for a basic network (sending, receiving, communication device, etc.)</li> <li>● Identify the components of data communication</li> <li>● Describe various forms of electronic communication (email, SMS)</li> <li>● Differentiate among the types of network (Personal Area Network, Local Area Network, Metropolitan Area Network, Wide Area Network)</li> <li>● Discuss the advantages and disadvantages of using a Network such as the Internet</li> <li>● Differentiate between the Internet and the World Wide Web</li> <li>● Investigate basic internet resources – Email, Instant messaging and Social Networking</li> <li>● Explain the relationship between key terms (World Wide Web, website, webpage, hyperlink, web browser, URL, search engine)</li> <li>● Collaborate in group activities to gather, record or present information</li> <li>● Formulate ethical judgment when using the internet</li> </ul>

Suggested Teaching and Learning Activities –	Key Skills	Assessment Criteria
<p>Students will:</p> <p>Play the Chinese telephone game to demonstrate the communication process; Identify the elements involved in the game as the necessary elements of communication – sender, channel, receiver</p> <p>Create a diagram depicting the communication process based on their interpretation of</p>	<p>Demonstrate the communication process and identify the necessary elements of communication</p> <p>Create diagram to represent information</p>	<p>Chart/game correctly shows the communication process.</p>

Suggested Teaching and Learning Activities –	Key Skills	Assessment Criteria																																			
<p>the process</p> <p>Conduct guided research to define the common terms related to data communication, network and the internet such as modem, web browser, search engines and so on.</p> <p>Examine the following scenario: the School Board has purchased 55 computers and wants to distribute one to each classroom, 5 to the library and 5 to the staffroom. There will be a meeting to decide if they need to network the computers or should have stand-alone computers. As a member of the computer club you were asked to present arguments for and against networking of the computers in the school. If the argument presented is in support of a network then samples of the hardware needed to network the computers should be shown and explained</p> <p>In pairs, produce a list of different ways in which data communication can be carried out then share the list with the whole class.</p> <p>Classify transmission media as wired or wireless from a list of different media Create a scrapbook that shows pictures of sending and receiving device, communication device(MODEM) and different types of transmission media</p> <p>Conduct a guided research to explain the various components of data communication (sending device, communication device, communication channel/transmission media and receiving device).</p> <p>Conduct guided research to determine the most common types of computer networks – PAN, LAN, MAN, WAN; and be given different scenarios to explain and justify which network is best suited for the various scenarios. For example</p> <table border="1" data-bbox="52 1123 991 1360"> <thead> <tr> <th>Places</th> <th>PAN</th> <th>LAN</th> <th>MAN</th> <th>WAN</th> </tr> </thead> <tbody> <tr> <td>Church</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Travel Agency</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Bank</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>University</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Library</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Home</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Create models of the different types of communication network using recycled materials (Plastic, string, paper, soda can, etc.)comparing and contrasting the features of the various networks</p>	Places	PAN	LAN	MAN	WAN	Church					Travel Agency					Bank					University					Library					Home					<p>Research and define terms</p> <p>Present arguments Gather, record, organize and present information</p> <p>Classify media</p> <p>Create scrapbook</p> <p>Research and present information</p> <p>Research and present information</p> <p>Create models to represent information</p> <p>Create puzzles</p>	<p>Terms accurately defined as related to data communication</p> <p>Arguments satisfactorily highlight advantages and disadvantages of using Networks. Correct hardware were used to support network</p> <p>Transmission media correctly classified as wired or wireless</p> <p>Scrapbook correctly shows the components of data communication</p> <p>Components of data communication correctly explained</p> <p>Satisfactorily justified type of network based on various scenarios</p> <p>Models created correctly shows the different types of network, highlighting the features</p>
Places	PAN	LAN	MAN	WAN																																	
Church																																					
Travel Agency																																					
Bank																																					
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Library																																					
Home																																					

Suggested Teaching and Learning Activities –	Key Skills	Assessment Criteria																				
<p>Create puzzles (crossword, find-a-word etc.) using terms from data communication.</p> <p>Watch an appropriate video on how is the Internet different from the World Wide Web and through discussions; identify the differences and the software used to access the resources on the Internet and the World Wide Web.</p> <p>List and draw examples of web browsers and identify the ones that are used on computers and other electronic devices.</p> <p>Debate the moot: “The world today, without the Internet, would be a better place.” Incorporating the advantages and disadvantages of using the internet.</p> <p>Discuss the difference between upload and download and identify instances in their Internet experience when they have uploaded or downloaded data</p> <p>Launch a web browser and practice accessing teacher-selected websites by inputting the Uniform Resource Locator (URL) in the address bar and search for specific information on the Internet by inputting terms into a search engine.</p>	<p>Discuss and share ideas</p> <p>Identify types of web browsers</p> <p>Debate moot</p> <p>Demonstrate uploading and downloading</p> <p>Demonstrate proper use of search engines and URL</p>	<p>Puzzles created satisfactorily using data communication terms</p> <p>Accurately list differences between the Internet and World Wide Web and resources needed to connect to the Internet and the World Wide Web</p> <p>Satisfactorily identified advantages and disadvantages of using the internet</p> <p>Assignment downloaded, adjusted and uploaded successfully</p> <p>Navigate between websites seamlessly i.e. download pages from a web server based on URL inputted and successfully locate specific information using a search engine</p>																				
<table border="1"> <thead> <tr> <th data-bbox="50 899 441 997">Question</th> <th data-bbox="447 899 583 997">Website</th> <th data-bbox="590 899 739 997">Search Engine</th> <th data-bbox="745 899 978 997">Answer</th> </tr> </thead> <tbody> <tr> <td data-bbox="50 1002 441 1099">Which parish it the largest in Jamaica?</td> <td data-bbox="447 1002 583 1099"></td> <td data-bbox="590 1002 739 1099"></td> <td data-bbox="745 1002 978 1099"></td> </tr> <tr> <td data-bbox="50 1104 441 1201">What is the highest mountain in Jamaica?</td> <td data-bbox="447 1104 583 1201"></td> <td data-bbox="590 1104 739 1201"></td> <td data-bbox="745 1104 978 1201"></td> </tr> <tr> <td data-bbox="50 1206 441 1343">How many medals did Jamaica received in the Summer Olympics in 2008 and 2012?</td> <td data-bbox="447 1206 583 1343"></td> <td data-bbox="590 1206 739 1343"></td> <td data-bbox="745 1206 978 1343"></td> </tr> <tr> <td data-bbox="50 1347 441 1440">The population of Jamaica is approximately</td> <td data-bbox="447 1347 583 1440"></td> <td data-bbox="590 1347 739 1440"></td> <td data-bbox="745 1347 978 1440"></td> </tr> </tbody> </table>	Question	Website	Search Engine	Answer	Which parish it the largest in Jamaica?				What is the highest mountain in Jamaica?				How many medals did Jamaica received in the Summer Olympics in 2008 and 2012?				The population of Jamaica is approximately				<p>Recall information</p> <p>Discuss and share ideas</p>	<p>Accurately list services/activities provided by the internet</p>
Question	Website	Search Engine	Answer																			
Which parish it the largest in Jamaica?																						
What is the highest mountain in Jamaica?																						
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Suggested Teaching and Learning Activities –	Key Skills	Assessment Criteria												
<table border="1"> <tr> <td data-bbox="52 219 441 397">What language throughout the Caribbean is spoken the most? How many people speak this?</td> <td data-bbox="441 219 583 397"></td> <td data-bbox="583 219 739 397"></td> <td data-bbox="739 219 976 397"></td> </tr> <tr> <td data-bbox="52 397 441 576">What is the tallest building in the Caribbean? Where is it? When was it built? How high is it?</td> <td data-bbox="441 397 583 576"></td> <td data-bbox="583 397 739 576"></td> <td data-bbox="739 397 976 576"></td> </tr> <tr> <td data-bbox="52 576 441 706">What is the longest river in the Jamaica? How long is it? Where is it?</td> <td data-bbox="441 576 583 706"></td> <td data-bbox="583 576 739 706"></td> <td data-bbox="739 576 976 706"></td> </tr> </table>	What language throughout the Caribbean is spoken the most? How many people speak this?				What is the tallest building in the Caribbean? Where is it? When was it built? How high is it?				What is the longest river in the Jamaica? How long is it? Where is it?				<p data-bbox="1018 868 1176 901">Create poster</p> <p data-bbox="1018 966 1354 1031">Create podcast/poem or using dramatic mode</p>	<p data-bbox="1449 836 1890 933">Posters correctly depicts information on Emails, Instant Messaging and Social Networking</p> <p data-bbox="1449 966 1942 1031">Presentation satisfactorily captures good and bad practices when using the internet</p>
What language throughout the Caribbean is spoken the most? How many people speak this?														
What is the tallest building in the Caribbean? Where is it? When was it built? How high is it?														
What is the longest river in the Jamaica? How long is it? Where is it?														
<p data-bbox="52 779 651 812">In pairs, create different posters highlighting following:</p> <ul data-bbox="189 812 861 909" style="list-style-type: none"> <li>➤ How to compose and send an email with attachment</li> <li>➤ How to compose and send an Instant Message</li> <li>➤ How to use Social Networks highlighting some basic rules</li> </ul> <p data-bbox="52 1006 976 1071">Create a <b>podcast</b>, poem or use dramatic mode to depict good and bad practices when using the Internet</p> <p data-bbox="52 1104 976 1258">In groups, create a model of a Wide Area Network between three countries. Model should show individual PAN, LAN and MAN that connects to form a WAN. Communication channel and communication devices that are used in each network should be highlighted. In addition, show approximate distance in km or miles for each network.</p>														

**Learning Outcomes**

Students will be able to:

- Have knowledge of the terms: Communication, Data Communication, Network, , Modem, Internet, URL and search engine
- Explain the relationship among the components of successful communication
- State the differences among PAN, LAN, MAN and WAN
- Differentiate among website, web browser and web page
- Identify resources needed to connect to the internet
- List various services and activities provided by the internet
- Differentiate between Upload and Download
- Demonstrate ability to perform basic search using the internet

<b>Points to Note</b>	<b>Extended Learning</b>
<p>Teachers must refer to the Guidance to Teacher notes at the beginning of this Unit. This unit deals only with the definitions of basic data communication, networking and internet terms. Teachers must be aware of new and emerging technologies in data communication. As much as is possible do not allow students to use pages that are made by the public as at times the information is not always correct!</p>	<p>Students can navigate between web pages using hyperlinks</p>
<p><b>Resources</b>            Personal computers            Internet access            Multimedia presentation kit            Diagrams of networks            Resource books/CDs</p>	<p><b>Key vocabulary</b>            communication, data communication, internet, network, , local area network(LAN), metropolitan area network(MAN), wide area network(WAN), modem, upload, download, sender, receiver, channel, feedback, , webpage, web browser, website, URL, search engine</p>
<p><b>Links to other subjects</b>            Link with Language Arts in Grade 7 Attainment Target 1 “Speaking and Listening” and Target 2 “Reading”            Link with Technical Vocational Education in Grade 7 Attainment Target 1 “Creativity and Innovation”            Link with Drama Grade 7 Attainment Target 1 “Exploring and Creating”</p>	

## **Unit 4: Computer Ethics and Research**

### **Range and Content**

Students will learn:

- What computer ethics and ethical behaviour means especially when using online and offline sources to collect and upload information (computer ethics means a set of moral practices that governs the use of computer}
- The concept of plagiarism, copyright, trademark and intellectual property rights
- Ethical practices that should be adhered to while using online and offline sources to gather information (for example: make reference or give credit to the authors of published materials; do not copy someone else's work and pretend it's your own)
- How to identify bibliography information from online and offline sources
- The criteria that make an online or offline source credible (for example, author's name, publication date, last update, credentials/qualifications)
- To determine if an online or offline source is credible by identifying specific information (for example: author's name: John Doe, publication date (June 3, 2008), last update (September 5, 2013), credentials/qualifications: MSc in Technology in Education)
- To cite online (websites) and offline (textbook) sources in their academic writing using the APA and MLA format

### **About the Unit**

Ethical behaviour must be exhibited in our daily lives at all times as it is morally the correct thing to do. Therefore, users of computer systems and information sources must be cognizant of the ethical behaviours that govern the downloading or uploading of information from on/offline sources and the need to practice good citizenship. Discussions from this unit will enable students to understand computer ethics and associated terms and concepts. It will enable students to properly identify credible online and offline sources when collecting and uploading information. In addition, this unit will enable students to use correct guidelines to make references or give credit to authors of published material by using the APA and MLA formats.

### **Guidance to Teacher**

It is important that students understand that ethical and moral practices must always be exercised when using online and offline sources to collect and upload information. The concepts to be covered in this unit, will allow students to apply the skills and knowledge to other subject areas. As such, emphasis must be placed on ensuring that students practice these concepts. Awareness of the consequences that may arise from neglecting to adhere to ethical and moral practices when using online and offline sources should be reinforced. Teachers should also for additional reinforcement ensure that they demonstrate ethical and moral practices in their delivery. Students are to be exposed to basic knowledge of using APA/MLA reference format.

#### **Prior Learning**

Check that students can:

- Distinguish between right and wrong
- Identify socially ethical behaviours

**UNITS OF WORK GRADE 7 TERM 2 (11weeks)**

<p><b>Unit 4: Computer Ethics and Research (3 weeks)</b></p>	
<p><b>Attainment Target(s):</b></p> <p>Students demonstrate a responsible, moral and ethical approach to using online and offline information</p> <p>Students use search technologies effectively while carefully evaluating digital content</p> <p>Students determine the ethical, social and moral issues and implications surrounding the use of technology.</p>	<p><b>Objectives:</b></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>● Define terms associated with computer ethics and its practice (ethics, moral, computer ethics, intellectual property right, plagiarism, trademark, copyright, etc.)</li> <li>● Discuss moral and ethical practices in downloading and uploading online and offline information.</li> <li>● Investigate to determine credible online or offline sources based on specific criteria.</li> <li>● Apply the APA and MLA styles when making reference to online and offline sources</li> <li>● Demonstrate willingness to question information available on the Internet</li> <li>● Collaborate in group activities</li> </ul>

<b>Suggested Teaching and Learning Activities</b>	<b>Key Skills</b>	<b>Assessment Criteria</b>
<p>Students will:</p> <p>Through guided discussion construct the meaning of the following terms: moral, ethics, computer ethics, intellectual property right, plagiarism, trademark, copyright, etc)</p> <p>Match computer ethics terms with their description to appropriately define the term.</p> <p>Determine what is regarded as online and offline sources based on their uses/application by viewing video on the various uses of online and offline sources.</p>	<p>Construct and present information</p> <p>Recognize meaning</p> <p>Analyze and evaluate visual and aural information.</p>	<p>Terms accurately defined</p> <p>Correctly match terms to their description</p>



Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p>Identify online and offline sources from a list of sources provided.</p> <p>Create a scene using two or more of the terms (moral, ethics, computer ethics, intellectual property right, plagiarism, trademark, copyright, etc) and role play to show an understanding of terms and their consequences.</p> <p>Through guided discussion, identify ethical practices in using online and offline information and share ideas with the class</p> <p>Illustrate ethical practices governing the use of online or offline information by creating a short video/cartoon/poster/brochure.</p> <p>In groups select unethical practices observed in your environment, and then develop a dialog discussion between group members on the ethical issues related to this practice. Using an online second life application with characters of each group member present their dialog discussion to the class.</p> <p>Use a checklist to assist in identifying the components of bibliography from given resources (such as IT textbooks, websites among other resources)</p> <p>Work in groups; to conduct a research on criteria that makes an online or offline source credible. Present findings to the class.</p> <p>View selected online and offline sources and justify why sources are credible based on researched criteria (author’s credentials, date of publication etc.) Present justifications through various media.</p> <p>Conduct an online or offline research to explain the following terms computer ethics, intellectual property rights, plagiarism, copyright and trademark; state whether the sources used are credible by listing the relevant information that determines a credible source; use bibliography information to cite source using the APA or MLA format</p> <p>Given various online and offline sources and differentiate categorize references written</p>	<p>Demonstrate to present information, teaming</p> <p>Discuss and share ideas Identify issue, Analyze, evaluate and present information</p> <p>Represent information</p> <p>Utilise checklist</p> <p>Collaborate in groups to research and present information</p> <p>View for information and identify information</p> <p>Analyze, evaluate, research and present information</p> <p>Categorize information</p>	<p>Accurately distinguish between online and offline sources</p> <p>Dramatization satisfactorily demonstrated an understanding of the terms and their consequences</p> <p>Identification of ethical practices in using online and offline information highlighted</p> <p>Video/cartoon/poster/brochure satisfactorily illustrates ethical practices governing the use of online and offline information</p> <p>Issues discussed shows an understanding of ethical behaviours</p> <p>Accurately identified bibliography information from resources</p> <p>Information presented correctly shows criteria that makes an online or offline source credible</p> <p>Presentation accurately justifies why sources are credible.</p> <p>Accurately define terms from credible sources without plagiarising the content as well as use bibliography information to cite sources.</p> <p>Accurately categorize references as APA or MLA formats</p>

Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
using either APA or MLA styles from a list of references		

<p><b>Learning Outcomes</b> Students will be able to:</p> <ul style="list-style-type: none"> <li>● Define the terms: ethics, computer ethics, moral, intellectual property right, plagiarism, trademark, copyright</li> <li>● Discuss moral and ethical practices in using online and offline information</li> <li>● Identify the bibliography information from online and offline sources</li> <li>● Recall the characteristics/features that makes an online or offline sources credible</li> <li>● Analyze a given source to determine credibility</li> </ul>
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Points to Note	Extended Learning
<p>Teachers must refer to the Guidance to Teacher notes at the beginning of this Unit.</p> <p>Plagiarism does not only mean copying text word for word from a published work but it also means copying ideas. Breaches of the practice comes in different forms:</p> <ul style="list-style-type: none"> <li>● Replacing a word with the synonym</li> <li>● Passing on someone's work as your own</li> <li>● Quoting, summarizing or rephrasing without citation</li> </ul> <p>Breaches of ethical practices are commonly performed when uploading or</p>	<p>Students can compose a song/poem which can be used to advise their school mates about the consequences of unethical practices when using online and offline sources to gather information</p> <p>Students can create a poster/brochure that explains to their school mate what the term intellectual property right means and the laws (copyright, trademark) that protect this right.</p>

forwarding information such as pictures, videos and audio to online sources.	
<b>Resources</b> Internet access Multimedia presentation kit Personal computer Videos Resource books	<b>Key vocabulary</b> Ethics, computer ethics, moral, online source, offline source, ethical behaviour, plagiarism, trademark, copyright, intellectual property rights, bibliography
<b>Links to other subjects</b> Link with Language Arts in Grade 7 Attainment Target 1 “Speaking and Listening” and Target 2 “Reading” Link with Civics in Grade 7 Attainment Target 3 “Demonstrate an awareness of individual and collective rights, their application and attendant responsibilities” Link with Drama in Grade 7 Attainment Target 1 “Exploring and Creating” and Attainment Target 2 “Expressing and Enacting”	

DRAFT

## **Unit 5: Computing Careers**

### **Range and Content**

Students will learn:

- Careers opportunities in ICT (file librarian, programmer, computer technician, system operator, computer engineer, system administrator, network engineer, software engineer, musical engineer, database administrator, system analyst, web designers, webmaster, data security analyst)
- Roles and responsibilities of ICT personnel (computer technician –maintains computer system; troubleshoot, fix and replace hardware and operating system; system analyst - identifies problems within an organization and develop new IT solutions or modify existing system to solve these problems.
- The importance of ICT careers in society (creation of new jobs, changes in work pattern)

### **About the Unit**

This unit will provide students with an awareness of the various job opportunities available in the field of ICT. Students will gain an understanding of the role and responsibilities of personnel in these fields. In addition, it will enable students to appreciate ICT careers.

### **Guidance to Teacher**

Teachers should use opportunity to provide students with some of the possible ICT related jobs. However, new and emerging jobs should not be taught until Grade 8. Students should be allowed to share past experiences or interactions with ICT personnel in their everyday lives. In addition, discussion should be tailored so that students appreciate ICT careers which may lead to students choosing careers in these fields. This will allow them to contribute significantly to the development of our society.

**Prior Learning**

Check that students can:

- Identify traditional careers (Teachers, Doctors, Police, Lawyers)

**UNITS OF WORK GRADE 7 TERM 2 (11 weeks)**

<b>Unit 5: Computing Careers ( 3 weeks)</b>	
<p><b>Attainment Target(s):</b> Students are aware of and understand the competencies and qualifications needed for computing careers and computing skills necessary for the world of work</p> <p>Students understand the roles of different personnel in Computing Careers</p> <p>Student understand the application of Computing Careers in everyday life</p>	<p><b>Objectives:</b></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>● Identify careers available in the field of ICT</li> <li>● Describe the job functions of different personnel in ICT careers</li> <li>● Discuss the importance of ICT careers in society</li> <li>● Create job description and advertisement on Computing career</li> <li>● Collaborate in group activities</li> <li>● Appreciate the importance of computing careers in the Information age</li> </ul>

<b>Suggested Teaching and Learning Activities</b>	<b>Key Skills</b>	<b>Assessment Criteria</b>
<p><b>Students will:</b></p> <p>Research job opportunities in the field of ICT and create a Multimedia presentation to report findings</p> <p>In groups conduct research to identify the job functions of specific Computing personnel; dramatize the job functions of these personnel to the class. The class should then determine the job being dramatized.</p> <p>Match Computing personnel with basic job functions in a table</p> <p>Work in groups to brainstorm and develop questions to interview a Computing personnel. Use questions developed to participate in a panel discussion with ICT personnel so as to gain knowledge about various Computing careers.</p>	<p>Research and present information</p> <p>Demonstrate to present information Observe dramatization</p> <p>Observe and make comparison Match functions</p> <p>Discuss and share ideas</p> <p>Create job description and</p>	<p>Presentation depicts accurate range of job opportunities in ICT</p> <p>Dramatization accurately depicts job function of Computing personnel</p> <p>Accurately match Computing personnel with job functions</p> <p>Questions developed correctly highlight aspects of the related Computing career</p>

Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p>In groups, create an advertisement along with a job description of an assigned Computing career to be placed in a local newspaper</p> <p>Research job description for different IT careers. Create a poster in to display collage of IT personnel job descriptions.</p>	advertisement	Satisfactorily created Computing career job description and advertisement

<p><b>Learning Outcomes</b> Students will be able to:</p> <ul style="list-style-type: none"> <li>✓ Identify career opportunities in ICT</li> <li>✓ Understand the basic job functions of ICT personnel</li> <li>✓ Understand the importance of ICT careers</li> </ul>	
<b>Points to Note</b>	<b>Extended Learning</b>
<p>Teachers must refer to the Guidance to Teacher notes at the beginning of this Unit. This unit deals with only the basic job functions of ICT personnel. Discussion about this unit should allow students to understand the importance these ICT careers as well as they should develop an appreciation of ICT careers in society.</p>	<p>Students can film the dramatizations and use an image editing software to create a video</p> <p>Conduct an interview with an industry personnel based on student's career</p>
<p><b>Resources</b> Personal computers Internet access Multimedia presentation kit Videos Resource books/CDs</p>	<p><b>Key vocabulary</b> career, careers including but not limited to file librarian, programmer, computer technician, system operator, computer engineer, system administrator, network engineer, software engineer, musical engineer, database administrator, system analyst</p>
<p><b>Links to other subjects</b> Link with Language Arts in Grade 7 Attainment Target 1 "Speaking and Listening" and Target 2 "Reading" Link with Technical Vocational Education in Grade 7 Attainment Target 4 :Career Awareness" Link with Drama in Grade 7 Attainment Target 1 "Exploring and Creating" and Attainment Target 2 "Expressing and Enacting" Link with Guidance</p>	

**GRADE 7**

**UNITS**

**TERM 3**

## Unit 6: Desktop Publishing (DTP)

### Range and content

Students will learn:

About desktop publishing and explore how it has changed over the years. Examine the applications/software needed for Desktop Publishing

The Present and Future of Desktop Publishing should also be highlighted.

