MINISTRY
OF
EDUCATION, YOUTH & INFORMATION
*Every Child Can Learn, Every Child Must Learn*

NATIONAL STANDARDS CURRICULUM

# INFORMATION TECHNOLOGY

## GRADE 7-9 APSE1

NATIONAL STANDARDS CURRICULUM GUIDE

GRADES 7-9

# INFORMATION TECHNOLOGY

APSE1

# ACKNOWLEDGEMENT

Our connection with each other is unquestionable and so at the end of this arduous yet rewarding journey, the Ministry of Education, Youth and Information gratefully acknowledges the contributions of the following individuals and institutions who generously gave of their time and resources in the planning and development of the National Standards Curriculum (NSC):

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- Mr. Derrick Hall- former ACEO (Acting), Core Curriculum Unit, who continued it
- Dr. Clover- Hamilton Flowers- ACEO, Core Curriculum Unit, who completed the task
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    - Miss Nadine Simms, former EO Technology
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- The team of curriculum formatters led by Mr. Marlo Scott, Mr. Kibwe Dunn and The Write Appeal
- The various stakeholder groups, who provided valuable information on societal needs in relation to the curriculum
- All others whose names do not appear, but who contributed to the production of the NSC

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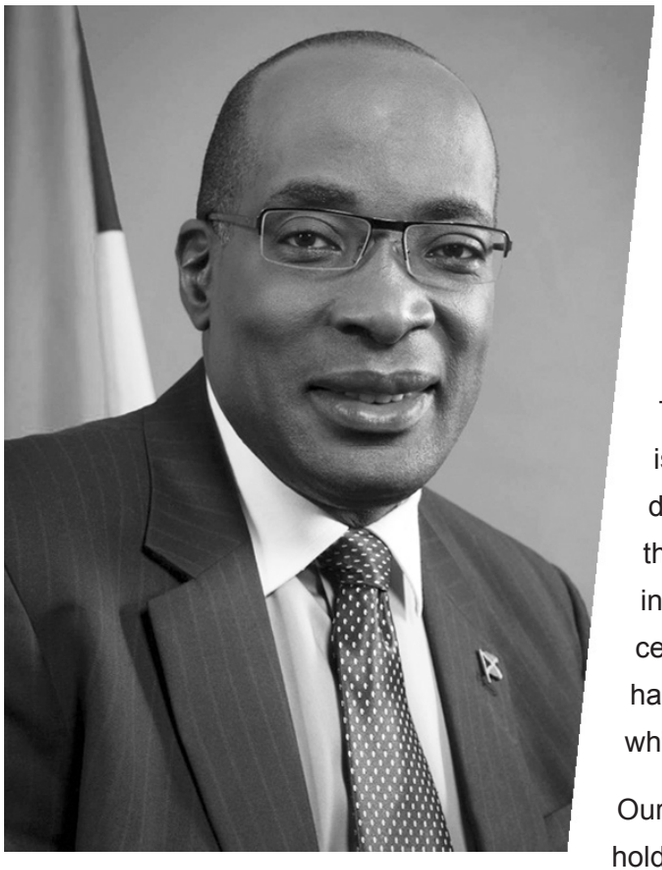


Education has always been pivotal to societal and economic development. It is for this reason that Jamaica remains unshaken and hopeful of a realized vision to be “the place of choice to live, work, raise families and do business.” The assurance of the possibility of all that such a vision entails comes from the recognition that Jamaica is endowed with tremendous God-given talent and creative potential and as a people of strong faith in spiritual principles and resilience; we are able to harness our capabilities, to make significant influence on the world. It is through this new National Standards Curriculum (NSC) that we hope to propel this vision of the education system whilst becoming more relevant, current and dynamic.

The team at the Ministry of Education Youth and Information is cognizant of the fact that the curriculum is the heart and mind of education and remains the most powerful means by which any country can develop and be sustainable. It is for this reason that the NSC has been designed with the understanding that people, learning and national development are at the core of our existence in a time of rapid change in the physical, social, economic and other dimensions of the global landscape. As a consequence, we celebrate the wisdom of the developers who through the engagement of numerous stakeholder groups, have responded favourably to the need for that kind of education that prepares our young people for life; while challenging our more mature to join in this lifelong journey of learning to learn.