The difference between Graphic Design and Desktop Publishing and why is Desktop Publishing important.

There are many processes and procedures in desktop publishing but the basic creation of a document using desktop publishing techniques involves 4 steps:

- **Design:** Research / Brainstorming / Planning
- **Create:** Document Setup / Text Retrieval or Acquisition / Image Retrieval or Acquisition / Page Layout
- **Digital Preparation:** Proofs to ensure creation is valid, correctly formatted, and of the desired type
- **Publish:** Printing and/or On-Screen / Electronic Distribution

Create digital artefacts using desktop publishing software and techniques

### About the Unit

This unit will provide students with an awareness of desktop publishing. It is hoped that through the various teaching and learning strategies, it will highlight, improve and reinforce students' understanding and appreciation of the importance of Desktop Publishing.

Learning to create Desktop Publishing product is good practice for those with an entrepreneurial spirit.

### Guidance to Teacher

Teachers should share with the students the relevance of desktop publishing and how this can be applied in everyday life. Career opportunities that are created as a result of desktop publishing should be explored. Resource persons in the industry could be invited to share their experiences with the students. Additional students should be exposed to various types of Desktop publishing software including free and open source software.

#### **Prior Learning**

Check that students can:

- Create text based documents and insert graphics



**UNITS OF WORK GRADE 7 TERM 3 (11 weeks)**

<p><b>Unit 6: Desktop Publishing (DTP)</b> <b>(5 weeks)</b></p>	
<p><b>Attainment Target(s):</b></p> <p>Students demonstrate competency in using productivity tools.</p> <p>Students understand and appreciate the benefits of using a DTP software for document creation</p>	<p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>• Identify terms associated with Desktop Publishing</li> <li>• Distinguish among Word Processing, graphics designing and Desktop Publishing</li> <li>• Discuss the uses and importance of Desktop Publishing software</li> <li>• Describe the steps involved in creating a Desktop Publishing document</li> <li>• Design and create digital artefacts using Desktop publishing</li> </ul>

Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p><b>Students will:</b> On worksheet provided, in pairs, write words/phrases that come to mind relating to the following terms 'desktop publishing' 'desktop publishing software' 'graphics design'. Discuss and select two phrases to share with the class. Along with teacher formulate a definition for the terms above.</p> <p>Discuss the relevance of desktop publishing and how it is applicable today.</p> <p>Conduct a research on word processing, graphic designing and desktop publishing. Create a portfolio/scrapbook highlighting the differences in word processing, graphic designing and desktop publishing products. Display portfolio/scrap book for class discussion</p> <p>Discuss the steps that would be needed to create the DTP products collected.</p> <p>Explore and discuss available templates and features in a DTP software (brochure, business cards, greeting cards, flyers, posters)</p> <p>Create individual business card. The card should convey name, interests, position in a club/society using the steps involved in the creation of the document using DTP OR Design business cards for each other. Interview each other and design what he or she believes is an appropriate business card and attempt to identify the card's owner.</p>	<p>Construct and present information</p> <p>Discuss and share ideas</p> <p>Research and present information</p> <p>Discuss and share ideas</p> <p>Discuss and share ideas</p> <p>Design and create business card</p>	<p>Accurately defined terms</p> <p>Portfolio/Scrapbook created accurately highlighted differences in word processing, graphic designing and desktop publishing products.</p> <p>Business card created correctly depicts DTP steps</p>

<p>Develop a checklist (list of assessment criteria) for DTP products, through class discussion and observation (appropriate colour scheme, lettering, pictures/images, etc.) and evaluate each of the cards that were designed.</p> <p>In groups, discuss the considerations necessary in designing an invitation and what features of the DTP tool should be employed. Create an invitation for the school's Prize Giving Ceremony or a birthday party using a DTP invitation template of their choice.</p> <p>Create a flyer/poster/ banner that inform, educate or persuade the public about a special event to take place at their school that will incorporate the use of desktop publishing. Print the publication to be mounted on a display. View and critique each other's end-products using DTP checklist</p>	<p>Discuss and observe to create checklist</p> <p>Discuss and create</p> <p>Create a flyer/poster/ banner</p>	<p>Checklist created accurately for assessing DTP products</p> <p>Invitation created satisfactorily using DTP template</p> <p>Flyer/poster/ banner created demonstrates expected levels of competence in the use of DTP software based on checklist</p>
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<p><b>Learning Outcomes</b> Students will be able to:</p> <ul style="list-style-type: none"> <li>✓ Operate desktop publishing software</li> <li>✓ State a variety of uses of desktop publishing software</li> <li>✓ Create digital products using Desktop publishing</li> </ul>	
<p><b>Points to Note</b></p> <p>Teachers must refer to Guidance notes at the beginning of this Unit.</p> <p>Teacher should also be aware of the importance of appropriate colour schemes when creating DTP documents.</p> <p>You may wish to place one or more of these restrictions on student business cards.</p> <ul style="list-style-type: none"> <li>• First names only, or First name and Initial.</li> </ul>	<p><b>Extended Learning</b></p> <p>Students will create a Sport's Day Banner for their respective sports houses. Students can also create business cards for family members and friends.</p> <p>Create a desktop publishing portfolio</p>

<ul style="list-style-type: none"> <li>• Use a fake address or use the school address.</li> <li>• Use a fake phone number or the school phone number.</li> <li>• Do not allow students to use a photograph of themselves on the card.</li> </ul> <p>Graphic design is the process and art of combining text and graphics and communicating an effective message in the design of logos, graphics, brochures, newsletters, posters, signs, and any other type of visual communication.</p>	
<p><b>Resources</b></p> <p>Personal computers  Internet access  Desktop Publishing software  Videos  Resource books/CDs  Business cards/brochures/flyers/posters from family, friends and businesses.</p>	<p><b>Key vocabulary</b></p> <p>Desktop publishing, graphic design, Digital Preparation, publish template, place holder, element, colour schemes, textbox, clipboard</p>
<p><b>Links to other subjects</b></p> <p>Link with Language Arts in Grade 7 Attainment Target 1 “Speaking and Listening” and Target 2 “Reading”  Link with Drama in Grade 7 Attainment Target 1 “Exploring and Creating”  Link with Technical Vocational Education in Grade 7 Attainment Target 1 “Creativity and Innovation” and Attainment Target 3 “Apply solutions”  Link with Visual Arts Grade 7 Attainment Target</p>	

## **Unit 7: Problem Solving**

### **Range and Content**

Students will learn:

- Definition of Terms – Problem - a matter or situation regarded as needing to be dealt with, Process - a series of actions or steps taken in order to achieve a particular end, Problem Solving - the process of finding solutions to difficult or complex issues, Algorithm - a sequence of steps designed to perform a particular task
- Problem solving process /Steps in Problem Solving
- How to use Problem Solving Steps to solve everyday problems
- Discuss the importance of algorithms and their characteristics (Precise, Logical Sequence, Efficient)
- Procedure for writing simple algorithms (paying for a bus card, giving directions)
- Comparison of alternative algorithms to choose best solution based on the characteristics of a good algorithm.

### **About the Unit**

The purpose of this unit is to serve as an introduction to solution development to develop the learner's computational thinking practices of algorithm development and problem solving using everyday scenarios. Check that the problems are completely understood before attempting to design an algorithm.

Exploring algorithms to solve generic problems will enable a learner to use similar principles to devise algorithms for new problems or situations.

Investigating specific algorithms should provide the learner with the opportunity to explore various ways to solve the same problem by using different principles or tools-

### **GUIDANCE TO TEACHER**

Problem Solving is a skill needed to effectively develop programming skills and computer programs. It is critical that the method used to deliver problem solving concept is a simple, and a step-by-step approach. De-mystifying the programming concept is important as generally the view is that problem solving and programming are very difficult concepts and procedures. It is important that students read the entire problem statement and conceptualise the process, in other words read the complete problem, not just some of it before attempting to solve it.

Students are to be stimulated and facilitated while learning. Time should be allocated for discovery learning and focus should not be on what is correct or accepted but on evaluating answers arrived at by the students and allowing them to analyze and critique their findings. Usually there are many ways to solve a problem, because we process differently and hence should allow for diversity of answers. An algorithm documents the "how to" for accomplishing a particular task. If an algorithm is written well, it can be used to accomplish not only a single task but a whole group of related tasks. The existence of an algorithm means that the task can potentially be automated (i.e., performed by a computer).

#### **Prior Learning**

Check that students can:

- Participate in a discussion about problems encountered in real life
- Analyze situations for validity and reasonableness
- Share ideas while accommodating the views of others

**UNITS OF WORK GRADE 7 TERM 3 (11 weeks)**

<p><b>Unit 7: Problem Solving and Algorithm Development (6 weeks)</b></p>	
<p><b>Attainment Target(s):</b></p> <p>Student demonstrate the skills of identifying a problem</p> <p>Students understand the steps in problem solving</p> <p>Students demonstrate an understanding of the importance of formulating a problem</p> <p>Students understand the importance of Algorithm in solving problems</p>	<p><b>Objectives:</b></p> <p>Students will:</p> <ul style="list-style-type: none"> <li>• Define the terms: 'problem', 'process', problem solving', 'algorithm'</li> <li>• Describe simple processes in everyday life</li> <li>• Explain the steps involved in problem solving process</li> <li>• Devise algorithms to solve real life problems</li> <li>• Explore characteristics of a good algorithm</li> <li>• Compare algorithms and select the best option</li> <li>• Describe the importance of an algorithm</li> <li>• Design storyboard(Visual or Textual)</li> <li>• Collaborate in group activities</li> </ul>

Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p>Students will:</p> <p>Engage in a guided discussion to arrive at definition of terms: problem, problem solving, algorithm etc. and describe processes in everyday life such as finding the area of a room, baking a cake, adding credit to a mobile device etc.</p> <p>In groups play logic games online or offline. Attempt to solve these problems and through guided discussion discover and document the steps involved in solving the problem.</p> <p>Select a problem from a "bag" and give the steps to solve the problem.</p> <p>With teacher's assistance derive the problem solving steps process.</p> <p>Identify and write down one problem they have experienced and solved. Analyse the problem and identify the actions that were taken at each step of the problem solving process. Discuss how these steps match with the formal problem solving process</p>	<p>Communicate ideas and construct new knowledge</p> <p>Collaborate in groups to share ideas</p> <p>Construct information</p> <p>Problem identification</p> <p>Evaluate situations and develop solutions</p>	<p>Accurately described the problem solving process</p> <p>Correctly apply the problem solving process to problems</p>

<p>In small groups use the problem solving process to discuss and record examples of how they will solve the problem below.</p> <p>In a small community, on Bernard Avenue there 5 houses in a row in the following colours: black, green, gold, white and purple.</p> <ul style="list-style-type: none"> <li>▪ In each house lives the following families: Jones, Williams, Brown, Smith and Hall</li> <li>▪ Each enjoys the following beverages: orange juice, coffee, milk, tea and water.</li> <li>▪ Each family represents the following jobs: teacher, driver, manager, artist and lawyer.</li> <li>▪ Each family keeps the following pets: cat, dog, pigeons, fish and snake.</li> <li>▪ The Jones person lives in a black house.</li> <li>▪ The Hall person keeps a snake.</li> <li>▪ The Williams drinks tea.</li> <li>▪ The green house is on the left of the white, next to it.</li> <li>▪ The owner of the green house drinks coffee.</li> <li>▪ The teacher rears pigeons.</li> <li>▪ The owner of the purple house is a lawyer.</li> <li>▪ The person living in the house in the centre drinks milk.</li> <li>▪ The Smiths lives in the first house.</li> <li>▪ The artist lives next to the person who owns a cat.</li> <li>▪ The man who keeps a dog lives next to the lawyer.</li> <li>▪ The driver drinks orange juice.</li> <li>▪ One of the Brown family members is a manager.</li> <li>▪ The Smiths lives next to the black house.</li> <li>▪ The Artist has a neighbour who drinks water.</li> </ul> <p>Who owns the fish? Justify your answer.</p> <p>View a video on what is an algorithm and discuss the everyday algorithms that are used to solve problems or complete tasks. Discuss if algorithms are important And describe the characteristics of a good algorithm.</p> <p>In groups identify a problem in their school environment (lack of seating at lunch time, long lines and insufficient menu options at canteen). Use the problem solving process to address the issue and create a process-log (list of steps and procedures) / group diary of the group's actions and the outcomes at each step of the process. Develop an algorithm to outline the solution.</p> <p>Compare algorithms and determine the best solution based on the characteristics of a</p>	<p>Collaborate and create solutions</p> <p>Synthesize and make comparisons Analyze problems and apply knowledge</p> <p>View for information Share and discuss ideas</p>	<p>Solution accurately reflects the problem solving process</p> <p>Algorithm satisfactorily developed and illustrates elements of a good algorithm</p>
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good algorithm.  
**OR**  
 Formulate problem statements from simple everyday tasks. Write instructions/algorithms for each task. Critique each solution, based on attributes of an algorithm. Comment on the logic of the solution and follow algorithm, to determine if the desired result is achieved.

Be given a list of words and phrases intended to achieve an end result. Organize the list in the most efficient way to achieve the desired end results. For example: Organize the following list in the sequence of being prepared for school.

Select something to wear	Take a shower	Eat breakfast
Leave house for school	Pickup school bag	Get out of bed
Look for your shoes	Brush your teeth	Put toast in the toaster
Check your alarm clock	Turn on shower	Put your shoes on
Get dressed	Turn off the alarm clock	Comb your hair
Ensure school bag is packed	Check the time	

In groups, identify a problem in their environment or select a list of problems, use storyboards to formulate a solution to the problem then present their solution to the class. Create solutions to problems using simple algorithmic procedures highlighting the problem-solving process.

Analyze and discuss problems  
 apply problem solving process  
 Develop algorithm  
 Compare algorithms

Analyze and organize data in a logical order

Collaborate, design and present information

List logically arranged

Satisfactorily used storyboard to illustrate solution to the problem.

Correctly developed algorithm observing problem solving process and algorithmic procedures

<p><b>Learning Outcomes</b></p> <p>Students will be able to:</p> <ul style="list-style-type: none"> <li>✓ Define the terms Problem and Algorithm</li> <li>✓ Understand the steps involved in solving a problem</li> <li>✓ Devise solutions to problems</li> <li>✓ Provide alternate solutions to problems</li> </ul>	
<p><b>Points to Note</b></p> <p>Teachers must refer to Guidance notes at the beginning of this Unit.  Teacher must use simple real-world problems from the student’s environment involving sequential steps only to deliver the content  There is usually more than one solution to any given problem.</p>	<p><b>Extended Learning</b></p> <p>Students can discuss and suggest solutions to actual problems in their environment  Students can plan together to actually implement simple and achievable solutions in the school/department</p>
<p><b>Resources</b></p> <p>Multimedia presentation kit  Videos</p> <p>Resource books/CDs  Interactive Digital games</p>	<p><b>Key vocabulary</b></p> <p>problem, problem-solving, algorithm, solution, decomposition, Problem-Solving Steps: Define the problem, Analyse the problem, Propose alternative solutions, Evaluate the alternatives,, Choose the best solution, Implement the solution, Review  Algorithmic Procedures: Logical sequence, Unambiguous, efficiency</p>
<p><b>Links to other subjects</b></p> <p>Link with Language Arts in Grade 7 Attainment Target 1 “ Speaking and listening” and Target 2 “Reading”  Link with Technical Vocational Education in Grade 7 Attainment Target 1 “Creativity and Innovation” and Attainment Target 3 “Apply solutions”</p> <p>Link with Language Arts-Concept Mapping and Essay Writing</p>	



**GRADE 8**

**UNITS**

**Information Technology**

**UNITS OF WORK**

## **Introduction**

Computing Education is constantly being reshaped. New thinking and new technologies continue to influence this. It is critical that the distinction be made among the three most common areas of computing education.

Each of these areas is known by various names in different jurisdiction, however in our context we call them:

- Information Technology
- Computer Science
- Educational Technology / Information and Communication Technology (ICT)

## **Defining key Terminologies**

In its computing curriculum 2005: the overview report, the Association of Computer Machinery (ACM) and IEEE Computing Society recognises the following:

### **Information Technology (IT)**

Information Technology is “the proper way of technologies by which people manipulate and share information in its various forms.”It involves learning about computers, and emphasizes the technology itself. Information Technology specialists assume responsibility for selecting appropriate hardware and software products, integrating those products with organizational needs and infrastructure, and installing, customizing, and maintaining those resources. Information Technology, therefore, focus on:

- installing, securing, and administrating computer network;
- installing, maintaining, and customizing software;
- managing and securing data in physical and virtual worlds;
- managing communication systems ;
- designing implementing, and managing multimedia resources and other digital media

### **Computer Science (CS)**

Computer Science is the study of computers and algorithmic processes, including their principles, their hardware and software designs, their application and their impact on society. Computer Science spans a wide range of computing activities, from theoretical foundations to robotics, intelligent systems, and bioinformatics and it is concentrates on designing, creating, modifying, and verifying computing tools.

### **Difference between Information Technology and Computer Science**

IT is an applied field of study, driven by the practical benefits of its knowledge, while computer science adds scientific and mathematical, as well as practical, dimensions. Some of the practical, dimensions of computer science are shared with IT, such as working with text, graphics, sound, and video. IT concentrates on learning how to use and apply these tools while computer science is concerned with learning how these tools are designed and why they work. Computer science and IT have a lot in common, but neither one is fully interchangeable.

## **Educational Technology / Information and Communication Technology (ICT)**

Educational Technology / ICT integration can be defined as using technology tools across the curriculum, or more specifically, using computer technology (hardware and software) to learn about other disciplines. For example, a science teacher may use computer simulations to provide students with a better understanding of a lesson on genetics, or a Social Studies teacher may use a digital story or Webquest to help students understand the middle passage.

### **Information Technology Literacy and Information Technology Fluency**

There are two other terms that is emerging in computing education these are Information Technology Literacy and Information Technology Fluency. A study published in 1999, defines IT fluency as something more comprehensive than IT literacy. Whereas IT literacy is the capability to use today's technology in one's field, the notion of IT fluency adds the capability to independently learn and use new technology as it evolves throughout one's professional life time. Moreover, IT fluency also includes the active use of computational thinking (including programming) to solve problems, whereas IT literacy does not.

### **Aim of Information Technology (IT):**

The 21<sup>st</sup> century learner lives in a technologically charged environment and IT will provide them with the requisite knowledge and skills to understand the underpinnings of current technology and to prepare them for utilizing new and emerging technologies. The Grades 7 - 9 Information Technology (IT) curriculum will introduce students to the opportunities afforded by this dynamic field and begin to prepare them for a wide range of rewarding careers as well as for personal use. IT is relevant as it incorporates a wide range of problem solving techniques and skills that is needed for life-long learning. The fundamental purpose of the IT curriculum is to provide students with knowledge, skills and attitudes that will enable them to achieve success at every stage of life be it personal, professional or academically.

### **The goals of the IT curriculum are to enable students to:**

- ☞ achieve an understanding of IT concepts
- ☞ develop essential skills such as critical thinking skills, research and enquiry skills and to communicate information effectively, accurately and ethically
- ☞ utilize the knowledge, skills and attitudes acquired through the study of IT to a variety of learning tasks in other subject areas
- ☞ develop life-long learning habits that will assist students in adapting to new and emerging technologies
- ☞ become aware of the wide range of career options available to individuals with IT skills

## ROLES AND RESPONSIBILITIES OF THE DELIVERY OF THE IT CURRICULUM

In order for the delivery of this curriculum to be effective all key stakeholders must be aware of their roles and responsibilities.

### STUDENTS

Students are responsible for their learning. It is clear that there is a relationship between student's effort and achievement. Students are encouraged to motivate themselves to learn. Teacher's encouragement can motivate any student to learn. Taking the learning experience outside of the classroom will extend and enrich their understanding of the content. These may include becoming members of a computer club, subscribing to magazines and other online resources; attend Technology conferences and competitions to learn of new and emerging technologies.

### PARENTS/GUARDIANS

Parents/guardians have a critical responsibility in supporting their child/ward learning experience. By becoming knowledgeable about the curriculum they determine what is taught and can determine best to support their child/ward. Parents/guardian can assist their child/ward by attending school's consultation sessions and encouraging them to do extended work outside the classroom.

### TEACHERS

Teachers and students responsibilities complement each other. Teachers are responsible for developing culturally relevant instructional technologies to achieve learning outcomes as well as appropriate methods for assessment and evaluations. Joining professional technology societies, subscribing to technology magazines and other online resources, attend Technology.

### SUGGESTED TEACHING AND LEARNING ACTIVITIES

The suggested teaching and learning activities indicates the minimum content to be covered per term. The sequence of the content listed per term **is not prescribed**. Teachers are encouraged to design their own sequence per term to deliver the content in an appropriate sequence and pace given their circumstances.

The topics should be presented in an integrated manner as much as is possible. Some content from one topic may strengthen and underpin the content of another. It is recommended that this approach be applied throughout grade 7 – 9 where applicable.

**Innovators Challenge:** *STEM education is an approach to teaching and learning that integrates the content and skills of science, technology, engineering and mathematics. STEM Education is a teaching and learning methodology that prepares individuals:*

- *For successful employment, post-secondary education, or both that require different and more technically sophisticated skills including the application of science, technology, engineering, and mathematics skills and concepts, and*
- *To be competent, capable citizens in our technology-dependent, democratic society.*

*The Innovators Challenge is to be used as a main STEM activity. It is to be used during the academic year. Teachers are at liberty to create other challenges to develop STEM methodology.*

OVERVIEW OF SUBJECT CONTENT GRADE 8

SUBJECT	TERM 1	TERM 2	TERM 3
Information Technology	<p><b>Unit 1</b> <b>Health and Safety</b> Demonstrate health and safety practices while operating the computer system</p> <ul style="list-style-type: none"> <li>- Proper hardware handling when connecting and disconnecting peripheral devices</li> <li>- Software compatibility</li> <li>- Proper care and maintenance of computer equipment and accessories.</li> </ul> <p><b>Unit II</b> <b>Foundations of Hardware &amp; Software</b></p> <p>Demonstrate competency in the use of hardware devices, software and productivity tools.</p> <p><b>Hardware</b> <b>Software</b> <b>Productivity Tools (Advanced Word &amp; Basic Spreadsheet)</b></p>	<p><b>Unit III</b> <b>Data Communication, Networking and Internet</b> Understand the application of communication technologies in everyday life</p> <ul style="list-style-type: none"> <li>- Data communication process</li> <li>- Transmission Direction</li> <li>- Data Communication and Networking devices</li> <li>- Transmission media (Wired and Wireless)</li> <li>- Internet Resources</li> <li>- Protocols</li> </ul> <p><b>Unit IV</b> <b>Computer Ethics</b> Demonstrate a responsible, moral and ethical approach to using information and suitable resources on the Internet.</p> <ul style="list-style-type: none"> <li>- Understand the need for appropriate behaviour when using the Internet.</li> <li>- Locate and select relevant information on the World Wide Web</li> <li>- Evaluate and present accurate information</li> </ul> <p><b>Unit V</b> <b>Computing Careers</b> Understand the importance of ICT careers in everyday life</p> <ul style="list-style-type: none"> <li>- New careers in ICT</li> <li>- Jobs functions in the IT department</li> </ul>	<p><b>Unit VI</b> <b>Multimedia Authoring</b></p> <p>Demonstrate their understanding of the use of multimedia authoring tools to create videos</p> <p><b>Unit VII</b> <b>Problem Solving and Algorithm Development</b></p> <p>Demonstrate their understanding of constructing algorithms for real world problems.</p> <ul style="list-style-type: none"> <li>- Flowcharting</li> </ul> <p><b>Unit VIII: Algorithm Development</b></p>

The Strands

There are three (3) strands in Information Technology as follows:

<p><b>STRAND 1:</b></p> <p><b>Computer Components and Operations/ Foundations of Hardware and Software</b></p> <p><b>STANDARD</b></p> <p>Students demonstrate an understanding of how computers work as well as develop competence in the use of hardware devices and software tools.</p> <p><i>(Guided by ISTE and CSTA Standards)</i></p>	<p><b>STRAND2:</b></p> <p><b>Digital Citizenship STANDARD</b></p> <p>Students demonstrate an understanding of the human, cultural and societal issues related to technology and practice responsible, moral and safe practices while applying information and communication technologies, and operating and maintaining computer systems in everyday life.</p> <p><i>(Guided by ISTE and CSTA Standards)</i></p>	<p><b>STRAND3:</b></p> <p><b>Computational thinking and practice STANDARD</b></p> <p>Students use critical thinking and analytical skills to solve problems by selecting and applying relevant strategies and tools.</p> <p><i>(Guided by CSTA Standards)</i></p>
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Sub Theme	Computer Components and Operations			Digital Citizenship			Computational thinking and Practice	
	Foundations of Hardware and Software	Computer Communication and Networking	Productivity Tools and multimedia authoring	Health and Safety	Computing Careers	Computer Ethics and Research	Problem- Solving	Algorithm Development
Grade 8	<p>Investigate key characteristics of the types of computers.</p> <p>Evaluate peripheral devices based on their functions and application</p> <p>Explain how instructions are stored and executed in a computer system</p> <p>Understand the key functions of an operating system and utility software</p> <p>Identify different types of system software</p>	<p>Understand and be aware of different data communication devices, networks, protocols and media and their application in everyday life</p> <p>Display knowledge of resources available on the World Wide Web</p> <p>Know advanced Internet terminologies and demonstrate an ability to use Internet-related software.</p>	<p>Manipulate advanced word processing software features</p> <p>Manipulate the spreadsheet software</p> <p>Demonstrate their understanding of the use of multimedia authoring tools to create videos</p> <p>Demonstrate</p>	<p>Understand why is it important to exercise safety measures while operating the computer system.</p> <p>Appreciate the importance of software installation for the proper functioning of the computer system</p> <p>Practise proper care and maintenance of computer equipment and accessories.</p> <p>Implement measures to reduce negative effects of computers on the environment</p>	<p>Discuss job functions in an IT department.</p> <p>Be aware and identify the duties associated with careers related to computing and technology</p>	<p>Display knowledge of resources available on the World Wide Web.</p> <p>Evaluate and present accurate information.</p> <p>Demonstrate an awareness of appropriate safety measures when using the Internet.</p> <p>Understand the consequences resulting from unethical practices associated with Internet use</p> <p>Research relevant information on the Internet by using successful search strategies</p>	<p>Demonstrate their understanding of constructing algorithms for real-world and computer-related problems.</p> <p>Document simple algorithms using flowcharts.</p> <p>Explore tools to represent an algorithm</p>	<p>Demonstrate their understanding of how a single problem can be solved using different algorithms</p> <p>Understand the importance of order and meticulousness when developing algorithms</p> <p>Explore graphical programming languages</p>

	Computer Components and Operations			Digital Citizenship			Computational thinking and Practice	
Sub Theme	Foundations of Hardware and Software	Computer Communication and Networking	Productivity Tools and multimedia authoring	Health and Safety	Computing Careers	Computer Ethics and Research	Problem- Solving	Algorithm Development
	Know the different categories of application software Assist peers in the use of computer software							

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## **Unit I: Health and Safety**

### **Range and Content**

#### **Students will learn:**

- The different types of cables (USB, VGA, PS2, power cords, HDMI, Ethernet) and ports associated with a computer system.
- Correct procedures when connecting and disconnecting peripheral devices such as monitor, mouse, keyboard, printer, speaker, flash drive, projector, and digital camera. For example, eject flash drive correctly before removing it from computer system, do not connect or disconnect cables while the computer system is on unless it is a USB cable.
- The proper care and maintenance of system unit and above mentioned peripheral devices. For example never move a computer system while it is turned on, keep food and liquid away from peripheral devices.
- To devise and implement strategies to reduce negative effect of electronic devices on the environment
- Specific system requirements for software compatibility to meet the needs of the user. (Hardware and software requirements may include: RAM capacity, type of operating system, word size, processing speed)

### **About the Unit**

This unit should provide students with the knowledge required to determine the necessary hardware and software requirements for the efficient and effective operation of computer systems. They will also learn about the proper care and maintenance of the computer system.

### **Guidance to Teacher**

Teachers should equip students with the knowledge and skills they will need to provide proper care and maintenance of electronic devices. They should give students the opportunity to demonstrate proper care and maintenance of the computer system. In addition, teacher should ensure that students practise proper care and maintenance of computer systems for longevity. Informing students about the mental and emotional health risks associated with social isolation is very important. This is a common disorder associated with extensive hours of computer use.

**Prior Learning**

Check that students can:

- List lab rules and safety procedures
- Discuss consequences of improper computer use
- Model correct health and safety behaviours when using computer systems

**Units of Work Grade 8 TERM 1(14 weeks)**

<b>Unit 1: Health and Safety (3 Weeks)</b>	
<b>Attainment Target(s):</b> Students understand the Health and Safety procedures applied to the use of a computer system.  Students demonstrate Health and Safety Practices while operating the computer system.	<b>Objectives:</b> <ul style="list-style-type: none"><li>- List at least three of the most common computer cable types</li><li>- Demonstrate correct procedure when connecting and disconnecting peripheral devices</li><li>- Demonstrate proper care and maintenance of computer equipment and accessories.</li><li>- Discuss system requirements for software compatibility</li><li>- Design a computer or electronic devices safety programme</li></ul>

Suggested Teaching and Learning Activities –	Key Skills	Assessment Criteria
<p><b>Students will:</b></p> <p>View video of people operating in a lab, discuss appropriate and inappropriate behaviours. In groups create list of lab rules and share with whole class.</p> <p>Given pictures of types of computer cables and ports, match the cable to its appropriate port.</p> <p>Observe teacher/technician connect and disconnect peripheral devices and discuss procedure.</p> <ul style="list-style-type: none"> <li>• Identify cables</li> <li>• identify appropriate ports</li> <li>• ensure that the cables are securely connected to ports</li> </ul> <p>In groups, practise to connect and disconnect peripheral devices</p> <p>Navigate the computer’s operating system to ascertain the system properties to identify specifications such as Manufacturer, model, processor type, system type, memory, etc. and discuss the importance of hardware specification to software installation</p> <p>Compile a list of desired software for personal use; determine the system requirements through discussion and exploration which software is compatible with their computer system (personal or school)</p> <p>In groups, discuss methods for proper care and maintenance of computer system peripherals e.g. multimedia projector, document camera, USB drives, printer, etc.</p> <p>Create a poster or manual depicting proper care of a peripheral device of their choice.</p> <p>Devise strategies for a plan to increase awareness of safety by developing a school wide computer or electronic devices safety programme and give evidence to justify each strategy</p>	<p>Observe to obtain information Summarize information Discuss and share ideas Teamwork - ability to work cooperatively with others</p> <p>Classifying</p> <p>Analyze problematic situations and select appropriate solutions</p> <p>Interpret system specifications</p> <p>Verbally express ideas</p> <p>Sharing ideas</p> <p>Designing and producing a document</p> <p>Devise and justify strategy</p>	<p>Correctly match computer cable to its appropriate port</p> <p>Correctly connect and disconnect peripheral devices</p> <p>Correctly identify hardware specifications of a computer system</p> <p>Correctly determine software compatibility based on system properties</p> <p>Poster/Manual accurately illustrates proper care and maintenance of specified peripheral device.</p> <p>Safety program devised accurately depicts awareness of safety when using electronic devices and strategies are satisfactorily justified</p>

<p><b>Learning Outcomes</b> Students will be able to:</p> <ul style="list-style-type: none"> <li>✓ Identify common computer cable types and their corresponding ports</li> <li>✓ Practise appropriate procedures when connecting and disconnecting peripheral devices</li> <li>✓ Identify hardware system requirements for software compatibility</li> <li>✓ Practise proper care and maintenance of computer system peripheral devices</li> <li>✓ Appreciate the importance of Health and Safety practises when using computer systems</li> <li>✓ Strategize a safety plan on the use of electronic devices</li> <li>✓ Work cooperatively to accomplish tasks</li> </ul>	
<p><b>Points to Note</b></p> <p>Teacher must observe correct procedures when using equipment powered by electricity. When disconnecting peripherals from the system unit, ensure that the system is properly shutdown and disconnected from power source.</p> <p>Refer to equipment manuals and other relevant material to keep current and up to date with recommended health and safety practises.</p>	<p><b>Extended Learning</b></p> <p>Students can visit a computer manufacturer’s website which displays computers from which they customize one for personal use.</p> <p>Field trip to an organization to observe procedures, operations and computer system requirements.</p> <p>Discuss the impact of the use of computers on the environment and on human health.</p>
<p><b>Resources</b></p> <p>Personal computers Software (for installation) Resource personnel (technician) Textbooks Selected list of software and their hardware requirements Internet Access</p>	<p><b>Key vocabulary</b></p> <p>Peripheral devices, PC, installation, software/hardware compatibility, system specification, connect, disconnect.</p>
<p><b>Links to other subjects</b></p> <p>Link with Language Arts in Grade 8 Attainment Target 1 “Speaking and Listening” and Target 2 “Reading”</p> <p>Link with Technical Vocational Education in Grade 8 Attainment Target 2 “Exploring methods and procedures” and Target 3 “Applying Solutions”</p> <p>Link with Physical Education in Grade 8 Attainment Target 3 “Health, safety and wellbeing”</p> <p>Link with Drama in Grade 8 Attainment Target 1 “Exploring and Creating” and Target 2 “Expressing and Enacting”</p>	

## Unit II (a): Foundations of Hardware and Software

### Range and Content

#### Students will learn:

- Definition of fundamental terms relating to hardware and software (input device, output device, hardcopy, softcopy, storage media, processing, application software, system software, word processing)
- The different hardware components (input device, output device, processing device, storage device and communication device) and how they interact with each other.
- Various hardware devices (keyboard, mouse, biometric system, OMR, MICR, graphic tablets, OCR, joystick, webcam, digital camera, sensor, barcode reader, microphone, scanner, track ball, touch pad, light pen, game console, monitor, printer, multimedia projector, speaker, plotter, RAM, ROM, CD, DVD, flash drive, hard drive, memory chip, magnetic tape, floppy disk, cloud computing, MODEM) and the functions they perform. For example: the keyboard is used to get data in the form of letters, numbers and symbols into the computer for processing; the plotter is used to print large architectural drawings such as maps and blueprints; RAM is used to hold data temporarily while processing takes place; DVD is used to hold information on a permanent basis and is used to store mainly videos or movies; MODEM is used to convert digital signal into analog signal and vice versa so that data can travel via communication channel such as a telephone line.
- How to compare the different units of storage (bit, byte, kilobyte, megabyte, gigabyte, terabyte)
- How the computer manipulates and process data into information using various hardware components (Central Processing Unit - Arithmetic Logic Unit (ALU) and Control Unit (CU) as well as the machine cycle).
- The two major types of software (application and system).
- Functions of the operating system (file management, security control, provides user interface, device management, program management, multitasking, memory management)
- To classify application software into the following categories integrated, custom – written, specialized and general – purpose
- Use word processing software to create, edit (highlight, copy and paste, cut and paste, find and replace, undo and redo); format (font, alignment, line spacing, bullets and numbering); manipulate tables as well as apply page layout features (margin, orientation, paper size) to various documents.
- Sort data in a spreadsheet application (ascending/ descending order)
- Apply formatting features to numeric values in a spreadsheet application (percentage, date and time, currency)
- Modify the layout of cells by adding borders and colour
- Use spreadsheet to enter data, apply various formatting features (merge and center, wrap text, font, alignment), insert formulae and functions (SUM, AVG, MAX, MIN) as well as create simple charts (pie chart and column graph).

### About the Unit

Students will be given the opportunity to garner the requisite skills and knowledge that will allow them to understand how the component of the computer system (hardware and software) interacts with each other to carry out its operations effectively and efficiently. This unit will enable students to appreciate how the various devices assist in making our daily tasks easier based on their functions. In addition, it will seek to equip students with basic computer skills essential for manipulating the computer as a tool to accomplish tasks such as the creation of word processing and spreadsheet documents. Students will be able to transfer the knowledge gained from the creation of these documents to other aspects of their lives.

## **Guidance to Teacher**

The foundation of hardware and software unit should help students feel more confident interacting with the various hardware and software presented. Hence, teachers are encouraged to provide students with models or actual (hardware and software) to help build their confidence. Trending devices, medium (such as cloud storage) and software should also be mentioned to help keep students up-to-date. Students should be exposed to different documents and formatting feature which will develop their own skills. In addition, students should be encouraged to transfer these skills to other subject areas.

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**Prior Learning**

Check that students:

- Know the difference between a computer and a computer system
- Can classify basic hardware devices as Input, Output, Storage, Processing and Communication
- Can competently use the keyboard and mouse
- Know the major categories of software
- Can utilize the basic features of a Word Processing program

**Units of Work Grade 8 TERM 1 (14 weeks)****Unit 2: Foundations of Hardware and Software (12 Weeks)****Attainment Target(s):**

Students demonstrate the appropriate competencies in using selected hardware devices

Students demonstrate an understanding of a variety of productivity tools used in today's society

Students understand the purpose of hardware devices and software tools in computer systems

**Objectives:****Students will**

- Define the term input devices, output devices, data, processing, storage, storage device, storage media
- Differentiate between Manual and Automated/Source Data Entry devices
- Describe different input devices and their uses
- Explain the relationship among hardware components in data processing.
- Discuss the role of the Central Processing Unit and its components
- Compare the different units of storage
- Differentiate between primary and secondary storage
- Describe different storage media and their uses
- Describe the concept of cloud computing and examine how it has impacted storage
- Describe different output devices and their uses
- Differentiate between Hardcopy and Softcopy Output

**Objectives cont'd:****Students will**

- Differentiate between Hardcopy and Softcopy Output devices
- Discuss the functions of the different types of System Software
- Outline the functions of the Operating System
- Classify Application Software into their different categories

	<ul style="list-style-type: none"> <li>• Use Word Processing software to move blocks of text, apply page layout and paragraph formatting features within documents.</li> <li>• Examine the use of a Spreadsheet software</li> <li>• Define key terms associated with spreadsheets</li> <li>• Investigate the different sections in the layout of a spreadsheet software</li> <li>• Demonstrate the use of spreadsheet software by entering data, applying formatting features, using simple formulae and functions and creating simple charts in a spreadsheet</li> <li>• Insert and manipulate tables using Word Processing software</li> <li>• Demonstrate the use of spreadsheet software by sorting data and applying formatting features to numeric values</li> <li>• Modify the layout of cells by adding borders and colour</li> </ul>
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Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p>Students will:</p> <p>Examine case studies and answer questions to indicate prior knowledge of hardware components</p> <p>Create a glossary/ dictionary with the terms associated with the unit such as: input devices, output devices, data, processing, storage, storage device, storage media based on class discussions.</p> <p>Be given terms associated with CPU and their definitions on strips of paper (Control Unit, ALU, cache, address bus etc.). In pairs/ groups attempt to correctly match the terms to the definitions.</p> <p>OR</p> <p>Play interactive online/ offline games related to CPU</p> <p>Draw a diagram illustrating the relationship among</p>	<p>Recall information</p> <p>Think critically and express ideas</p> <p>Exploring ideas and presenting information</p>	<p>Questions satisfactorily answered</p> <p>Glossary/ Dictionary created</p> <p>CPU terms correctly match their definitions</p>



Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p>hardware components of a computer system to accomplish data processing</p> <p>OR</p> <p>Be placed in small groups and assigned a component of the computer system and describe the role they play and their relationship to the other components to the class.</p> <p>Investigate the use of various input devices and their operations to identify similarities and differences. These findings will then be discussed with the class to derive a definition for manual and automated.</p> <p>Be given a list of input devices and asked to categorize them as being Manual or Automated (Source Data Entry) devices e.g. keyboard, mouse, digital camera, scanner, barcode reader, bio-metric reader, track ball, touch pad, light pen, Optical Mark Reader, etc. Be placed into groups to research and present information on different Input Devices and their uses. These findings will be discussed with the class.</p> <p>Unveil projected electronic images of output devices and categorize them as providing Hardcopy or Softcopy Output. E.g. Monitor, speaker, printer (different types), plotter, and multimedia projector.</p> <p>Watch video clips of different output devices at work then complete a worksheet where they match different Output Devices and their functions.</p> <p>Engage in a discussion about the different units of storage. Given a list of units of storage in random order, rearrange them into the order from the largest to smallest or vice versa.</p>	<p>Graphically illustrate information</p> <p>Presenting information orally</p> <p>Compare and contrast information</p> <p>Categorize information</p> <p>Infer conclusions from clues</p> <p>Observe to obtain information</p> <p>Verbally express ideas</p>	<p>Diagram correctly indicates the relationship among hardware components of a computer system to accomplish data processing.</p> <p>Explanation correctly indicates the relationship among hardware components of a computer system to accomplish data processing.</p> <p>Input devices correctly categorized as manual or automated</p> <p>Output devices correctly classified as producing hardcopy OR softcopy output.</p> <p>Output devices accurately categorized as hardcopy or softcopy output</p> <p>Output devices accurately matched with their functions</p> <p>Units of computer storage arranged in the correct</p>

Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p>Discuss different storage media and their uses. In groups, suggest with reasons, the most appropriate storage medium to be used a given situation or for specific types of data.</p> <p>In groups, create a model of a computer system and label the parts.</p> <p>Create a scrapbook of the different Hardware devices (Input Devices, Output Devices, Processing Devices, Storage Devices) giving their names and functions.</p> <p>Participate in a guided online discussion forum sharing information on system software and their functions.</p> <p>View and discuss a multimedia presentation on the functions of the Operating System</p> <p>Play a game of “Who am I?” to identify operating system functions– clues will be given describing functions.</p> <p>Participate in a treasure hunt. In groups, collect colour coded cards with examples of application software hidden in the room and classify these examples into their respective categories.(General Purpose, Custom Written, Specialized , Customized, Integrated)</p> <p>Be given a hardcopy text-based document. Discuss the page layout and paragraph formatting features depicted, and then reproduce the document applying these paragraph formatting features. e.g. Columns</p> <p>Retrieve a saved document and practise</p>	<p>Teamwork - ability to work cooperatively with others</p> <p>Design and produce a model of a computer system</p> <p>Compile information</p> <p>Discuss and share ideas</p> <p>Observe to obtain information</p> <p>Infer conclusions from clues</p> <p>Categorize information</p> <p>Manipulate WordProcessor</p>	<p>order.</p> <p>Most appropriate storage medium suggested for each situation or type of data given.</p> <p>Model accurately depicts a computer system with correct labels.</p> <p>Scrapbook satisfactorily completed on different hardware devices (Input Devices, Output Devices, Processing Devices, Storage Devices)</p> <p>Accurately complete a closed question exercise on system software and their functions</p> <p>Accurately identify the functions of the operating system from the “Who am I?” activity</p> <p>Software correctly classified as general purpose, custom written, integrated or specialized.</p> <p>Document satisfactorily completed according to the formatting features presented in the hard copy text based document</p> <p>Reorganize information in given document using</p>

Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p>cut/copy/paste blocks of text within document</p> <p>Use table feature of a word processing programme to prepare an electronic copy of their school time table.</p> <p>Through guided discussion, give examples of situations when it is more appropriate to use a Spreadsheet Software to manipulate documents.</p> <p>Discuss key terms associated with spreadsheet from a projected image of a spreadsheet window then complete a crossword puzzle using these terms.</p> <p>Launch a spreadsheet application, describe the role of the different sections of the displayed spreadsheet interface and draw and label the main parts of spreadsheet window. Compare the spreadsheet application interface to a word processing application interface.</p> <p>View a video demonstrating how data is entered into cells and formatted.</p> <p>Observe teacher computing using simple arithmetic formulae/functions in a spreadsheet, and then engage in a discussion about their observations.</p> <p>Demonstrate solving a problem using specific electronic spreadsheet arithmetic operations.</p> <p>Identify appropriate chart to be used in given scenarios e.g. the ratio of students who wear glasses to those who do not or compare the sale of three different goods per quarter at the cafeteria.</p>	<p>Manipulate hardware and software tools</p> <p>WordProcessor</p> <p>Manipulate</p> <p>Express ideas orally</p> <p>Discuss and share ideas</p> <p>Observe to compare and contrast</p> <p>Observe and record information</p> <p>Observe and record information</p>	<p>cut/copy/paste feature</p> <p>Timetable satisfactorily created</p> <p>Crossword puzzle with spreadsheet terms correctly completed.</p> <p>Parts of the spreadsheet application interface correctly labelled</p> <p>Formulae and functions appropriately used in a spreadsheet document to solve problems.</p> <p>Appropriate chart type selected based on scenarios.</p>

Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria																
<p>Explore the use of a chart wizard in an electronic spreadsheet to create appropriate charts to graphically represent given data.</p> <p>Create electronic portfolio of simple documents that were generated in spreadsheet application; for example, Mark book, Student's Time Table</p>	<p>Use spreadsheet to solve problems</p> <p>Analyse information and draw conclusions</p> <p>Observe spreadsheet software</p> <p>Reproduce document using Spreadsheet Software</p>	<p>Data graphically represented using appropriate charts.</p> <p>Electronic portfolio created satisfactorily</p>																
<p>Collect the following data from at least 10 members of their class: name, age, shoe size and height. Students will enter the data in a spreadsheet application similar to the table below:</p> <table border="1" data-bbox="96 998 646 1133"> <thead> <tr> <th>Name</th> <th>Height</th> <th>Age</th> <th>Shoe Size</th> </tr> </thead> <tbody> <tr> <td>Anna</td> <td>120cm</td> <td>12</td> <td>3</td> </tr> <tr> <td>Beth</td> <td>127cm</td> <td>11</td> <td>2</td> </tr> <tr> <td>Simon</td> <td>140cm</td> <td>12</td> <td>4</td> </tr> </tbody> </table> <p>Apply the following formatting features to their data:</p> <ul style="list-style-type: none"> <li>• Make all the titles and names bold</li> <li>• Give the Column titles a yellow background</li> <li>• Give the names a blue background</li> <li>• Place border around the cells (rows and columns)</li> <li>• Sort the data by the different column headings</li> </ul>	Name	Height	Age	Shoe Size	Anna	120cm	12	3	Beth	127cm	11	2	Simon	140cm	12	4	<p>Collect data</p> <p>Manipulate spreadsheet software</p> <p>Observe</p> <p>Manipulate spreadsheet software</p>	<p>Document satisfactorily completed with specified formatting features applied</p> <p>Document satisfactorily completed according to the formatting features presented in the hard copy</p>
Name	Height	Age	Shoe Size															
Anna	120cm	12	3															
Beth	127cm	11	2															
Simon	140cm	12	4															

<p>Be given a printed copy of a table from the newspaper or internet that has numeric values that are in the form of currency, date and percentage. Reproduce the table in a spreadsheet application first without any formatting features. After which, apply formatting features to the numeric values to reflect the ones presented in the printed copy.</p>		<p>text based document</p> <p>Documents satisfactorily completed with appropriate formatting features applied</p>
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<b>Links to other subjects</b>	
Link with Language Arts in Grade 8 Attainment Target 1 “Speaking and Listening” and Target 2 “Reading” Link with Technical Vocational Education in Grade 8 Attainment Target 2 “Exploring methods and procedures” and Target 3 “Applying Solutions”	
<b>Learning Outcomes</b>	
<b>Students will be able to:</b>	
<ul style="list-style-type: none"> <li>✓ Recognize the functions of the hardware components of a computer system</li> <li>✓ Understand the role of the CPU and its components</li> <li>✓ Understand the uses of different input devices</li> <li>✓ Identify different output devices and their uses</li> <li>✓ Describe different storage media and their uses</li> <li>✓ Organize units of storage into a specific order</li> <li>✓ Explain the functions of the different types of system software</li> <li>✓ State the functions of the operating system</li> <li>✓ Differentiate among the categories of application software</li> <li>✓ Explain the purpose of spreadsheet software</li> <li>✓ Define key terms associated with spreadsheet</li> <li>✓ Apply data formatting features, use simple formulae and functions and create simple charts in a spreadsheet</li> </ul>	
<b>Points to Note</b>	<b>Extended Learning</b>
Teacher must refer to guidance note at the beginning of this unit. Only Pie and Column/Bar Charts should be taught in this Unit.	Create a study timetable using a word processing software Create a budget using a spreadsheet software
<b>Resources</b>	<b>Key vocabulary</b>
Personal computers Spreadsheet software, word processing software Multimedia Presentation Kit Videos Textbook/Worksheet Cards Internet Access	Central Processing Unit, Control Unit, Arithmetic and Logic Unit, Memory, Secondary storage, Primary Storage, Storage medium, Monitor, speaker, printer, plotter, multimedia projector, Hardcopy, Softcopy, Manual, Automatic (Source Data Entry) Keyboard, mouse, digital camera, scanner, barcode reader, bio-metric reader, track ball, touch pad, light pen, Optical Mark Reader, Operating system, Utility programs, General Purpose, Custom Written, Specialized, Custom - Written, Integrated, Functions, formulae, spreadsheet, row, column, cell, value, range, cell address, formatting, alignments, bullets, cut, copy, paste, landscape, portrait, operating system software, application software, bar chart, column chart, pie chart, currency, accounting, percentage

## **Grade 8 TERM 2 Unit 3: Data Communication, Networking and the Internet**

### **Range and Content**

Students will learn:

Additional terms associated with data communication which includes:

- simplex, half duplex, duplex, ISP, URL, IP address, bandwidth (broadband, voice-band, and narrowband), network domain, transfer rate, latency, and computer network protocol;
- contrast of types of signals should include digital (discrete) and analogue (continuous).
- classification of transmission media based on their characteristics, such as their transfer rate, and whether the transmission media is wired or wireless. Wired transmission media should include twisted-pair cable, coaxial cable, and fibre-optic cable; while wireless transmission media should include infrared, broadcast radio, cellular radio, microwaves, and communications satellites.
- recommending a protocol for transfer/access of resources that are available online. Some of the protocols that should be discussed include: HTTP, S-HTTP, TCP/IP, FTP, POP3, SMTP, ICMP, IMAP, and TLS, among others. Some of the available online resources include blogs, podcasts, tutorials, FAQ (web document), games, among others.

### **About the Unit**

This unit will provide students with an awareness of the various opportunities available for modern communication, through the use of technological tools. This unit will develop students understanding of additional technical terms used in data communication. This unit will develop students' skill of synthesis and critical analysis for searching for information on the Internet and identifying protocols for communication tasks, respectively

### **Guidance to Teacher**

Where possible, teachers should demonstrate the communication process with several of today's common communication tools (whatsapp, Skype, Facebook, and email clients, among others); with the aim of having the students identify the required protocol(s).

**Prior Learning**

Check that students:

- Explain the relationship among components of communication, and data communication; as well as webpage, website and web browser
- Perform upload and download of electronic document

**Units of Work Grade 8 TERM 2 Unit (11 weeks)****Unit 3: Data Communication, Networking and Internet (5 Weeks)****Attainment Target(s):**

Students understand the different data communication devices, protocols and media that may be used in today's society

Students appreciate the various protocols used for accessing available resources on the World Wide Web

Students demonstrate the ability to correctly use Internet-related tools and Internet jargons e.g. software, web applications

**Objectives:**

Students will:

- Define terms: ISP, URL, IP address, bandwidth (broadband, voice-band, and narrowband), network domain, transfer rate, latency, computer network protocol
- Contrast the two types of signals for transmitting data (analog and digital)
- Differentiate among the three transmission modes (simplex, duplex and half duplex)
- Evaluate the importance of all components required for successful data communication
- Classify data communication transmission media based on their characteristics (transfer rate, wired or wireless)
- Explain data communication protocols and their applications
- Recommend a computer network protocol for use in a communication process



Suggested Teaching and Learning Activities	Key Skills	Assessment												
<p><b>Students will:</b></p> <p>Examine a video which present the concepts of data communication that needs to be defined. Record and share their discovery/understanding of data communication terms, for peer review.</p> <p>Listen to an appropriate song and compare the signal quality of the song stored and transmitted two ways: (play same song using an analog recording device and MP3 or other appropriate digital player). In small groups discuss errors in the analog signal (dust, pops, scratches) as compared to the digital version and explain in their own words the difference between an analog and digital signal.</p> <p>Dramatize data transmission modes using scenarios such as a person listening to a radio, family watching television, policemen on their walkie/ talkie having conversation, persons having a telephone conversation. Identify which of the three transmission modes are being demonstrated.</p> <p>In groups be given pieces of puzzles representing components of the data communication process. Fit the puzzles together and explain the importance of each component in class discussion.</p> <p>Create a Picture Dictionary outlining data communication media along with their characteristics</p> <p>View teacher prepared presentation on Protocols, highlighting the meaning of the terms and discuss cases in which each protocol is used e.g. HTTP found at the beginning of some web addresses.</p> <p>Examine the scenario and determine the most appropriate data communication protocol.</p>	<p>Synthesize information</p> <p>Listen, discuss to prove understanding</p> <p>Observe and interpret</p> <p>Collaborate to complete puzzle Discuss and share ideas</p> <p>Research and present information</p> <p>Observe and interpret information</p> <p>Analysis of scenario</p>	<p>Discussion accurately contrasts the digital signal and the analogue signal</p> <p>Transmission modes correctly identified</p> <p>Completed puzzle accurately and satisfactorily explained the components of data communications</p> <p>Data communication media accurately characterized</p> <p>Matches the best suited protocol satisfactorily to a given Scenario</p>												
<table border="1"> <thead> <tr> <th data-bbox="92 1252 567 1279">Scenario</th> <th data-bbox="573 1252 1033 1279">Protocol</th> </tr> </thead> <tbody> <tr> <td data-bbox="92 1284 567 1312">Surfing from one webpage to another</td> <td data-bbox="573 1284 1033 1312"></td> </tr> <tr> <td data-bbox="92 1317 567 1344">Downloading an attachment</td> <td data-bbox="573 1317 1033 1344"></td> </tr> <tr> <td data-bbox="92 1349 567 1409">Error message that says a requested service is not available</td> <td data-bbox="573 1349 1033 1409"></td> </tr> <tr> <td data-bbox="92 1414 567 1442">Accessing email</td> <td data-bbox="573 1414 1033 1442"></td> </tr> <tr> <td data-bbox="92 1446 567 1507"></td> <td data-bbox="573 1446 1033 1507"></td> </tr> </tbody> </table>	Scenario	Protocol	Surfing from one webpage to another		Downloading an attachment		Error message that says a requested service is not available		Accessing email					
Scenario	Protocol													
Surfing from one webpage to another														
Downloading an attachment														
Error message that says a requested service is not available														
Accessing email														

**Learning Outcomes**

Students will be able to:

- ✓ Demonstrate an understanding of the components required for data communication.
- ✓ Differentiate among the transmission modes, and signals used in data transmission.
- ✓ Explain the terms simplex, half duplex, duplex, ISP, URL, IP address, bandwidth (broadband, voice-band, and narrowband), network domain, transfer rate, latency, and computer network protocol
- ✓ Classify a given transmission media, as either Wired or Wireless.
- ✓ Tell the appropriate protocol that may be used to accomplish a given communication tasks.

<b>Points to Note</b>	<b>Extended Learning</b>
<p>Teacher must refer to guidance note at the beginning of this unit.</p> <p>Teacher must ensure to use the jargon of the discipline when explaining concepts for data communication, for example, use the term transmission mode, as oppose to transmission direction. Students must be taught to correctly differentiate transmission devices, as oppose to transmission media.</p> <p>Teacher must peruse all videos to be seen by students, ensuring to show content that is relevant to the lesson.</p>	<p>Use advance search features to locate content for their search text within other types of media, such as videos ,images, and sound, among others</p> <p>Students create a portfolio/scrapbook with the aim of tracking additional protocols that are prominent.</p> <p>Students conduct interviews with parents or user of communication devices, so as to ascertain the transmission media and protocols that are used in at least five distinct ways.</p>
<b>Resources</b>	<b>Key vocabulary</b>
<p>Communication/VoIP software          Personal Computers equipped with microphones, speakers and webcams          Textbooks          Internet Access</p>	<p>Simplex, Duplex, Half Duplex, Hyper Text Transfer Protocol, Transfer Control Protocol/Internet Protocol, Ethernet, File Transfer Protocol, Transmission Media, Wireless, Wired, Coaxial, Satellite, Microwave</p>
<b>Links to other subjects</b>	
<p>Link with Language Arts in Grade 8 Attainment Target 1 “Speaking and Listening” and Target 2 “Reading”</p> <p>Link with Technical Vocational Education in Grade 8 Attainment Target 2 “Exploring methods and procedures” and Target 3 “Applying Solutions”</p> <p>Link with Drama in Grade 8 Attainment Target 1 “Exploring and Creating”</p>	

## Unit II (b): Foundations of Hardware and Software

### **Range and Content**

#### **Students will learn how to:**

- Copy sections of data and charts from a spreadsheet application to a word processing application
- Explain how data is represented in the computer system (bit, byte, place value of binary numbers)
- Describe how binary numbers relate to computers (computers use binary switches (on/off) to store information)
- Convert from decimal numbers to binary numbers and vice versa

### **About the Unit**

This unit will seek to equip students with basic computer skills essential for manipulating the computer as a tool to accomplish tasks such as the creation of word processing and spreadsheet documents. This unit is also targeted at training students to integrate the various application software available in a computer software package with the aim of solving multiple problems. Students will be able to transfer the knowledge gained from the creation of these documents to other aspects of their lives. In carrying out tasks that require the use of hardware and software tools, this unit will give students knowledge about how the binary number system plays a central role in how information of all kinds is stored on computers.

### **Guidance to Teacher**

Students should be exposed to different documents and formatting feature which will develop their own skills. Teacher should provide opportunities for students to understand that one individual software application is not able to solve all the data processing problems of an organization or individual. As such it is important to have knowledge of several data processing applications and how to integrate these in order to be more efficient in carrying out tasks. Students should be encouraged to transfer these skills garnered from this unit to other subject areas.

Teacher should allow students the opportunity to transfer the theory learnt of binary system to the physical computer so as to remove some of the mystery associated with computing. Teacher should also try as much as possible to make linkage to the knowledge students may have acquired in their mathematics class related to binary number system.

**Prior Learning**

Check that students:

- Apply basic formatting features to word processing document
- Manipulate simple word processing documents

**Units of Work Grade 8 TERM 2 Unit (11 weeks)****Unit 2: Foundations of Hardware and Software****Attainment Target(s):**

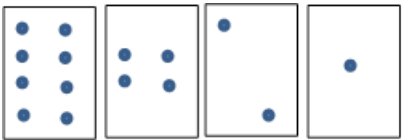
Students demonstrate an understanding of a variety of productivity tools used in today's society

Students understand the purpose of hardware devices and software tools in computer systems

Students understand how data is represented in computers

**Objectives:****Students will**

- Explain the importance of importing and exporting data between among software applications
- Demonstrate copying sections of data created in a spreadsheet application to a word processing application.
- Explain the general principles related to the binary number system
- Discuss how binary number system apply to computers and digital technology
- Convert decimal numbers to binary and vice versa

Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p><b>Students will:</b></p> <p>Conduct online or offline research on statistics on road accidents that have occurred in the last 10 years. Prepare a spreadsheet document that presents the numeric information researched. Create a suitable chart to depict the information in the spreadsheet. Copy pertinent data from the spreadsheet application to a word-processing application and type a report on their findings. Apply appropriate formatting features to their word processing document so as to enhance it.</p> <p>Be shown a set of four cards prepared by the teacher, as shown below, with dots on one side. Observe the cards in the following order:</p>  <p>After observing the cards, discuss the following questions:</p> <ul style="list-style-type: none"> <li>• Discuss: <ul style="list-style-type: none"> <li>• What notice about the pattern of the dots from one card to the next</li> <li>• How many dots would be on subsequent cards</li> <li>• Use the cards to convert decimal numbers to binary and vice versa by turning some of them face down and adding up the dots that are showing. For example to convert 6 to Binary, students would leave the card</li> </ul> </li> </ul>	<p>Research information Manipulate spreadsheet and wordprocessing software</p> <p>Observe Make inferences from patterns Discuss</p>	<p>Documents satisfactorily completed with appropriate formatting features applied</p>

with four and two up and turn down the others. Once face up, a 1 is used to represent that and once turned down, a zero; therefore, the solution would be 0 110.

View a video that shows tiny transistors/ switches inside a computer system that represents on/ off (1 and 0) switches.

Place binary numbers on individual strips of papers and their corresponding decimal numbers on strips of paper. Be given a strip of paper and asked to find their matching partner, that is, the binary number that correctly matches the decimal number

Observe for information

Convert numbers

Convert numbers accurately

**Learning Outcomes**

Students will be able to:

- ✓ Manipulate data across Software applications through importing and exporting
- ✓ Understand the general principles governing the binary number system
- ✓ Explain how binary number system applies to computers and digital technology
- ✓ Convert decimal numbers to binary and vice versa

<p><b>Points to Note</b></p> <p>Teacher should refer to guidance note at the beginning of this unit.</p> <p>Students should understand that at times no one software can cater to all of a user's need. Therefore they need to understand the importance of manipulating multiple software.</p> <p>Teacher should ensure that students understand Binary Mathematical concepts and Binary Computing concepts are the same. Therefore teachers should encourage students to transfer knowledge of Binary number system garnered from Mathematics class to IT class.</p> <p>Teacher should explore with students to bridge the gap between the abstractness of binary concepts and how this applies practically to computing.</p>	<p><b>Extended Learning</b></p> <p>Use advance features of Word-processing and Spreadsheet to produce various documents</p> <p>Students research on character representation in Binary for example ASCII and EBCDIC</p> <p>Students explore the hexadecimal system</p> <ul style="list-style-type: none"> <li>○ Explain how data is represented in the computer system (bit, byte, place value of binary numbers)</li> <li>○ Describe how binary numbers relate to computers (computers use binary switches (on/off) to store information)</li> <li>○ Convert from decimal numbers to binary numbers and vice versa</li> </ul>
<p><b>Resources</b></p> <p>Computers including word processing and spreadsheet software</p> <p>Textbooks</p> <p>Internet Access</p> <p>Teacher created Binary cards</p>	<p><b>Key vocabulary</b></p> <p>Import, export, extract, copy, paste, integrated, bit, byte, bistable, binary, base 2, decimal, base 10, denary system,</p>
<p><b>Links to other subjects</b></p> <p>Link with Language Arts in Grade 8 Attainment Target 1 "Speaking and Listening" and Target 2 "Reading"</p> <p>Link with Technical Vocational Education in Grade 8 Attainment Target 2 "Exploring methods and procedures" and Target 3 "Applying Solutions"</p> <p>Link with Drama in Grade 8 Attainment Target 1 "Exploring and Creating"</p>	

## **Unit 4: Computer Ethics and Research**

### **Range and Content**

Students will learn:

- Network etiquette, netiquette, is a set of rules for behaving properly online. Some rules of behaving properly should include adhering to the same standards of behaviour online that one would use in real life; respecting other people's time and bandwidth; share expert knowledge; respect the privacy of others; and, to be forgiving to other people's mistakes, among others.
- Role and function of local organizations that protect the rights of content creators, such organizations include Broadcasting Commission of Jamaica, JIPO, and JARIA, among others. Consequences, punishable by Jamaican laws, for producing or possessing any obscene content or placing them into circulation.
- Locate and choose information on the WWW using basic search strategies World Wide Web based on use of advanced search techniques. Some of the advanced search techniques should include using operators (AND, -, and parentheses, among others), navigating dead links, and being concise with search text, among others
- How to use American Psychological Association (APA) and Modern Language Association (MLA) referencing styles to cite media (text, graphics, video, audio among others)
- How to use criterions, such as author's name, publication date, last update, credentials/qualifications to determine credibility of online or offline source

### **About the Unit**

This unit will provide students with an awareness of the various types of values, attitudes and ethics that are associated with the use of the Internet. This unit assist in the development the required skills and importance of evaluating information accessed online or offline. It is hoped, that through rich discussions, students' will understand and appreciate responsible ethical online practices, and understand the consequences related to non-compliance of unethical Internet practices, under the Jamaican law. Due to the need for citing references as a skill by the 21st century learner, instructing this unit also serves the purpose of developing students' appreciation and skill in applying citation techniques.

### **Guidance to Teacher**

Where possible, teachers should use case studies to examine unethical practices where prosecution by local laws has been enforced. Teachers are also encouraged to use guided discovery/discussions to develop students' appreciation of advance search techniques for refining their search for information. The use of videos and role play should also be used to demonstrate responsible ethical behaviours for using the Internet, so as to ensure that students benefit from this unit.



**Prior Learning**

Check that students:

- Have knowledge of the terms: Computer ethics and moral behaviour
- Can identify the use of either MLA or APA style of reference
- Understand most implications for irresponsibly using computer
- Are aware of the criterion used to determine the credibility of online and offline sources

**Units of Work Grade 8 TERM 2 Unit (11 weeks)**

**Unit 4 : Computer Ethics and Research (4 Weeks)**

**Attainment Target(s):**

Students recognize the resulting consequences from unethical practices associated with Internet use

Students search for information on the Internet by using advance search strategies

Students use criterion to evaluate information obtained from research

Students demonstrate an awareness of appropriate guidelines when using resources available on the Internet

**Objectives:**

Students will:

Define the term netiquette

Evaluate scenarios to determine whether or not responsible/ethical practices ensued

Identify Internet practices for which an individual is punishable by local laws

Recommend appropriate behaviours when using the Internet

Describe the role/function of at least three Jamaican organizations that are responsible for protecting the rights of content creators

Apply advance search techniques for locating and selecting information on the World Wide Web

Evaluate information accessed on the World Wide Web using at least five criterion

Apply the MLA and APA style of references to cite information sourced from offline (such as CDs) and online (such as text, graphics, video, audio among others) resources

Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p><b>Students will:</b></p> <p>Be given strips of paper with situations in which they have to role play violating simple etiquette behaviours (for example a person eating and talking simultaneously at a dinner). Discuss the role play highlighting inappropriate behaviour and identify the correct etiquette practice that should be applied. Examine the term “netiquette” and brainstorm to determine the definition.</p> <p>Read the following scenarios and then discuss and provide justification for whether they think ethical or unethical behaviours ensued. Give arguments to support their stance:</p> <ul style="list-style-type: none"> <li>○ A Grade 8 girl types in her age as 18 years old so as to gain access to a certain website.</li> <li>○ An employee is given a PC at work but not all of the software needed to do his/her job. The employee copies licensed software from a friend outside of the company to use at work.</li> <li>○ A student discovered a way to access the administrator’s password on the computer system in his/ her lab. This flaw in the system security was reported to the teacher.</li> </ul> <p>The body of a boy who drowned was in full view of the residents of a certain community. Many persons took out their phones to take pictures of the body. One person who had the picture on his phone started circulating it on social media websites</p> <p>Be placed in small groups and be given various settings for example</p> <ol style="list-style-type: none"> <li>1. Posting pictures on Social Media</li> <li>2. Sending emails</li> <li>3. Commenting on online articles</li> <li>4. Participating in an online course thread</li> <li>5. Posting information about persons on Social Media</li> </ol> <p>Brainstorm and generate a list of Do’s and Don’ts when involved in the settings above. Present lists to peers/class for discussion.</p> <p>Examine the Jamaican Cybercrimes Act to identify at least three (3) practices that are punishable by local laws.</p> <p>OR</p>	<p>Role play and brainstorm</p> <p>Discuss information</p> <p>Brainstorm and discuss information</p> <p>Analysis of information</p>	<p>The term netiquette satisfactorily defined.</p> <p>Scenarios adequately described as ethical or unethical with justifications provided.</p> <p>List of Do’s and Don’ts appropriately address behaviours on the internet</p>

<p>Conduct an interview with a resource person in the law and/ or law enforcement profession. Gather information about cybercrimes punishable by local laws. Use recording devices to capture interview and play back for class discussion</p> <p>In groups be assigned an organization that protects the rights of the Jamaican content developers and use teacher created Webquest to identify the roles and functions of the assigned organization and present findings for class discussion</p> <p>Brainstorm, discuss and compile a list of advance Internet search techniques.</p> <p>Be given topics to conduct an online research for example new and emerging careers, requirements needed to pursue these careers and where can certification/qualifications be obtained for these careers. Use available presentation software to demonstrate the steps involved in conducting the research</p> <p>In groups create a checklist to evaluate information found on the Internet. Be given several sources (blogs, e-books, e-journal and e-magazine, webzines and web pages) and evaluate information found on the Internet using the checklist generated. (Checklist should focus on criteria to evaluate information characteristics such as accuracy, currency, relevance and authorship/publishing body)</p> <p>OR</p> <p>Be given a topic for example Athletics in Jamaica and conduct a search for at least three different sources of information. In pairs, identify any discrepancies found among the sources. Use a teacher generated checklist to evaluate the information sources.</p> <p>Conduct an online and off-line research on a controversial topic for example “Should close circuit cameras be used in schools”. Prepare document on the topic researched, and provide a reference list for the resources on-line and offline that were used using the MLA or APA format.</p>	<p>Conducting of interviews</p> <p>Collaborate to complete task</p> <p>Discuss information</p> <p>Conduct research</p> <p>Create checklist Evaluate information source</p> <p>Evaluate information source</p> <p>Conduct research</p>	<p>Presentation accurately describes the roles and functions of at least three Jamaican organizations which protect content developers</p> <p>List satisfactorily depicts advance internet search information</p> <p>Presentation satisfactorily describes online research strategies</p> <p>Checklist created accurately captures criteria used to evaluate information. Information sources correctly evaluated.</p> <p>Information sources correctly evaluated.</p> <p>Appropriately cite references for information accessed online and offline.</p> <p>Document prepared correctly</p>
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<p>Be given a list of references that are scrambled. Put the references in the correct order according to the APA or MLA referencing format.          For e.g. Students will be given the following scrambled reference of a book:          2010. The Dream Maker. Brown, Paul          Students should reorder it to read:          Brown, Paul (2010). The Dream Maker</p>	<p>Apply knowledge</p>	<p>emphasized MLA or APA style of referencing</p> <p>References correctly reordered according to APA or MLA format</p>
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<p><b>Learning Outcomes</b>          Students will be able to:</p> <ul style="list-style-type: none"> <li>✓ Define the term netiquette</li> <li>✓ Use at least five criteria to Evaluate information accessed on the World Wide Web</li> <li>✓ Demonstrate appropriate behaviours when using the Internet</li> <li>✓ Practise responsible use of the computer and the Internet</li> <li>✓ Use the MLA or APA styles of referencing to cite online and offline sources</li> <li>✓ Articulate the steps to locate and select information on the WWW using advanced search strategies</li> </ul>
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<b>Points to Note</b>	<b>Extended Learning</b>
<p>Teacher must refer to guidance note at the beginning of this unit.</p> <p>Teacher should collect frequently researched topics from different subject teachers that they asked or will ask students to research.</p> <p>Teachers should source cases about 'netiquette' issues and thoroughly discuss the required ethics of posting personal and sensitive information online.</p> <p>Teacher must research and guide students in observing the Cybercrime Act and Obscene Publication Act, when examining the practices for which individuals are punishable.</p> <p>Teacher must teach students the skill of selecting keyword from a given topic, so as to aptly formulate their search text.</p>	<p>Students Compare ethics observed in the physical world and the digital world(cyberspace)</p> <p>Students observe international cases in which prosecution of irresponsible/unethical use of Internet occurs; comparison of local consequences and applied consequences should be done</p> <p>Visit a wiki and examine information using evaluation checklist.</p> <p>Use advance search features to locate content for their search text within other types of media, such as videos ,images, and sound, among others</p>
<p><b>Resources</b></p> <p>Computer with Internet access</p> <p>Evaluation checklist</p>	<p><b>Key vocabulary</b></p> <p>Netiquette, citation, VoiceThread, authorship, currency, accuracy, publishing body, credibility, Broadcasting Commission of Jamaica, JIPO, JARIA, Obscene Publications (Suppression of) Act, Cybercrime Act</p>
<p><b>Links to other subjects</b></p> <p>Link with Language Arts in Grade 8 Attainment Target 1 "Speaking and Listening" and Target 2 "Reading"</p> <p>Link with Civics in Grade 8 Attainment Target 3 "Demonstrate an awareness of individual and collective rights, their application and attendant responsibilities"</p> <p>Link with Drama in Grade 8 Attainment Target 1 "Exploring and Creating"</p>	

## **Unit 5: Computing Careers**

### **Range and content**

Students will learn:

- About the organizational structure of an IT department (this is a collection of expert individuals who use computer science and information technology related resources to effectively and efficiently aid a business/organization to meet its goal).
- Some of the services offered by an IT department include evaluating available services; determining which services and vendors can provide required equipment; and, overseeing day to day operations of all electronic devices within a business/company, among others.
- Basic job functions of an IT department include: system administrator, system analyst, network administrator, database administrator, computer repair technician, among others.
  - Job loss and retraining are examples of two impacts that Information Technology have on traditional jobs; while, social issues, health issues, and legal issues are repercussions that affect non-IT careers with the use of computing and technology.

### **About the Unit**

This unit will provide students with an awareness of the various types of careers in Computer Science and Information Technology. This unit will develop students understanding of the roles and job functions of personnel in the IT department. It is hoped that resource persons will be invited to participate in panel discussions and interviews. This should help to highlight, improve and reinforce students' understanding and appreciation of the importance of careers in the fields of Computer Science and Information Technology.

### **Guidance to Teacher**

Teachers should permit students to investigate real world (or virtual model) companies to discover the IT department functions. Key concepts that teachers must emphasize include the implications that originate from the use of computing and technology within non-IT professions, as well as the impacts of emerging careers on traditional jobs. Co-operative learning group strategies should also be employed, so as to allow students to share their observations and experiences related to IT careers.

**Prior Learning**

Check that students can:

- identify Computer Science and Information Technology careers
- list at least five career opportunities in ICT
- match roles and responsibilities of ICT personnel
- explain the importance of an ICT careers in society

**Units of Work Grade 8 TERM 2 (11 weeks)****Unit 5: Computing Careers (3 Weeks)****Attainment Target(s):**

Students understand the job functions within an IT department

Students are aware and identify the duties associated with careers related to computing and technology

**Objectives:**

Students will:

Describe an *Information Technology (IT) Department*

Describe at least four services offered-by an IT department

Identify at least four distinct computing jobs that aid in the delivery of the services offered by an IT Department

Examine the impact of trending Computing careers on traditional jobs

Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p><b>Students will:</b></p> <p>Draw or use available software to create an Information Technology Department/Unit /Section organizational chart within a Government Ministry/Agency or Private Company. Emphasise the different positions within the Information Technology Department/Unit /Section.</p> <p>Listen to an IT resource person from an industry discussing roles and responsibilities that both they and their department provide. Use image capturing devices or make note of discussion. Present summary of discussion using multimedia presentation.</p> <p>Visit a Government Ministry/Agency or Private Company to observe personnel in the work environment and to conduct interviews with personnel about their roles and responsibilities within the IT department. In groups compile a report to present their findings for class discussion.</p> <p>Match duties and responsibilities performed by IT personnel using a table.</p> <p>Debate on the topic “Since the advent of Digital Technology many jobs are made obsolete”. OR</p> <p>Create an informational brochure to educate readers about the implications of computing and technology towards non-IT careers.</p>	<p>Draw/Create chart</p> <p>Present to share facts</p> <p>Research to gather data</p> <p>Matching duties with personnel</p> <p>Discuss to share ideas</p> <p>Create informational brochure</p>	<p>Organizational chart satisfactorily captures the main IT positions within a Government Ministry/Agency or Private Company</p> <p>Reports accurately describe roles and functions of personnel interviewed and observed.</p> <p>Responsibilities of IT personnel accurately matched duties</p> <p>Debate arguments satisfactorily stressed for and against points establishing the implications of computing and technology</p> <p>Informational brochure accurately educate readers on implications</p>



Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria

<p><b>Learning Outcomes:</b>  <b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>✓ Describe an Information Technology (IT) Department</li> <li>✓ Explain the functions and roles of both IT personnel and their department within an organization</li> <li>✓ Articulate the implications of computing and technology on non-IT career</li> </ul>
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Points to Note	Extended Learning
<p>A field trip will be required or interaction with personnel from the IT department in an organization.</p> <p>Teachers must assist students with the construction of their questions for interview, so as to capture data that meets the objective.</p> <p>Teacher must research trending issues in health, law, and society, as they result from the use of computing and technology in non-IT careers</p>	<p>Students create portfolio/scrapbook entries which hoard newspaper articles of the impact of computing and technology locally and internationally.</p> <p>Students design a WebQuest repository to maintain: role and functions of IT personnel in co-operate and public service departments; and, the implications of computing and technology in these local government and non-government agencies</p>
<p><b>Resources</b>  Resource Books  Computer  Internet Access  Case studies  Multimedia Presentation Kit  Resource persons</p>	<p><b>Key vocabulary</b>  role, IT department, responsibility, duties , ICT Industry; issues (health, social, legal) of technology in non-IT career</p>
<p><b>Links to other subjects</b>  Link with Language Arts in Grade 8 Attainment Target 1 “Speaking and Listening” and Target 2 “Reading”  Link with Technical Vocational Education in Grade 8 Attainment Target 4 :Career Awareness”  Link with Guidance</p>	

## ***Unit 6: Multimedia Authoring***

### **Range and Content**

Students will learn:

- About Multimedia, Multimedia authoring and Multimedia authoring tools
- How multimedia has changed over the years.
- About the advantages and disadvantages of using Multimedia and how these are useful in specific fields/spaces
- The elements of Multimedia (text, still images/graphics, audio, video, animation and interactivity), the common file format (.txt,gif etc.)associated with each and the hardware devices and software used to capture each Multimedia element
- About the legal and ethical issues and consequences involved in the reusing of person’s intellectual properties without proper acknowledgement or permission
- How to modify text, still images/graphics, audio and video using appropriate software so as to create simple multimedia products that integrates at least three multimedia elements

### **About this Unit**

The primary purpose of this unit is to develop students’ creativity using digital tools to design various multimedia products. This unit will provide students with an awareness of Multimedia authoring tools needed to create these digital artefacts. It will develop students’ appreciation of such tools and the role they will play in the future. The Unit will enable students through its teaching and learning activities to demonstrate competency in using multimedia tools and to develop various 21<sup>st</sup> century skills such as creativity, critical thinking and innovation through the creation of multi-media products. It is hoped that through various teaching and learning strategies it will highlight, improve and reinforce students’ understanding and appreciation of the importance of ethical and legal responsibilities when designing multimedia products.

### **Guidance to Teachers**

Teachers should share with the students about the relevance of Multimedia and how this is applicable in everyday life. Students should be given an opportunity to demonstrate knowledge, skills and attitudes to express innovativeness through the development of multimedia products.

They should also be cognizant that **portion limitations** should be exercised in the reuse of text, sounds, still images and videos in support of “fair use” of the work of others when creating or authoring multimedia products.

Teachers be aware of the Jamaican Copyright Act and Fair Use and should highlight that the inclusion of illegal portions or the reproduction of other persons’ intellectual property without permission or proper acknowledgement is a breach of copyright laws and warrants appropriate penalty. Students should be guided in adhering to the portion of copyrighted work that is legally permissible in the production of their own work.

Teachers should demonstrate the application of fair use in creating their own instructional resources to be used as a part of their teaching aid(s).

Fair Use guidelines

<b>Copyrighted Material</b>	<b>Portion</b>
Motion media	10% or 3mins (whichever is less)
Text media	10% or 1000 words
Music, music lyrics, music video	10% or up to 30 seconds
Illustrations and photograph	Not more than 10% or 15 images
Numerical data set	10% or 2500 fields or cell entries (whichever is less.)

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**Prior Learning**

Check that students can:

- Manipulate graphics in using Desktop Publishing Software
- Download Internet resources
- Use hardware devices to capture and transfer sounds, images and videos.

**Unit 6: Multimedia Authoring (7 Weeks)****Attainment Target(s):**

Students demonstrate awareness of multimedia authoring tools to create multimedia products.

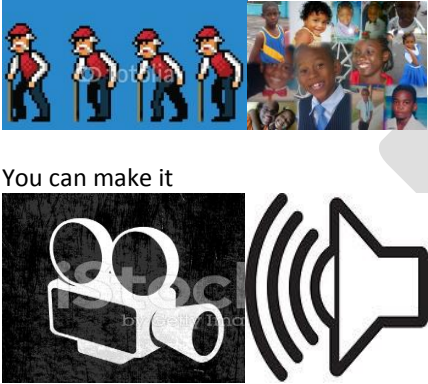
Students demonstrate competency in the use of multimedia authoring tools to develop competencies in various skills such as critical thinking, innovation, analysis, and creativity

**Objectives:**

Students will:

- Explain the terms “Multimedia”, “Multimedia authoring”, “Multimedia authoring tools”
- Examine the historical development of Multimedia
- Analyse the advantages and disadvantages of using Multimedia
- Identify the use of Multimedia in various fields/space
- Describe the elements of Multimedia (text, still images/graphics, audio, video, animation and interactivity)
- Identify common file format associated with each Multimedia element
- State at least two hardware devices and software used to capture each Multimedia element
- Discuss legal and ethical issues and consequences involved in the reusing of person’s intellectual properties without proper acknowledgement or permission
- Modify text, still images/graphics, audio and video using appropriate software
- Create simple multimedia products that integrates at least three multimedia elements

**Units of Work Grade 8 TERM 3 (11 weeks)**

Suggested Teaching and Learning	Key Skills	Assessment Criteria				
<p>Students will:</p> <p style="text-align: right;">Brainstorm to derive the definition of the terms “Multimedia” and “Multimedia Authoring,”, “Multimedia authoring tools”</p> <p>View teacher created video on the historical development of Multimedia. Prepare a report on presentation viewed.</p> <p>Conduct an online or offline research on the advantages and disadvantages of using multimedia. Discuss their findings</p> <p>In small groups, explore one field/space (Business, Education, Entertainment, Home, Public places) in which Multimedia is used. Use a picture collage to show how Multimedia is utilised in this field/space. Share findings with class for discussion.</p> <p>Be shown a display of pictures highlighting the five multimedia elements. Tell the specific multimedia element that is shown in the display. Describe each element.</p> <div data-bbox="117 889 644 1312" style="border: 1px solid black; padding: 5px;">  <p>You can make it</p> </div> <p>Match the multimedia element to its corresponding file format. For example:</p> <table border="1" data-bbox="96 1393 863 1511"> <thead> <tr> <th>Multimedia Element</th> <th>Common File Formats</th> </tr> </thead> <tbody> <tr> <td>Sound</td> <td>.ani</td> </tr> </tbody> </table>	Multimedia Element	Common File Formats	Sound	.ani	<p>Synthesize to construct knowledge</p> <p>Observe for information</p> <p>Conduct research</p> <p>Create picture collage Collaboration</p> <p>Discuss pictures</p> <p>Classification of elements</p>	<p>Terms correctly defined</p> <p>Report correctly captures information on the historical development of Multimedia</p> <p>Picture collage satisfactorily shows applications in assigned field/space</p> <p>Multimedia elements correctly match to its corresponding file format</p>
Multimedia Element	Common File Formats					
Sound	.ani					

Graphics	.mp3
Text	.jpg
Animation	.avi
Video	.txt

In small groups be given one of the multimedia elements (text, audio, video, animation, and graphics) conduct an online/offline research in order to obtain:

- two pictures of hardware devices used to capture the assigned element
- the names of two software used to manipulate the assigned element

Examine teacher selected areas of the Copyright Act and discuss issues and behaviours associated with legal and ethical practices governing the reuse of intellectual properties.

In groups use any available graphics software to create/ edit any of the following:

- School crest
- A logo
- Cartoon Character
- A map/ diagram

In groups use any available audio software to create a “mash – up” (fusion) of appropriate songs. Present their “mash - up” to their classmates.

In groups use a video capturing device to record something in their school environment. Use any available software to present their videos to the class.

Create a five minutes multimedia product, for example, a digital story advertising a school event, institution or product using a combination of at least two multimedia elements (text, graphics, audio, video)

Conduct research

Discuss and share information

Design and create

Create and manipulate variety of media forms.

Research satisfactorily shows hardware and software used to manipulate multimedia elements

Item created /modified satisfactorily using appropriate software

Multimedia product correctly and creatively created using a combination of media forms while adhering to portion limits and showing credits to authors of media pieces where applicable

**Learning Outcomes**

Students will be able to:

- ✓ Describe the terms “Multimedia”, “Multimedia authoring”, “Multimedia authoring tools”
- ✓ Trace the historical development of Multimedia
- ✓ Investigate the advantages and disadvantages of using Multimedia
- ✓ Recognize the use of Multimedia in various fields/space
- ✓ Explain the elements of Multimedia (text, still images/graphics, audio, video, animation and interactivity)
- ✓ Classify common file format associated with each Multimedia element
- ✓ State at least two hardware devices and software used to capture each Multimedia element
- ✓ Discuss legal and ethical issues and consequences involved in the reusing of person’s intellectual properties without proper acknowledgement or permission
- ✓ Manipulate text, still images/graphics, audio and video using appropriate software
- ✓ Produce simple multimedia products that integrates at least three multimedia elements

**Points to Note**

Students may need permission to bring recording devices to school

Students should be directed to websites that offer royalty free resources

Students should be directed to use compressed resources such as Mp3(sounds) and Mp4 (videos) where applicable

**Extended Learning**

Use advanced features of multimedia authoring software to enhance multimedia product previously created

**Resources**

Digital Camera  
 Graphics Software e.g. GIMP, Windows Movie maker  
 Speakers  
 Headsets  
 Multimedia Presentation Kit  
 Textbooks  
 Computer  
 Audacity

**Key vocabulary**

Sound/audio, video, file format, sequence, transition, Graphics, storyboard, Mp3, MP4 file formats. Multimedia, Multimedia Authoring, Animation.

**Links to other subjects**

Link with Drama in Grade 8 Attainment Target 1 “Exploring and Creating”

Link with Technical Vocational Education in Grade 8 Attainment Target 1 “Creativity

Link with Language Arts in Grade 8 Attainment Target 1 “Speaking and Listening” and Target 2 “Reading”

## ***Units of Work Grade 8 TERM Unit 7:***

### ***Problem Solving and Algorithm Development***

#### **Range and Content**

Students will learn:

- ✓ how to use IPO charts to partition simple problems into input, processing and output components
- ✓ the three ways of representing an algorithm (Flowchart, Pseudo code and narratives)
- ✓ how to explain how control structures are integral in governing the flow of the solution to a problem
- ✓ how to draw simple flowcharts to represent algorithms

#### **About this Unit**

The intention of this unit is to guide teachers in the teaching of the problem solving component of the curriculum. It serves as a precursor to algorithm development which will develop the learner's computational thinking practices as well as help them to apply problem solving techniques to everyday scenarios. The unit uses a simplicity approach in its guide to de-mystify the problem solving and program development concept. The unit will explore the analysis of a problem using tools such as IPO charts and flowchart.

#### **Guidance to Teachers**

Problem Solving is a skill needed to effectively develop computer programs and it is critical that students develop these skills. However, student's perception that the topic is difficult often prevents them from fully appreciating, developing, exploring and mastering such skills. Teachers should therefore be cautious in their approach and the attitude that they pass on to the learner about the subject matter as the subject is no more difficult than learning a new skill or learning a new language.

Teachers should ensure that students are given adequate opportunity to the problem and thereby become efficient in developing the solution. Teachers should also use a step by step approach in getting students to understand the importance that input component plays in generating the output.



**Prior Learning**

Check that students can:

- Define the terms 'problem', 'problem solving'
- Define an algorithm
- Explain the steps involved in the problem solving process

**Units of Work Grade 8 TERM 3(11 weeks)****Unit 7: Problem Solving and Algorithm Development (4 Weeks)****Attainment Target(s):**

Students develop an appreciation for the tools used in algorithm development

Students demonstrate their understanding of constructing algorithms for real-world and computer-related problems

Students understand and implement algorithms for solving problems

**Objectives:**

- Explain the purpose of the IPO chart
- Use IPO charts to partition simple problems into input, processing and output components
- Explain three different ways of representing an algorithm
- Define the term "control structures"
- Examine the importance of sequencing and selection control structures to problem solving
- State advantages and disadvantages of using a flowchart
- Describe symbols used in constructing flowcharts
- Draw simple flowcharts to represent algorithms

Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p>Students will:</p> <p>In small groups of 2-3 students, conduct offline or online research on uses, benefits and components of IPO chart. Present their findings to the class.</p> <p>In small groups (maximum three students), be given a problem (real world/ computational). In the group be asked to complete one section (Input, Process or Output) of the IPO chart. Present their solutions for different problems identified to the class for review and discussion highlighting Input, Processing, and Output or to determine if the problem is adequately decomposed.</p> <p>In groups conduct online or offline research and prepare a presentation on the three methods used to represent algorithms (Pseudocode, Flow Chart, Narrative).</p> <p>Review literature to discover the meaning of the terms control structures, sequencing and selection. Record the meanings for the terms. Discuss with class, using examples, their understanding of the terms.</p> <p>Be given pictures of a series of activities done to complete a task (e.g. baking a cake, getting ready for school) and in pairs place the pictures in the correct sequencing order and explain their decision. Justify your selection.</p> <p>Play a 2 – way decision game where teacher will begin a scenario by stating for example, “If I wake up early, I eat breakfast but if I wake up late I have to hurry to the bus stop.” Try to build on the previous scenario by adding their own two- way decision scenario. For example state “If I reach to the bus stop on time, I will catch the bus, but if I reach late, then I will miss the bus.” Keep adding to the scenario</p> <p>Look at samples of completed flow charts (for e.g. billing system of a company).</p> <p>Compile a list of two (2) advantages and two (2) disadvantages of using a flow chart to represent algorithms/ procedures. Share their lists with the class.</p> <p>In groups, create annotated charts showing images, names and functions of flowchart symbols: start/stop, input/output, processing, decision and flow.</p>	<p>Conduct Research</p> <p>Analyse Problem Decompose problem into given parts Construct Knowledge</p> <p>Conduct research</p> <p>Discuss information</p> <p>Sequencing data Justify decision</p> <p>Create scenarios Evaluate decision</p> <p>Observe flowcharts</p> <p>Compile List</p> <p>Application of knowledge</p>	<p>Presentation adequately describes the purpose and components of IPO</p> <p>Problem accurately decomposed using IPO chart</p> <p>Definition of terms accurately constructed</p> <p>Pictures correctly placed in sequential order</p> <p>List adequately describe benefits and limitations of flow charts</p> <p>Charts adequately show flow chart symbols and their meanings</p>

<p>Graphically represent given algorithms (for example, steps involved in making a cup of tea, baking a cake etc.) using Flow Charts. Display completed Flow Charts for comparison and peer evaluation.</p>	<p>Create an annotated flowchart</p> <p>Represent flowchart</p>	<p>Flow charts created adequately show the steps involved in the given algorithms.</p> <p>Chart correctly depicting Flow Chart symbols, names and functions</p> <p>Accurately represent algorithm using a flowchart</p>
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**Learning Outcomes**

Students will be able to:

- ✓ Use IPO charts to partition simple problems into input, processing and output components
- ✓ Explain the three different ways of representing an algorithm (flow chart, pseudocode, narratives)
- ✓ Examine the importance of sequencing and selection control structures to problem solving
- ✓ State advantages and disadvantages of using a flowchart
- ✓ Describe the symbols used in constructing flowcharts (start/stop, input/output, processing, decision and flow)
- ✓ Draw simple flowcharts to represent algorithms

<b>Points to Note</b>	<b>Extended Learning</b>
<p>It should be highlighted when examining a problem that most problems have a background or information component. Only flowchart is supposed to be used at this point to show solutions. Students may manually draw Flow Charts or use Word processing feature to insert symbols. Developing problem solving skills require much nurturing and time so teachers should be cognizant of factors in selecting teaching strategies.</p>	<p>Identify problems in their environment and use the pseudocode method to develop solutions</p>
<p><b>Resources</b> Textbooks, Wordprocessing software Chart with flow chart diagrams</p>	<p><b>Key vocabulary</b> Flowchart, pseudocode, narrative, logical, parallelogram, diamond, rectangle, arrow, oval, rhombus, control structure, sequencing, selection decompose, IPO charts, Ambiguity, commands/Keywords.</p>
<p><b>Links to other subjects</b> Link with Technical Vocational Education in Grade 7 Attainment Target 1 “Creativity and Innovation” and Attainment Target 3 “Apply solutions”</p>	

**GRADE 9**

**UNITS**

**TERM 1**

## **Introduction**

Computing Education is constantly being reshaped. New thinking and new technologies continue to influence this. It is critical that the distinction be made among the three most common areas of computing education.

Each of these areas is known by various names in different jurisdiction, however in our context we call them:

- Information Technology
- Computer Science
- Educational Technology / Information and Communication Technology (ICT)

## **Defining key Terminologies**

In its computing curriculum 2005: the overview report, the Association of Computer Machinery (ACM) and IEEE Computing Society recognises the following:

### **Information Technology (IT)**

Information Technology is “the proper way of technologies by which people manipulate and share information in its various forms.”It involves learning about computers, and emphasizes the technology itself. Information Technology specialists assume responsibility for selecting appropriate hardware and software products, integrating those products with organizational needs and infrastructure, and installing, customizing, and maintaining those resources. Information Technology, therefore, focus on:

- installing, securing, and administrating computer network;
- installing, maintaining, and customizing software;
- managing and securing data in physical and virtual worlds;
- managing communication systems ;
- designing implementing, and managing multimedia resources and other digital media

### **Computer Science (CS)**

Computer Science is the study of computers and algorithmic processes, including their principles, their hardware and software designs, their application and their impact on society. Computer Science spans a wide range of computing activities, from theoretical foundations to robotics, intelligent systems, and bioinformatics and it is concentrates on designing, creating, modifying, and verifying computing tools.

### **Difference between Information Technology and Computer Science**

IT is an applied field of study, driven by the practical benefits of its knowledge, while computer science adds scientific and mathematical, as well as practical, dimensions. Some of the practical, dimensions of computer science are shared with IT, such as working with text, graphics, sound, and video. IT concentrates on learning how to use and apply these tools while computer science is concerned with learning how these tools are designed and why they work. Computer science and IT have a lot in common, but neither one is fully interchangeable.

## **Educational Technology / Information and Communication Technology (ICT)**

Educational Technology / ICT integration can be defined as using technology tools across the curriculum, or more specifically, using computer technology (hardware and software) to learn about other disciplines. For example, a science teacher may use computer simulations to provide students with a better understanding of a lesson on genetics, or a Social Studies teacher may use a digital story or Webquest to help students understand the middle passage.

### **Information Technology Literacy and Information Technology Fluency**

There are two other terms that is emerging in computing education these are Information Technology Literacy and Information Technology Fluency. A study published in 1999, defines IT fluency as something more comprehensive than IT literacy. Whereas IT literacy is the capability to use today's technology in one's field, the notion of IT fluency adds the capability to independently learn and use new technology as it evolves throughout one's professional life time. Moreover, IT fluency also includes the active use of computational thinking (including programming) to solve problems, whereas IT literacy does not.

### **Aim of Information Technology (IT):**

The 21<sup>st</sup> century learner lives in a technologically charged environment and IT will provide them with the requisite knowledge and skills to understand the underpinnings of current technology and to prepare them for utilizing new and emerging technologies. The Grades 7 - 9 Information Technology (IT) curriculum will introduce students to the opportunities afforded by this dynamic field and begin to prepare them for a wide range of rewarding careers as well as for personal use. IT is relevant as it incorporates a wide range of problem solving techniques and skills that is needed for life-long learning. The fundamental purpose of the IT curriculum is to provide students with knowledge, skills and attitudes that will enable them to achieve success at every stage of life be it personal, professional or academically.

### **The goals of the IT curriculum are to enable students to:**

- ☞ achieve an understanding of IT concepts
- ☞ develop essential skills such as critical thinking skills, research and enquiry skills and to communicate information effectively, accurately and ethically
- ☞ utilize the knowledge, skills and attitudes acquired through the study of IT to a variety of learning tasks in other subject areas
- ☞ develop life-long learning habits that will assist students in adapting to new and emerging technologies
- ☞ become aware of the wide range of career options available to individuals with IT skills

## **ROLES AND RESPONSIBILITIES OF THE DELIVERY OF THE IT CURRICULUM**

In order for the delivery of this curriculum to be effective all key stakeholders must be aware of their roles and responsibilities.

## **STUDENTS**

Students are responsible for their learning. It is clear that there is a relationship between student's effort and achievement. Students are encouraged to motivate themselves to learn. Teacher's encouragement can motivate any student to learn. Taking the learning experience outside of the classroom will extend and enrich their understanding of the content. These may include becoming members of a computer club, subscribing to magazines and other online resources; attend Technology conferences and competitions to learn of new and emerging technologies.

### **PARENTS/GUARDIANS**

Parents/guardians have a critical responsibility in supporting their child/ward learning experience. By becoming knowledgeable about the curriculum they determine what is taught and can determine best to support their child/ward. Parents/guardian can assist their child/ward by attending school's consultation sessions and encouraging them to do extended work outside the classroom.

### **TEACHERS**

Teachers and students responsibilities complement each other. Teachers are responsible for developing culturally relevant instructional technologies to achieve learning outcomes as well as appropriate methods for assessment and evaluations. Joining professional technology societies, subscribing to technology magazines and other online resources, attend Technology.

### **SUGGESTED TEACHING AND LEARNING ACTIVITIES**

The suggested teaching and learning activities indicates the minimum content to be covered per term. The sequence of the content listed per term **is not prescribed**. Teachers are encouraged to design their own sequence per term to deliver the content in an appropriate sequence and pace given their circumstances.

The topics should be presented in an integrated manner as much as is possible. Some content from one topic may strengthen and underpin the content of another. It is recommended that this approach be applied throughout grade 7 – 9 where applicable.

**Innovators Challenge:** *STEM education is an approach to teaching and learning that integrates the content and skills of science, technology, engineering and mathematics. STEM Education is a teaching and learning methodology that prepares individuals:*

- *For successful employment, post-secondary education, or both that require different and more technically sophisticated skills including the application of science, technology, engineering, and mathematics skills and concepts, and*
- *To be competent, capable citizens in our technology-dependent, democratic society.*

*The Innovators Challenge is to be used as a main STEM activity. It is to be used during the academic year. Teachers are at liberty to create other challenges to develop STEM methodology.*



**STANDARDS FOR INFORMATION TECHNOLOGY GRADE 9**

**The Strands**

There are three (3) strands in Information Technology as follows:

<p><b>STRAND 1:</b></p> <p><b>Computer Components and Operations/ Foundations of Hardware and Software</b></p> <p><b>STANDARD</b></p> <p>Students demonstrate an understanding of how computers work as well as develop competence in the use of hardware devices and software tools.</p> <p><i>(Guided by ISTE and CSTA Standards)</i></p>	<p><b>STRAND 2:</b></p> <p><b>Digital Citizenship</b></p> <p><b>STANDARD</b></p> <p>Students demonstrate an understanding of the human, cultural and societal issues related to technology and practice responsible, moral and safe practices while applying information and communication technologies, and operating and maintaining computer systems in everyday life.</p> <p><i>(Guided by ISTE and CSTA Standards)</i></p>	<p><b>STRAND 3:</b></p> <p><b>Computational thinking and practice</b></p> <p><b>STANDARD</b></p> <p>Students use critical thinking and analytical skills to solve problems by selecting and applying relevant strategies and tools.</p> <p><i>(Guided by CSTA Standards)</i></p>
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## OVERVIEW OF SUBJECT CONTENT GRADE 9

SUBJECT	TERM 1	TERM 2	TERM 3
Information Technology	<p><b>Unit 1 : Health and safety</b>            Demonstrate health and safety practices while operating the computer system or handling parts thereof</p> <ul style="list-style-type: none"> <li>- Basic Troubleshooting – Identify possible problems associated with input, output, storage (thumb drive), power outlets, disconnection, loosely fitted cables, replacement of toner and replenishing of paper stocks</li> </ul> <p>Proper care and maintenance of equipment and accessories(lab furniture, replacement of toner)</p> <p><b>Unit II: Foundations of Hardware and Software</b>            Understand device management and file management; Appreciate how data is represented in a computer’s storage; Manipulate the database software; and use the integration feature in productivity software to improve presentation of data</p> <ul style="list-style-type: none"> <li>- Hardware(Device management)</li> <li>- Software(File management)</li> <li>- Data representation(Data management)</li> <li>- Database management software</li> <li>- Integration across Word-processors, Spreadsheets, and Database Management Software</li> </ul>	<p><b>Unit III : Data Communication, Networking and the Internet</b>            Appreciate the role and use of ICTs in society; understand the application of communication technologies in everyday life; implement efficient information gathering techniques on the Internet; and understand and be aware of common threats and security measures associated with networks</p> <ul style="list-style-type: none"> <li>- Applications of ICT</li> <li>- Network security</li> <li>- Components of URL and types of services on the internet</li> </ul> <p><b>Unit IV: Computer Ethics and Researching</b>            Recognise and acknowledge the owners and creators of online and offline material; and understand the consequences resulting from unethical practices and beware of measures to avert there unethical practices.</p> <ul style="list-style-type: none"> <li>- Advanced Search Criteria</li> <li>- Citing media (text, graphics, video, audio among others) sources using APA and MLA referencing</li> <li>- Software Piracy</li> </ul> <p>Critiquing media messages, photographs, websites etc. as they relate to digital citizenship</p> <p><b>Unit V: Computing Careers</b>            Describe the new career options available in the ICT field; and be aware of and understand the competencies and qualifications needed for ICT careers, and the computing skills necessary for the working world at large.</p> <ul style="list-style-type: none"> <li>- Emerging ICT careers</li> <li>- ICT skills</li> <li>- Computing competencies and qualifications</li> </ul>	<p><b>Unit VI : Multimedia Authoring</b>            Use Hypertext Markup Language (HTML) tags to create a basic webpage; use multimedia authoring tools to create a website;</p> <ul style="list-style-type: none"> <li>- HTML tags</li> <li>- Web authoring tools</li> </ul> <p><b>Unit VII : Problem Solving and algorithm development</b>            Use critical thinking and analytical skills to develop simple algorithms to solve problems.</p> <ul style="list-style-type: none"> <li>- Algorithms</li> </ul> <p><b>Unit VIII : Algorithm Development</b></p>

	Computer Components and Operations			Digital Citizenship			Computational thinking and Practice	
Sub Theme	Foundations of Hardware and Software	Data Communication and Networking	Productivity Tools and multimedia authoring	Health and Safety	Computing Careers	Computer Ethics and Research	Problem-Solving	Algorithm Development
Grade 9	<p>Understand device and file management</p> <p>Understand how numbers can be represented in octal and hexadecimal and be able to carry out simple operations on these numbers systems</p> <p>Use basic troubleshooting techniques to identify problems with the computer system.</p>	<p>Understand the application of communication devices and networks</p> <p>Know and be aware of common threats associated with networks</p> <p>Implement appropriate measures to secure computer networks</p>	<p>Demonstrate competency in the use of a database management system.</p> <p>Use the integration feature in productivity software to manage data.</p> <p>Use HTML tags to create a basic web page.</p> <p>Use multimedia authoring tools to create a website</p>	<p>Demonstrate an awareness of health and safety practises when using and maintaining ICTs.</p> <p>Perform basic troubleshooting on computing devices</p> <p>Examine health and safety Acts for ICTs in the environment</p>	<p>Be aware of and understand the qualifications and competencies related to careers in computing and technology</p> <p>Discuss the new and emerging career options available in computing and technology field</p>	<p>Independently research, locate and select relevant information on the Internet by using the successful search strategies safely.</p> <p>Determine and acknowledge the owners and creators of online and offline material</p> <p>Understand the consequences resulting from unethical practices associated with Internet use.</p>	<p>Identify other ways of representing algorithms</p> <p>Explore the use of truth tables in algorithm development</p> <p>Interpret and test algorithms for correctness</p> <p>Apply appropriate problem solving techniques to solve a problem</p>	<p>Make the connections between algorithms and programming languages</p> <p>Demonstrate their understanding of analysing a computer-related program</p> <p>Apply computational thinking to the development of solutions</p> <p>Apply graphical programming languages to arrive at solutions to problems</p>

## ***Unit 1: Health and Safety***

### **Range and Content**

#### **Student will learn:**

- Health and safety skills that will aid the proper use of the computer lab and electronic devices (Adequate lighting in the work environments, place cables out of walkway, ensure, report any smell of smoke, fire, or burning, broken cables or furniture or malfunction computer systems, do not eat or drink in the computer laboratory, practise proper seating and typing posture, proper disposal of carcinogenic materials such as printer toners.)
- Diagnose and resolve basic hardware and software problems (continuous beeping sound from the keyboard, monitor not powering)
- The proper care and maintenance of computer lab and electronic devices (Update anti-virus software, change printer toner, check proper connection of keyboard and mouse cables, ensure all devices and accessories are accounted for after use)

### **About this unit**

This unit will equip students with the requisite skills needed for safe use of the computer laboratory and/or operating electronic devices. It will allow students the opportunity to identify and resolve hardware and software problems as well as caring for and maintaining computer laboratory and electronic devices.

### **Guidance to Teachers**

The aim of the curriculum is to encourage learning that will stimulate innovation, discovery, exploration, analysis and problem solving. Hence, teachers are expected to create opportunities where students will use the knowledge and troubleshooting skills acquired to solve everyday computer hardware related problems. For example, stack printer tray with less paper than the print job requires and allow students to identify and resolve the problem they encountered. Teachers should foster a culture in the classroom where students are encouraged to care and maintain computer lab and electronic devices.

**UNITS OF WORK GRADE 9 TERM 1(14weeks)**

**Prior Learning**

Check that students:

- Have knowledge and understanding of health and safety practices
- Have knowledge of ergonomics
- Have knowledge of hardware components and their functions.

<b>Unit 1: Health and Safety (3 weeks)</b>	
<b>Attainment Target(s):</b>  Students understand the impact of the use of computer systems on the environment.  Students demonstrate health and safety practices while operating the computer system or handling parts thereof.	<b>Objectives:</b> <b>Students will:</b> <ul style="list-style-type: none"><li>• Investigate and resolve basic computer hardware problems</li><li>• Explain how the Government Agencies responsible for Health and Safety Acts carries out its mandate in relation to ICT/IT industry</li><li>• Discuss the impact of the use of computers on health, safety and the environment</li><li>• Revises judgments and changes behaviour in light of health and safety practices when using computer system</li></ul>

Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p>Students will:</p> <p>Work in pairs to investigate various scenarios related to input, output or storage devices to identify problems and determine possible solutions For example <i>“Jack tried to save a file from his computer onto his thumb drive but he is not seeing the thumb drive icon on his computer.”</i></p> <p>In groups, use a checklist to identify and determine the source of the problems with peripheral devices and resolve the issues.</p> <p>Through guided discussion, review the National Health and Safety Act for the ICT industry. Identify the Government Agency responsible and analyze selected components of the Act. Present findings on the mandate of the Agency</p> <p>Conduct a guided research on Green Computing and produce a flyer /song /poem/multi-media presentation explaining the concept of Green Computing and its advantages and disadvantages.</p> <p>Use a Web quest to explore the disposal of old or non-operational computer devices in a way that minimizes its negative impacts on the environment and present findings.</p>	<p>Collaborate with others to identify and solve problem(s)</p> <p>Troubleshoot to solve problems.</p> <p>Review literature</p> <p>Compile findings from research and communicate information.</p> <p>Research and investigate.</p>	<p>Computer hardware problems are properly investigated and reasonable solutions suggested.</p> <p>Problems correctly identified and solved.</p> <p>Presentation satisfactorily captures the mandate of the Government Agency</p> <p>Flyer /song /poem/multi-media presentation reasonably communicate the advantages and disadvantages of green computing.</p> <p>Presentation depicts environmentally friendly ways of disposing of old or non-operational computer</p>
<p><b>Learning Outcomes</b> Students will be able to:</p> <ul style="list-style-type: none"> <li>✓ Practice proper care and maintenance of computer equipment</li> <li>✓ Correct simple hardware malfunctions</li> <li>✓ Recognize health hazards in work environment and practice safety when using computer equipment</li> <li>✓ Apply aspects of the Health and Safety Act for ICT to guide practices in their work environment.</li> </ul>		

<b>Points to Note</b>	<b>Extended Learning</b>
<p>Teachers must refer to Guidance notes at the beginning of this Unit.</p> <p>Teachers must also ensure that extreme care is taken when students are involved in troubleshooting that involves plugging in/unplugging electrical equipment.</p>	<p>Students will act as Computer laboratory assistants and help other students who experience computer malfunctions in the computer lab. Students will be scheduled for community service, to act as Lab Assistants. They will assist students in grades 7 and 8 in resolving basic trouble shooting needs.</p>
<p><b>Resources</b></p> <p>Computers  Internet access  Multimedia presentation kit  Hardware troubleshooting checklist  Personal computers and other devices to be used for troubleshooting and software installation  Videos  Resource books/CDs  World Wide Web</p>	<p><b>Key vocabulary</b></p> <p>backup, restore, hardware, printer, monitor, system unit, keyboard, speaker, install, reinstall, setup, software, troubleshoot, power outlet, carcinogenic, OSHA.</p>
<p><b>Links to other subjects</b></p> <p>Link with Language Arts in Grade 7 Attainment Target 1 “Speaking and Listening” and Target 2 “Reading”</p> <p>Link with Technical Vocational Education in Grade 9 Attainment Target 2 “Explore Methods and Procedures” and Attainment Target 3 “Apply Solutions”</p> <p>Link with Physical Education in Grade 9 Attainment Target 3 “Health, Safety and wellbeing”</p>	

## ***Unit 2: Foundations of Hardware and Software***

### **Range and Content**

#### **Student will learn:**

- The concepts and skills associated with file management. For example, conventions for naming files correctly; storing a file to both online and offline storage technology, based on purpose/use of file e.g. archiving, backup, current working; locating a file by specifying its directory path and using the file manager of the operating system
- The purpose of drivers in the functional operation of the hardware
- To use a database management system in the effective storing, retrieval, questioning and presentation of data.

### **About this Unit**

As the world is becoming increasingly digital, vast amount of information are thrust on computer users. How people find, gather, sort, retrieve and present data is becoming increasingly important to determining data quality. This unit will prepare students with the requisite knowledge and skills to effectively manage data and files stored on a computer's storage. It also seeks to expose students to the way in which numerical data are represented using number systems and the importance of drivers (software) in the functional operation of computer hardware.

### **Guidance to Teachers**

Teachers should insist that students employ the proper file management techniques in managing their personal files. Teachers should create opportunities for students to appreciate the role of a driver (software) in the functional operation of a hardware component. For example, installation software for printer and scanner). Teachers should create awareness for the need of a database to store data effectively and a database management tool to manage such data.



**UNITS OF WORK GRADE 9 TERM 1(14 weeks)**

**Prior Learning**

Check that students:

- Have basic knowledge of hardware and software functions
- Possess competency in Word Processing and Presentation software
- Can satisfactorily perform basic Spreadsheet tasks
- Have knowledge of primary storage and data processing

<p><b>Unit 2: Foundations of Hardware and Software (11 weeks)</b></p>	
<p><b>Attainment Target(s):</b></p> <p>Students understands the purpose of hardware devices and software productivity tools in computer systems</p> <p>Students demonstrate competency in the use of computer hardware devices.</p> <p>Students demonstrate competency in the use of computer software productivity tools.</p>	<p><b>Objectives:</b></p> <ul style="list-style-type: none"><li>• Define the terms 'file' and 'file management'</li><li>• Categorize files based on their file extensions</li><li>• Solve the path to a file, with the tree directory structure</li><li>• Perform file management related tasks in a directory folder</li><li>• Discuss the role of drivers in device management</li><li>• Explain and justify the need for database management systems</li><li>• Compare and contrast electronic databases and manual databases</li><li>• Design and populate a database table</li><li>• Create simple queries and reports from single tables</li><li>• Apply the concepts of importing and exporting database objects to a word processor or spreadsheet</li><li>• Perform mail merge using a spreadsheet or database table as the source</li><li>• Perform simple binary operations such as addition and subtraction</li></ul>

Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p><b>Students will:</b></p> <p>Brainstorm to arrive at definitions for the terms ‘file’, ‘file management’, and ‘file extension’</p> <p>Using the Graphical User Interface (GUI) of an operating system, categorize files into folders (according to their purpose).</p> <p>Classify files into applications based on the file extensions.</p> <p>Be given some binary numbers to carry out addition and subtraction</p> <p>Discuss how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits</p> <p>Discuss scenarios illustrating classification structures and explain how this is similar to file management for example: Mr. Drummond the new IT teacher at the school has been asked to identify his position on the school’s organizational chart.</p> <p>Students are visiting a zoo/farm. A classmate needs directions to visit the parrot named Sue.</p> <p>Use the file explorer utility on their computers to navigate to a file on a storage medium and draw a diagram to illustrate the structure.</p> <p>Use the Graphical User Interface (GUI) of an operating system to create, delete, rename, and move folders and files.</p> <p>Use a command driven interface to explore the directory structure, as well as create, delete, rename and move folders and files.</p>	<p>Discuss and share ideas</p> <p>Categorize files into folders</p> <p>Classify application files</p> <p>Compute numbers</p> <p>Discuss and share information</p> <p>Discuss, analyze and share information</p> <p>Draw directory structure</p> <p>Create, delete, rename and move folders and files.</p> <p>Interpret data and information</p>	<p>Accurately defined terms</p> <p>Binary numbers accurately computed</p> <p>Files are correctly classified into applications based on file extensions</p> <p>Diagram accurately depicts path to a stored file</p> <p>Correctly create, rename, delete, and move specified files and folders using GUI</p> <p>Correctly create, rename, delete, and move specified files and folders using command line</p> <p>Tree directory structure accurately outlined file path</p>

<p>Using the tree directory structure, outline the path to a specific file</p> <p>Practice classifying files and storing them in appropriate folders.</p> <p>Conduct online/offline research to determine the meaning of the term 'device driver'.</p> <p>Install a new device and observe the process especially where the system indicates that it is installing the device driver.</p> <p>Conduct an online/offline research to arrive at appropriate definitions of the terms data, database, Data Base Management System (DBMS), table/file, field, record primary key, foreign key and relationships</p> <p>Create a table to store personal information on five members of their class for example their Student_ID, Last_name, First_name and Phone_number. Use the data in the table to examine and describe the elements of a database (field, record and table).</p> <p>Create another table to store information about favourite songs for the same five members for example Student_ID, Title, Artiste, Album and Genre. Use the data in the tables to examine and describe the elements of a database (field, record, table, database, DBMS, primary key, foreign key, relationship).</p> <p>Arrange the elements of a database in the appropriate hierarchy.</p> <p>Create an appropriate concept map to demonstrate their understanding of the relationship among the terms.</p> <p>Through discussion</p> <ul style="list-style-type: none"> <li>● identify situations in their environment where databases are presently used</li> <li>● compare an electronic database with a manual database system to identify advantages and disadvantages</li> <li>● describe situations in their environment where a DBMS would be more suitable</li> </ul> <p>Create a database file using a DBMS program. Interact with the database window and identify database objects (Tables, Forms,</p>	<p>Classify files</p> <p>Research information</p> <p>Install device</p> <p>Research for information</p> <p>Identify elements of a database</p> <p>Recognize and establish relationship among tables</p> <p>Use knowledge to construct new information Evaluate and analyse information and demonstrate understanding</p> <p>Use knowledge to identify databases</p> <p>Compare to identify advantages and advantages Use knowledge to make decisions</p> <p>Create a database using</p>	<p>The device is operational after it is installed within the computer system</p> <p>Accurately defined terms</p> <p>Concept map accurately illustrated relationship among DBMS terms.</p> <p>Reasonable advantages and disadvantages of electronic databases highlighted</p> <p>Correctly created database</p> <p>Tables use appropriate -field names -data types -basic field properties (field size,</p>
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<p>Queries and Reports).</p> <p>Create tables using design view: appropriately name fields, select data types and apply basic field properties (field size, format).</p> <p>Select and set an appropriate field as the primary key in a table.</p> <p>Establish relationship between tables using primary and foreign keys.</p> <p>Use the wizard feature to create a database form. Enter, delete and modify records in a table using the datasheet view and the form.</p> <p>Perform simple select queries using query design.</p> <ul style="list-style-type: none"> <li>(a) single table</li> <li>(b) multiple tables</li> <li>(c) single criterion</li> <li>(d) multiple criteria</li> </ul> <p>Using the wizard, create simple reports based on:</p> <ul style="list-style-type: none"> <li>(a) Single table</li> <li>(b) Multiple tables</li> </ul> <p>Revise productivity tools concepts previously learnt by:</p> <ul style="list-style-type: none"> <li>● completing a simple word processing document using selected formatting features e.g. bold, italics</li> <li>● completing a simple spreadsheet using basic functions and formulae</li> </ul> <p>Import completed spreadsheet to create a database table.</p> <p>Create queries and generate reports from the new table.</p> <p>Export queries from the database to a spreadsheet and use it to create graphs/charts.</p> <p>Export graphs/charts to a word processing document.</p> <p>Export database report to the created word processing document.</p> <p>Perform a mail merge operation using word processing, database and spreadsheet documents.</p>	<p>application software</p> <p>Create tables using design view</p> <p>Select primary key</p> <p>Select foreign key</p> <p>Use database wizard</p> <p>Create queries</p> <p>Generate reports using wizard</p> <p>Recall concepts</p> <p>Integrate spreadsheet and database</p> <p>Integrate spreadsheet and word processing</p> <p>Integrate spreadsheet, database and word processing</p>	<p>format)</p> <p>Relationships correctly established between primary and foreign keys</p> <p>Data extracted correctly based on specified criteria</p> <p>Reports accurately generated and information appropriately presented</p> <p>Word processing document and spreadsheet conforms to specifications</p> <p>Imports and exports are done successfully</p> <p>Document successfully merged to create multiple individualized copies</p>
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<p>Add completed work to their electronic Information Technology portfolio</p>		
<p><b>Learning Outcomes</b> Students will be able to:</p> <ul style="list-style-type: none"> <li>● Use the operating system’s features to manage the storage of files</li> <li>● Demonstrate how data are manipulated in a computer system</li> <li>● Produce and populate an electronic database</li> <li>● Questions database using simple queries</li> <li>● Generate reports from a database</li> <li>● Transfer data among multiple programs in an integrated software package</li> <li>● Manipulate a word-processor to create mass mailings</li> </ul>		

<b>Points to Note</b>	<b>Extended Learning</b>
<p>Teachers need to be aware of the possibility for confusion when students depict files and folders in the drawing of a file structure and ensure that students do not show files having ‘sub-files’</p> <p>In cases where software installation is required the teacher or technician must supervise this activity.</p> <p>Teachers should feel free to incorporate new storage units which may have come into popular use since the publication of this document.</p> <p>This unit requires that the students create simple forms, queries and reports involving one table only. Teachers and students can explore the use of an open-source software to use in this unit.</p> <p>The creation of tables and queries should be done using design view. Forms and Reports should be done using wizards.</p> <p>Teacher must revise word processing and spreadsheet with students before starting the integration activities.</p> <p>Examples of databases should relate to/ target students’ life experiences.</p>	<p>Students can use their DBMS skills to manage the data for inter-house competitions, clubs and societies at school</p> <p>Students can collaborate to design and create a simulated information system, incorporating Database, Spreadsheet and Word Processing (mini SBA project)</p>

<p>Teachers should explain to students that DBMS are best used in situations where there is a large amount of data to be processed and efficiency in manipulating these data is one of the main focus. Students may not appreciate this benefit since in their practical activities, they are only interacting with a few records of data. Teachers should provide opportunities for students to realize this benefit.</p>	
<p><b>Resources</b>  Personal computers  Internet access  Multimedia presentation kit  Hardware troubleshooting checklist  Out of use but operational personal computers and other devices to be used for software installation  Integrated productivity tools software package including a DBMS - free software (from the Internet) can be used  Binary worksheet  Videos  Resource books/CDs</p>	<p><b>Key vocabulary</b>  file, file management, file extension, path, folder, tree directory, device, device driver, denary, base 10, base 2, database, database management system, table, field, database file, data type, record, primary key, form, query, report, spreadsheet, document, database report, database query, import, export, integrated, software, primary document, data source, mail merge, merge field, secondary document, digital portfolio</p>
<p><b>Links to other subjects</b>  Link with Language Arts in Grade 7 Attainment Target 1 “Speaking and Listening” and Target 2 “Reading”  Link with Mathematics in Grade 7 Attainment Target 4 “Interpret, model and solve problems involving unknown quantities”  Link with Mathematics Grade 8 Attainment Target 1 “Number operation and Application”  Link with Technical Vocational Education in Grade 9 Attainment Target 2 “Explore Methods and Procedures”</p>	

**GRADE 9**

**UNITS**

**TERM 2**

## **Unit 3: Data Communication, Networking and the Internet**

### **Range and Content**

Students will learn:

- Recommending and justifying appropriate communication devices and communication software, for use in computer networks that are prominent in today's society (aspects of society should examine include governance, commerce, research, education, essential services, and medicine). Communication devices should include wired and wireless media, while communication software should include applications for IRC, email, Internet telephony, pod-casting, blogging, and file transfer.
- Services offered on the Internet, and how these services are accessed, while understanding where in society the Internet services are best applicable. Discussion of how the services are accessed should include Web address: protocol, domain, path (absolute and/or relative), and web resource; explanation of how a web page is accessed should include open web browser, reference DNS, translate IP address, directed to web page. Services of the Internet should include email, chat rooms/IRC, FTP, VoIP, newsgroups, message board, and instant messaging. Types of websites to be discussed should include educational, personal, wiki, portals, blogs, social networking, news, informational, and business/marketing.
- Methods for securing computer networks from trending computer threats. Aspects of computer threats should examine eavesdropping, industrial espionage, spam, identify theft, credit card fraud, botnet, denial of service, phishing, pharming, malware (logic bomb, virus, worm, Trojan, spyware, and key logger). Methods of securing computer networks should examine firewall, turnkey solutions, anti-virus, anti-spyware, network monitors, training employees, following policies (standard operating procedures), security guards, locks, surveillance camera, motion detector, keypad, biometric systems, username and password, and encryption.

### **About the Unit**

Due to the need to interact and exchange information on computer networks, students ought to be aware of the ways in which their exchange/interactions may be achieved, compromised, and protected. Learning this unit will be beneficial to the student by advancing their understanding of communication technologies and their uses. Additionally, this unit will develop an appreciation within the student for the uses of communication devices and related software for effective data communication. Also, teaching this unit is expected to deepen the students understanding of the services offered on the Internet today, while demonstrating the steps to accessing the services.

### **Guidance to Teacher**

As the Internet has become a main source of information, it is critical that students use advanced search criteria to both refine web searches and find credible information. Hence, teachers should guide students to using the search techniques and strategies with at least five trending search engines. Teachers should provide students with tasks/topics and assist students to set criteria for refining their search. Teacher should also assist the students to investigate computer networks in today's society, based on its: geographical span, inter-connectivity, and administration (intranet or extranet), so as to recommend apt computer network architecture and communication software. Additionally, teachers should emphasize that all security threats are intentional, while creating an awareness of the categories within which security threats occur.



## UNITS OF WORK GRADE 9 TERM 2

### **Prior Learning**

Check that students:

- Possess basic Internet, mouse, and keyboarding skills
- Understand terms: protocol, computer network, URL, web browser, domain, communication device, Internet, address, web page, Internet Service Provider, communication software, and transmission media
- Know, and are able to recognize, concepts related to threats and security of property
- Are aware of tasks that are performed in various institutions in society e.g. government agencies

<b>Unit 3: Data Communication, Networking and the Internet (6 weeks)</b>	
<b>Attainment Target(s):</b>  Student understand the applications of communication technologies in everyday life  Student appreciate using advance search criteria to refine an Internet search  Student know and use appropriate security measures to protect or mitigate the effects of a threat upon a computer network	<b>Objectives:</b> <ul style="list-style-type: none"><li>• Identify at least five communication devices used with computer networks today's society</li><li>• Describe correctly at least three communication software that are used in computer networks</li><li>• Compare at least four uses of communication technologies in different types of computer networks</li><li>• Propose a modification to an existing computer network, for future expansion</li><li>• Describe the purpose of each component within a web address</li><li>• Explain how a web browser retrieves a desired web page</li><li>• Identify some characteristics of at least five distinct types of web sites</li><li>• Justify the use of two or more Internet services in an organization's department</li><li>• Describe accurately at least six threats to a computer network</li><li>• Identify correctly whether a computer network threat has compromised the availability, integrity, or confidentiality of a company's resources and services</li><li>• Determine appropriately which security measure(s) is applicable for a given situation</li><li>• Cite whether a computer network security measures is either physical or logical</li></ul>

Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p><b>Students will:</b></p> <p>Observe two or more departments within organizations of today's society. <i>Such observations should gather data on how the departments use the communication device and/or software to accomplish their tasks.</i></p> <p>Create a properly labelled diagram of an organization's computer network (physical layout). <i>By using a legend, such diagrams must detail the type of communication devices and the locations at which they are used within the computer network.</i></p> <p>Work in groups to conduct guided research/WebQuest which determine the technologies that are used in organizations. <i>Ensure that each group studies a distinct organization, whereby focusing on what/how/why/where/when communication devices or software are used in its computer network.</i></p> <p>Conduct explorations of computer networks for organizations, so as to determine the administration that is being used (intranet and/or extranets).</p> <p>In groups to learn the purpose of each component of a URL. <i>Group experts will then return to their original groups to share what they have learnt.</i></p> <ol style="list-style-type: none"> <li>1. Examine a tutorial which details the steps/procedures of how a web browser accesses a web page. <i>Prepare a brochure or a poster which depicts the steps/procedures.</i></li> </ol> <p>Participate in a guided discovery activity, so as to determine the primary traits of each type of web site. <i>Prepare a check list of web site traits, as well as a list of web site to examine and find the given traits.</i></p> <p>Prepare a videocast which educates participants about using at least six services of the Internet.</p>	<p>Research to gather data</p> <p>Classify similar characteristics</p> <p>Draw to show components</p> <p>Read diagram to establish relationships</p> <p>Infer to deduce trend</p> <p>Discuss to share awareness</p> <p>Explore to attain a goal</p> <p>Follow directions to a goal</p> <p>Collaborate to problem-solve</p> <p>Explain facts</p> <p>Prepare a report</p> <p>Use steps to solve tasks</p> <p>Follow directions to a goal</p> <p>Identify specific traits</p> <p>Present to share facts</p>	<p>Presentation accurately shows and explains how communication technologies are used in distinct organizations</p> <p>Diagram correctly matches communication software with tasks performed within departments</p> <p>Research/WebQuest satisfactorily depicts technologies that are used in organizations</p> <p>Communication devices for an organization's computer network are satisfactorily justified</p> <p>Presentation accurately describes the purpose of each URL component.</p> <p>Brochure or posture indicates correctly whether a result for a step in retrieving a web page is true or false</p> <p>Check list of web site correctly matches corresponding traits</p> <p>Videocast satisfactorily informs on services on the Internet</p>

<p>Listen and discuss presentations or reports on companies that have had experiences with threats to their computer network. Then create a cross word puzzle highlighting words that provides adequate description of</p> <p>Examine case studies about computer networks for organization that have been attacked and share/report their findings and suggest suitable security measures for implementation.</p> <p>Demonstrate, by use of role play, how at least six distinct computer network threats affect organizations today.</p> <p>Create a storyboard which depicts the application of both logical and physical security measures to a computer network for an organization.</p> <p>Work in groups to create a wiki page related to concepts learnt about computer network threats. <i>Ensure students are guided to describe the computer network threat, as well as recommend apt solutions.</i></p>	<p>Analyse to derive conclusion</p> <p>Identify cause and effect</p> <p>Establish coherent patterns</p> <p>Synthesize information</p> <p>Reproduce a practice/idea</p> <p>Collaborate to meet goals</p> <p>Formulate original problem</p> <p>Arrange steps to meet goals</p> <p>Recommend solutions</p> <p>Apply information</p>	<p>Crossword puzzle successfully captures word clues that provides adequate description of computer network threat for students</p> <p>Report accurately describes a computer network threat and satisfactorily suggests security measures to mitigate against threats</p> <p>Storyboard accurately depicts logical and physical security measures</p> <p>Wiki page correctly captures information on computer network threats</p>
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<p><b>Learning Outcomes</b></p> <p>Students will be able to:</p> <ul style="list-style-type: none"> <li>✓ Describe prominent communication devices which are used in computer networks</li> <li>✓ Explain the importance of communication devices and communication software for organizations</li> <li>✓ Identify prominent computer network threats</li> <li>✓ Justify an appropriate security measure for an identified computer network threat</li> <li>✓ Use search operators to locate information</li> <li>✓ Perform the steps for conducting an advanced search</li> </ul>		
<p><b>Points to Note</b></p>	<p><b>Extended Learning</b></p>	
<p>Teachers must refer to Guidance notes at the beginning of this Unit.</p> <p>Teacher must guide students to construct properly an observation instrument which will be used to identify communication devices and communication software. Teacher must ensure that students make notes and/or capture video footage or photographs throughout the excursion.</p> <p>Teacher must peruse videos to be seen by students, ensuring to show content that is relevant to the lesson. Teacher must be aware of physical and logical means of protecting computer networks.</p> <p>Teachers must conduct a site visit prior to carrying students on excursion, so as to ensure that the organization has observable computer network devices and software. Teachers must seek permission to create recordings of field trip observation.</p> <p>Teachers must be aware of the varied computer network threats that exist, and appropriate computer security measures to address them.</p> <p><i>Allow students to document their observations and then apply and note the steps so as to verify their findings with popular web browsers.</i></p>	<p>Students interview their parents or a family friend to ascertain how they use technology at work.</p> <p>Students can investigate and report on what type of network configurations are in effect in their school</p> <p>Students create a portfolio tracking several types of web sites that are prominent, while comparing and contrasting those of the same type.</p> <p>Students can either stage a symposium, Technology Day, create flyers, brochures, and/or banners to promote awareness of computer network security threats and measures to combat these threats.</p>	

<p><b>Resources</b></p> <ul style="list-style-type: none"> <li>Personal computers</li> <li>Internet access</li> <li>Set of links for WebQuests</li> <li>Multimedia presentation kit</li> <li>Website Reliability checklist</li> <li>Videos</li> <li>Video recording equipment/ cameras</li> <li>Video editing software</li> <li>Resource books/CDs</li> </ul>	<p><b>Key vocabulary</b></p> <p>computer network; availability, confidentiality, and data integrity, with respect to services and resources on a network; Internet, intranet, and extranet; computer network threat: virus, key loggers, phishing, pharming, spam; computer network security: locks, grills, password, firewall, biometric security, surveillance camera; hacking; physical protection and logical protection; search criteria: last date used, file format, region, language, usage rights; search engine.</p>
<p><b>Links to other subjects</b></p> <p>Link with Language Arts in Grade 9 Attainment Target 1 “Speaking and Listening” and Target 2 “Reading”</p> <p>Link with Social Studies in Grade 9 Attainment Target 2 “Develop understanding of the interdependent relationship between man and his environment”</p>	

## **Unit 4: Computer Ethics and Research**

### **Range and Content**

Students will learn:

- Technical terms: ‘cyber stalking’, ‘trolling’, ‘cyber bullying’, sexting, software piracy
- How to use American Psychological Association (APA) and Modern Language Association (MLA) referencing styles to cite media (text, graphics, video, audio among others)
- Understand the importance of appropriately citing references using the above-mentioned styles.
- The ethics of posting personal and sensitive information online is to be thoroughly discussed. Understand the legal consequences of unethical behaviours( such as software piracy, cyber bullying, ‘cyber stalking’)
- Understand the psychological consequences of unethical behaviours on the victims
- Techniques and strategies associated with searching for multiple content on the Internet (searching for text, document, images, sound, and video; using operators in the search box e.g. +, @, #, !, \*, ·, ·, site, link, OR; narrowing search results by: language, region, last update, exact phrase/word, and a specific range).

### **About the Unit**

The 21<sup>st</sup> century learner and students by default are members of the digital society and as digital citizens are called upon to be digitally literate. Students must understand how to participate in this digital society effectively and appropriately; therefore they must be made aware of unethical behaviours in this new society and the social, legal and psychological consequences. This unit will provide students with an awareness of the various unethical behaviours, how to cite online and offline media sources. This unit will further develop students understanding of the importance of evaluating information accessed online or offline. It is hoped that through rich discussions it will highlight, improve and reinforce students’ understanding and appreciation of the importance of not posting personal information online and to understand the consequences related to same.

### **Guidance to Teacher**

This is a unit that spans several subject areas and efforts should be made to make relevant and important links. Violations of intellectual property rights and all legal consequences should be reinforced. Representatives from relevant authorities in Jamaica should be invited in to make presentations to students. Where possible teachers should create case studies to ensure that students benefit from this unit as this is applicable throughout life.

**UNITS OF WORK GRADE 9 TERM 2 (11 weeks)**

**Prior Learning**

Check that students:

- Possess basic mouse, and keyboarding skills
- Possess Internet research skills
- Recognize the difference between morally accepted and unethical behaviours

<p><b>Unit 4: Computer Ethics and Research (2 weeks)</b></p>	
<p><b>Attainment Target(s):</b></p> <p>Student understands the ramifications of unethical behaviours online</p> <p>Student demonstrates a responsible, moral and ethical approach to using information and suitable resources on the Internet</p> <p>Students appreciate using advance search criteria to refine an Internet search</p>	<p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>• Define terms related to unethical behaviours such as ‘trolling’, ‘cyber bullying’ " cyber stalking”, and software piracy</li> <li>• Describe the possible results of unethical practices using online resources</li> <li>• Appropriately present information sourced from offline( such as CDs) and online( such as text, graphics, video, audio among others) resources</li> <li>• Restate a search text/phrase, for an efficient search on the Internet</li> <li>• Construct accurately a search text with two or more operators to refine the search result</li> <li>• Specify correctly two or more search criterions for narrowing a search result</li> </ul>

<b>Suggested Teaching and Learning Activities</b>	<b>Key Skills</b>	<b>Assessment Criteria</b>
<p>Students will:</p> <p>View a video of recent acts of unethical behaviour online and then place students in group to discuss the issues from the video. In groups, conduct a guided online research on ethical and unethical behaviours terminologies (Bystander, Upstander, Escalate, De-escalate, Target, Offender, Trolling, Cyber-bullying, cyber-stalking) and distinguish ethical or unethical behaviour and present findings for class discussions</p>	<p>Discuss to share awareness on information presented</p> <p>Research to gather data</p>	<p>Presentation accurately distinguishes between ethical and unethical behaviours</p>

<p>OR</p> <p>Be presented with a case or scenario illustrating/outlining unethical practices and engage in discussion of the case or scenario to highlight ethical and unethical behaviours. For example: Mary shares her password with her best friend who is not a member of the School's computer club for which a laboratory fee is charged. The password allows access to the school's computer. Her best friend uses six hours of computer time in a time-sharing environment.</p> <p>Play a 'Grab Bag game' – definitions (ethical and unethical terms) are placed in the bag and pull a definition at random and give the technical term for each definition pulled.</p> <p>Prepare and conduct a debate on the pros and cons of Software Piracy</p> <p>Work in groups to create a short documentary (movie) about the impact of Software piracy on society</p> <p>Conduct a guided online research on intellectual property rights terminologies (such as copyright, plagiarism). Interview representatives from the Jamaica Intellectual Property Office (JIPO) or any other relevant organization or visit their website to become more aware of intellectual property rights and the consequences of violating these rights and use image capturing device to record interviews and playback for class discussions.</p> <p>Write or email a letter to the editor after examining the various violations of intellectual property rights that they are aware of in their communities and in Jamaica</p> <p>Use various oral presentation styles such as dub poetry and songs to demonstrate their awareness of intellectual property rights.</p> <p>In groups, research the American Psychological Association (APA) and Modern Language Association (MLA) methods of presenting references, discuss their findings and decide which is more applicable in various scenarios.</p> <p>Practice presenting researched data using the appropriately chosen referencing</p>	<p>Identify correct terms</p> <p>Debate moot</p> <p>Collaborate to create movie</p> <p>Conduct research and interviews and present information</p> <p>Compose email or letters and share ideas</p> <p>Creatively present information</p> <p>Collaborate in groups to research</p>	<p>Debate satisfactorily examined the issue of Software Piracy</p> <p>Short documentary (movie) satisfactorily depicts impact of software piracy on Society</p> <p>Discussion indicates intellectual property rights and the consequences of violating these rights</p> <p>Letter accurately captures examples of intellectual property violations</p> <p>Discussion shows knowledge of APA and MLA and which is more applicable in various scenarios</p> <p>Researched data accurately referenced</p>
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<p>scheme (MLA or APA). For example: conduct and present research on a new and emerging technology using at least three appropriately referenced media (text, graphics, video, audio among others) sources.</p> <p>Determine context relevance and locate the possible results for a given search text that uses two or more search operators. Investigate search results by changing the search operators of their given search text.</p> <p>Apply two or more criteria to narrow search results for scholarly topics.</p>	<p>and present information</p> <p>Research and present information</p> <p>Investigate to inspect change Surmise possible outcomes</p>	<p>Sources accurately referenced in research reports</p>
<p><b>Learning Outcomes</b> Students will be able to:</p> <ul style="list-style-type: none"> <li>● Reflect on the factors that intensify online cruelty ( such as cyber bullying)</li> <li>● Identify what ‘targets’ and ‘upstanders’ can do when online cruelty occurs</li> <li>● Recognize their own role in escalating or de-escalating online cruelty</li> <li>● Understand why it is important to respect intellectual property rights.</li> <li>● Create appropriate references</li> <li>● Make ethical choices in their use of Internet resources</li> </ul>		
<p><b>Points to Note</b></p>	<p><b>Extended Learning</b></p>	
<p>Teachers must refer to Guidance notes at the beginning of this Unit.</p> <p>Teachers must be aware of intellectual property rights.</p> <p>Teachers must be aware of legislation governing IT practices</p> <p>Teachers must be aware of legislation governing unethical practices</p> <p>Teachers must demonstrate /model ethical practices when working online and in the computer lab</p>	<p>Students can conduct interviews with musicians and recording artistes to highlight the effects of violation of intellectual property rights on owners of copyrighted materials not cited.</p> <p>Students can keep a paper journal or a blog that recounts their encounters with situations that require them to make a moral choice in their use of computing resources and how they deal with the challenges</p> <p>Students can create a short documentary(movie) ,flyers, brochures, to promote awareness of "cyber bullying"</p> <p>Students can develop an anonymous school survey on incidents of cyber bullying (including how often students have acted as upstanders, by bystanders, and offenders).</p>	

<p><b>Resources</b></p> <p>Personal computers  Internet access  Set of links for WebQuests  Multimedia presentation kit  Website Reliability checklist  Videos  Video recording equipment/ cameras  Video editing software  Resource books/CDs</p>	<p><b>Key vocabulary</b></p> <p>Software piracy, counterfeiting, soft-lifting, hard disk loading, peer-to-peer sharing, intellectual property, intellectual property rights, computer ethics, on-line cruelty, 'trolling', 'cyber bullying' " cyber stalking", sexting, Upstander, Escalate, De-escalate, Target, Offender, Bystander ,references, open-source software, freeware software, proprietary software, MLA, APA, licenses, site licence, shareware</p>
<p><b>Links to other subjects</b></p> <p>Link with Language Arts in Grade 9 Attainment Target 1 "Speaking and Listening" and Target 2 "Reading"</p> <p>Link with Civics in Grade 9 Attainment Target 3 "Demonstrate an awareness of individual and collective rights, their application and attendant responsibilities"</p> <p>Link with Religious Education in Grade 9 Attainment Target 2 "Learning from Religions"</p>	

## **Unit 5: Computing Careers**

### **Range and Content**

Students will learn:

- Descriptions of prominent and trending careers in Computer Science and Information Technology. Prominent computing careers should include game/application developer, system analyst, help desk specialist, software engineer, bio-informatician, web designer, database administrator, cryptographer, network administrator, IT trainer/manager, security administrator, computer forensic expert, repair technician, file librarian. Departments for studying the significance of IT professionals' responsibilities should include hotels, schools, banks, government agencies, insurance companies, airline industry, police station, custom and excise department, hospital, local businesses (realty investment, distributors, wholesale, farming).
- Benefits of obtaining post-secondary computing qualifications, as well as examine possible academic paths for becoming a professional in a computing field. Studying of benefit for obtaining computing qualifications should include: measuring a person's skill, increasing remuneration, professional growth and life-long learning, and becoming a credible source of information. Exploring possible paths for becoming a computing professional should include taking prescribed course(s) for study either at a technical and vocational training institution, college, and/or university.

### **About the Unit**

The field of computing has established Information Technology departments in most, if not all, sectors of society. As we educate our students, and bear this notion in mind, we aim to use this unit to make students aware of placements in Information Technology departments. This unit will then provide students with an awareness of the various career choices in Computer Science and Information Technology. Additionally, teaching this unit will aid in developing students understanding of the roles of personnel, their job functions, remuneration, and skills required in today's IT department. The student is expected to benefit from this unit by having an awareness of today's reputable institutions and commonly accepted certification, so as to obtain post-secondary training for skills in computing. The unit's relevance is established through a discovery of the computing professionals which are be required for achieving objectives in IT departments. Also, relevance is obtained through an examination of trends in the work environment, for the associated skills and qualifications required to effectively work within a desired field of computing.

### **Guidance to Teacher**

Due to the fact that there are careers which have become obsolete while others are developing, teachers should aim to be *au fait* with new and emerging careers in computing as well as the computing qualifications available locally. The teacher should guide students to understand and appreciate the importance of computing careers in today's society, through the use of interviews, panel discussions, and role plays, as strategies to highlight, improve and reinforce the said content. Teacher should guide students to discover the job descriptions of computing professionals, by examining the daily activities, responsibilities, skills requirements, salary and training required.

**Prior Learning**

Check that students can:

- Understand terms: career, salary, qualification, certification, professional body, college, university, training institution
- Know sectors and/or organizations in society where employment is trending: businesses, hotels, schools, and banks, among others
- Are aware of most Information Technology skills
- Know how to read and write a resume

**UNITS OF WORK GRADE 9 TERM 2 (11 weeks)**

<b>Unit 5: Computing Careers ( 3 weeks)</b>		
<p><b>Attainment Target(s):</b> Student understands the significance of Computer Science and Information Technology careers in today's society</p> <p>Student appreciates the course of studies to be undertaken, so as to have a career in the field of Information Technology and Computer Science</p> <p>Student derives a career plan for a profession in the field of computing</p>	<p><b>Objectives:</b></p> <p><b>Students will:</b></p> <ul style="list-style-type: none"> <li>• Identify accurately at least four IT skills needed for a non- IT job specialist</li> <li>• Describe accurately at least three job functions for new and emerging careers in Computer Science and Information Technology</li> <li>• Explain concisely four benefits from obtaining certification in computer related studies</li> <li>• State appropriately the salary range for a professional in the field of Computer Science and/or Information Technology</li> <li>• Give correctly three differences among two or more certifications in the field of computing</li> <li>• List correctly at least one required certification each, for at least five careers in the field of computing</li> <li>• Recommend correctly academic path options for obtaining IT professional qualification</li> <li>• Identify correctly relevant professionals that are needed for completing computing related projects in society</li> <li>• Design a resume for a profession in the field of Information Technology and/or Computer Science</li> </ul>	
<b>Suggested Teaching and Learning Activities</b>	<b>Key Skills</b>	<b>Assessment Criteria</b>
<p><b>Students will:</b> View videos to examine and report on the use of common/popular Information</p>	<p>Infer to draw conclusion</p>	<p>Report correctly states Information</p>

Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p>Technology tools by non-IT professionals/specialists in their environment.</p> <p>Participate in guided panel discussions with persons who are engaged in emerging computing careers. <i>Make notes or record discussions using image capturing devices of the findings from the panel discussions and present findings for class discussion.</i></p> <p>Use expressive forms such a drama/<i>poetry/painting</i> to explain the benefits of obtaining an IT certification for employers and employees.</p> <p>Conduct online/offline research to identify salary ranges based on certification and classification (novice, intermediate, expert) in Computer Science and Information Technology fields using credible sources and present findings in tables.</p> <p>Work in groups to produce a project, by conducting online/offline research on four or more institutions offering computing programmes so as to compare and contrast matriculation requirements, course duration, skills to be certified, and applicability of skills in society, among others.</p> <p>Produce an information booklet after reviewing the classified/career sections of local/regional/international newspapers, so as to note the various IT skills and certifications being requested for computing jobs today</p> <p>Identify groups and programs that are available to support students interested in pursuing career choices in computing fields.</p> <p>Host a mock symposium which details at least five (5) prominent computing professions, while highlighting the academic path for obtaining the relevant qualifications or design interview questions and conduct interviews with computing professionals, so as to identify the various computing qualifications and institutions attended.</p> <p>Create three or more distinct scenarios using storyboards, so as to depict required computing professionals for meeting objectives within an organization.</p>	<p>Convey to share facts</p> <p>Think critically to find relation</p> <p>Collaborate to present idea</p> <p>Identify to sort information</p> <p>Research to be informed</p> <p>Record to disseminate facts</p> <p>Investigate to find relations Document observations</p> <p>Investigate to be informed</p> <p>Communicate ideas</p> <p>Collaborate to meet goals</p>	<p>Technology tools for personnel in non-IT professions.</p> <p>Presentation on findings accurately captures information on emerging computing careers</p> <p>Expressive form accurately describes the benefits of obtaining computer related certification/qualification.</p> <p>Information in table accurately presents salary ranges based on and its certification and classification for a computing professional</p> <p>Project accurately provides information on computing programmes</p> <p>Information booklet correctly captures information on computing professions with its required certification Mock symposium/interview discussions indicates relevant information on pathways to achieving a career in computing</p> <p>Storyboard scenarios accurately depicts need for computing professionals</p> <p>Justification for selection is accurate</p>

Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p>Perform mock job interviews (interviewers and interviewee) utilising five or more online/offline sample resumes of computing professionals. Justify why one individual is selected over another.</p>	<p>Present to share awareness</p>	

<b>Learning Outcomes</b> Students will be able to: <ul style="list-style-type: none"> <li>● Describe emerging computing career options</li> <li>● Articulate the advantages of IT certifications</li> <li>● Tell the IT skills required for completing tasks within two or more organizational departments</li> <li>● Demonstrate writing a resume for a computing profession</li> </ul>	
<b>Points to Note</b>	<b>Extended Learning</b>
<p>Teachers must refer to Guidance notes at the beginning of this Unit.</p> <p>Teacher must keep abreast of new developments in computing, whereby being aware of the emerging IT careers.</p> <p>Teacher must guide students to construct properly an interview instrument which will be used to identify qualifications and career path.</p> <p>When discussing IT professions, teacher must indicate that when one instructors/educates others in a discipline that they are not a professional of that field. For example, a teacher of IT or CS is not an IT or CS professional.</p> <p>When students are conducting research on salaries encourage them to conduct searches using local and regional sources of information, such as local newspaper and career websites, among others.</p> <p>Encourage students to conduct searches for mentor programs and professional social network sites, among others when pursuing career choices in computing fields.</p> <p>Teacher must emphasize the need for computing professionals joining work unions/association and professional bodies for networking. Teacher must</p>	<p>Students will collaborate with each other and with the Guidance Department to set up a career booth highlighting ICT careers, certifications and benefits</p> <p>Conduct an interview with an industry personnel based on student's career</p>

<p>indicate prominent <i>computing</i> professional bodies, such as: JCS, ACM, IEEE Computer Society, AIS, and AWC among others.</p>	
<p><b>Resources</b>  Computers  Internet access  Multimedia presentation kit  Videos  Recent copies of newspapers  Resource persons (computing professionals)  Resource books/CDs</p>	<p><b>Key vocabulary</b>  file librarian, game/application developer, programmer, computer technician, system operator, computer engineer, system administrator, network engineer, software engineer, musical engineer, database administrator, cryptographer, system analyst, help desk specialist, bio-informatician, web designer, network administrator, IT trainer/manager, security administrator, computer forensic expert, repair technician, computing career, certification, degree, IT skill, post-secondary qualification</p>
<p><b>Links to other subjects</b>  Link with Language Arts in Grade 7 Attainment Target 1 “Speaking and Listening” and Target 2 “Reading”  Link with Technical Vocational Education in Grade 7 Attainment Target 4 :Career Awareness”  Link with Drama in Grade 7 Attainment Target 1 “Exploring and Creating” and Attainment Target 2 “Expressing and Enacting”  Link with Guidance in Grade 9</p>	

**GRADE 9**

**UNITS**

**TERM 3**



## **Unit 6: Web Authoring**

### ***Unit VI: Web Authoring Tools***

#### **Range and content**

Students will learn:

About Web Authoring Tools and explore how Web Authoring Tools has changed over the years. Examine the applications of Web authoring tools Terms related to web design such as storyboard, Hypertext Markup Language (HTML), HTML editor.

The various website creation processes will be explored. The following are the initial steps to take in preparing to design your web portfolio site.

1. **Consider the site's purpose.**
2. **Outline the homepage** this includes the key elements of your website. In the outline be sure to include at least these essential elements:
  - Content - Heading and subheadings
  - Navigation
  - Design elements/Graphics

Simple websites should be created initially and as the class progresses more complex websites should be developed

The Present and Future of Web Authoring Tools should also be highlighted.

#### **About the Unit**

This unit will provide students with an awareness of Web Authoring Tools. This unit will develop students appreciation of the Web Authoring Tools and the role it will play in the future. It is hoped that through the various teaching and learning strategies it will highlight, improve and reinforce students' understanding and appreciation of the importance of Web Authoring Tools.

#### **Guidance to Teacher**

Teachers should share with the students the relevance of Web Authoring Tools and how this can be applied in everyday life. There are various web authoring tools and students should be exposed to as much as is possible. HTML is the language that has historically been used to create documents on the web. It is plain text, but includes a variety of codes or "tags" that define the structure of the document, and allow documents to include headings, paragraphs, images, links, lists, tables, and other features. Explain to students that a storyboard is a visual plan for a website. Remember to display the html editor. Students are only required to create a **simple** website of approximately no more than 4 web pages.

**Prior Learning**

Check that students:

- Can competently manipulate hardware devices and interact with software application programs

<p><b>Unit 6: Web Authoring (5 weeks)</b></p>	
<p><b>Attainment Target(s):</b></p> <p>Students use digital media to design and develop multimedia products such as websites</p>	<p><b>Objectives:</b></p> <ul style="list-style-type: none"><li>• Define terms related to website design</li><li>• Analyze website to determine domain names</li><li>• Examine steps to be followed when creating webpages</li><li>• Understand the website development process</li><li>• Create a storyboard for a webpage</li><li>• Design a website using HTML syntax and tags</li><li>• Identify various web authoring tools</li><li>• Create a website using online or offline web authoring Software</li><li>• Analyze the design characteristics that makes a good website design</li><li>• Collaborate in group activities</li></ul>

Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p><b>Students will:</b></p> <p>Conduct online/offline research and create a glossary of terms relating to the World Wide Web (e.g. HTML, webpage, website, browser, hyperlinks, tag, domain name, etc.)</p> <p>Investigate websites with different domain names and create a poster explaining what they (domain names) are and what they represent.</p> <p>Discuss the factors to consider before designing a website and the steps in the website design process and list the characteristics of a good website design</p> <p>Use their web browser to view the source 'code' for their favourite web pages. With teachers assistance discusses source codes.</p> <p>Create a storyboard for a website containing at least three (3) pages.</p> <p>Use a simple editor program to set up the structure of a web page using the tags: <i>html</i>, <i>head</i>, <i>title</i> and <i>body</i>.</p> <p>Use additional HTML formatting tags to display text on their web page. Add images and links to actual web pages, to their web page.</p> <p>Open their web page using their favourite browser.</p> <p>Through a guided research discover ways of producing a website which does not involve directly writing HTML code (free website builders online or programs which run</p>	<p>Research and define information</p> <p>Research and create</p> <p>Discuss ideas</p> <p>Observe source codes</p> <p>Create storyboard</p> <p>Manipulate HTML tags</p> <p>Research for information</p>	<p>Glossary of terms accurately defines relevant terms</p> <p>Poster created correctly captures domain names.</p> <p>List accurately captures characteristics of a good website</p> <p>Storyboard created satisfactorily</p> <p>HTML tags used correctly to design Web pages</p> <p>Website created contains several pages and hyperlinks are correct and functional</p>

<p>offline).</p> <p>Use the web page design feature of a DTP/presentation software or a specialist web authoring software and/or a free website builder website on the Internet to create their website.</p> <p>Develop a website evaluation checklist to critique each other's web pages both in terms of style and content and use the list of characteristic of a good website design to reinforce claims and critique</p> <p>Add their products to their electronic Information Technology portfolio.</p>	<p>Create website</p> <p>Design</p> <p>website evaluation checklist</p>	<p>Website created satisfactorily using appropriate software</p> <p>Website evaluation checklist satisfactorily captures good website design</p>
<p><b>Learning Outcomes</b></p> <p>Students will be able to:</p> <ul style="list-style-type: none"> <li>● Construct basic web pages using basic HTML</li> <li>● Use a web authoring tool to create a website</li> </ul>		

<p><b>Points to Note</b></p>	<p><b>Extended Learning</b></p>
<p>Teachers must refer to Guidance notes at the beginning of this Unit.</p> <p>Teachers should carefully select the websites they want their students to view as not all web pages allow a full view of their HTML source.</p> <p>It is strongly recommended that teachers investigate the use of free software which can be used to create websites. Teachers may also choose to use a website that offers free website creation and hosting to Internet users.</p>	<p>Using web authoring tools, students will design and create a website for a co-curricular club/activity in which they are involved using two or more enhancements.</p>

<p><b>Resources</b></p> <p>Personal computers Internet access Source code editor Web authoring program online/offline Multimedia presentation kit Website evaluation check-sheet Resource books/ CDs Free HTML tutorials</p>	<p><b>Key vocabulary</b></p> <p>HTML, webpage, website, web authoring, hyperlinks, storyboard, web server, home page, navigation, domain name, index.html, audience, content, layout, structure, tag, tags: html, head, title, body, strong, a, img</p>
<p><b>Links to other subjects</b></p> <p>Link with Language Arts in Grade 9 Attainment Target 1 “Speaking and Listening” and Target 2 “Reading”</p> <p>Link with Visual Arts in Grade 9</p>	

## **Unit 7: Problem Solving**

### **Range and Content**

Students will learn:

- Develop Algorithm and use pseudocode and flowcharts to represent algorithms
- Recognise the uses of simple data types in solving problems (integer, real, character and Boolean)
- About sequencing, selection and iteration control structures
- Explore the different generations of programming languages
- Graphically represent given algorithms using Flow Charts.

### **About the Unit**

The purpose of this unit is to serve as an advanced phase to solution development which will develop the learner's computational thinking practices of using various algorithm types to problem solve. It emphasises the design of a solution, the algorithm which is essential in computer programming. Students should learn to solve problems analytically and logically and not just to write computer programs.

The students should be exposed to the different control structures.

Students should begin writing simple programs using available programming language software.

### **GUIDANCE FOR THE TEACHER**

Problem Solving is a skill needed to effectively develop computer programs and it is critical that students develop these skills. It is not expected that students should grasp everything about problem-solving and programming all at once. The desired outcome is that the students will go through the problem solving process by taking a problem, defining it, do a manual solution and then write down the instructions in their own words. Students are encouraged to refine their solutions and ultimately how to choose the best solution and code in a specific programming language.

The most of the time should be spent on practicing a wide range of programming problems. Students are to be exposed to problems with many programming features, such as, condition statements, loops etc. If students are to learn design algorithms effectively then there is to be deliberate and constant application of problem-solving principles. Logical thinking is required to solve problems. Through constant practice, it is hoped that the student will not find problem-solving/programming difficult. Finally, keep the problems simple. Students come with different aptitude for programming and those with a high aptitude should be encouraged in the field of programming, the others can apply problem-solving skills to any real-life problems.

**Prior Learning**

Check that students:

- Have knowledge and understanding of problem-solving process
- Possess basic flowcharting skills
- Understand the concept of control structure

<p><b>Unit 7: Problem Solving and Algorithm Development</b> <b>(6 weeks)</b></p>	
<p><b>Attainment Target(s):</b></p> <p>Students demonstrate competence in the use of pseudocodes and flowcharts to solve problems</p> <p>Students demonstrate their understanding of algorithm concepts and their application to programming languages</p> <p>Students use computational thinking and analytical skills to solve problems</p>	<p><b>Objectives:</b></p> <ul style="list-style-type: none"><li>• Discuss the relationship between algorithms and programming languages</li><li>• Decompose problems into input, processing and output</li><li>• Represent algorithms using flowchart and pseudocode</li><li>• Explain the concepts variable and constant as they relate to algorithm development</li><li>• Identify factors to consider when choosing an appropriate variable name</li><li>• Describe and select appropriate data types based on problems</li><li>• Describe sequencing, selection and iteration control structures</li><li>• Distinguish among the different generations of programming languages</li><li>• Explain the importance of good programming styles</li><li>• Develop simple programs to solve specific problems</li><li>• Collaborate in group activities</li></ul>

Suggested Teaching and Learning Activities	Key Skills	Assessment Criteria
<p><b>Students will:</b></p> <p>Revise concept in problem solving process and flowcharting (symbols, names and function) using an interactive game or a puzzle</p> <p>Draw a flowchart to indicate one of the following activities and use pseudocode statements to capture the same activity step by step :</p> <ol style="list-style-type: none"> <li>1. Directions from home to school.</li> <li>2. How to top up bus card or add credit to mobile phones.</li> <li>3. Baking a cake</li> </ol> <p>Compare and contrast both flowchart diagrams and pseudocode statements</p> <p>Discuss or view a video on how algorithms are linked to Programming Languages</p> <p>Create a glossary of key terms related to algorithms e.g. solution, algorithm, pseudocode, flowchart, input, output, assignment, calculation, data, selection, iteration, control structure, data type</p> <p>Write an algorithm (flowchart or pseudocode) to determine if a number is prime number. Present flowcharts or pseudocode for class discussion and feedback.</p> <p>Write algorithm (flowchart or pseudocode) to solve problems involving basic calculations such as area, volume and GCT.</p> <p>Identify errors in Flowcharts and Pseudocodes based on given problems</p> <p>Explore how to declare variables of different types and assign values. In small groups think about the different types of data that may exist in their environment. Explore various data types such as (integer, real, character and Boolean). Match data types with simple expressions.</p>	<p>Construction of flowchart and pseudocode</p> <p>Comparison of flowchart and pseudocode</p> <p>Discuss to share information</p> <p>Think critically and express ideas</p> <p>Create flowchart or pseudocode</p> <p>Create flowchart or pseudocode</p> <p>Create flowchart or pseudocode</p> <p>Detect error</p> <p>Discuss and share ideas</p>	<p>Flowchart and pseudocode satisfactorily developed</p> <p>Glossary accurately lists all relevant terms</p> <p>Satisfactorily created flowcharts</p> <p>Correctly identified errors</p> <p>Accurately assign data types to appropriate variables and data types to data</p>



<p>View a video explaining the iterations: While, For, Repeat and discuss scenarios or cases where these iterations (While, For and Repeat) could be captured</p> <p>Write algorithm using pseudocode/flowchart to solve problems involving iterations.</p> <p>Trace the development of computer languages by using a diagram to record examples of languages that fall in each generation and distinguish their characteristics.</p> <p>In groups to design a simple program based on the following scenario: Mr. Peter teaches at a popular high school. He has over 100 students and wants to utilise technology to be more efficient in managing his students' examination scores. He has asked a group students to assist him in designing an examination score calculator program that should do the following:</p> <ul style="list-style-type: none"> <li>• Input examination scores</li> <li>• Assign a grade based on scores</li> <li>• Calculate the average examination score</li> <li>• Output the above results</li> </ul> <p>Discuss and document the solution for class presentation and discussion.</p>	<p>Infer to draw conclusions</p> <p>Create flowchart or pseudocode</p> <p>Discuss and share ideas</p> <p>Apply various data types and control constructs to solution</p>	<p>Pseudocodes/algorithm correctly represented</p> <p>Diagram accurately depicts programming languages generations</p> <p>Appropriate control structures used to represent solutions</p>
<p><b>Learning Outcomes</b></p> <p>Students will be able to:</p> <ul style="list-style-type: none"> <li>• Construct a Defining Diagram/IPO charts</li> <li>• Construct simple algorithms using pseudocode or flowchart</li> </ul>		

<p><b>Points to Note</b></p>	<p><b>Extended Learning</b></p>
<p>Teachers must refer to Guidance notes at the beginning of this Unit. Teachers should note that students are only required to create algorithms involving sequential statements and simple selection statements, no iteration need be covered. Students should be aware that a problem may be solved using different algorithms</p>	<p>Students can learn the iteration constructs and construct more complex algorithms. Students are encouraged to develop more complex solutions to problems</p>

<p><b>Resources</b></p> <p>Multimedia presentation kit</p> <p>Resource books/ CDs</p> <p>Worksheets</p>	<p><b>Key vocabulary</b></p> <p>problem, problem-solving, Defining Diagram, solution, algorithm, pseudocode, flowchart, input, output, assignment, if, selection, calculation, data, variable, start, stop, Problem-Solving Steps: Define the problem, Analyse the problem, Propose alternative solutions, Evaluate the alternatives, Choose the best solution, Implement the solution, Review;</p>
<p><b>Links to other subjects</b></p> <p>Link with Language Arts in Grade 9 Attainment Target 1 “ Speaking and listening” and Target 2 “Reading”</p> <p>Link with Technical Vocational Education in Grade 9 Attainment Target 1 “Creativity and Innovation” and Attainment Target 3 “Apply solutions”</p>	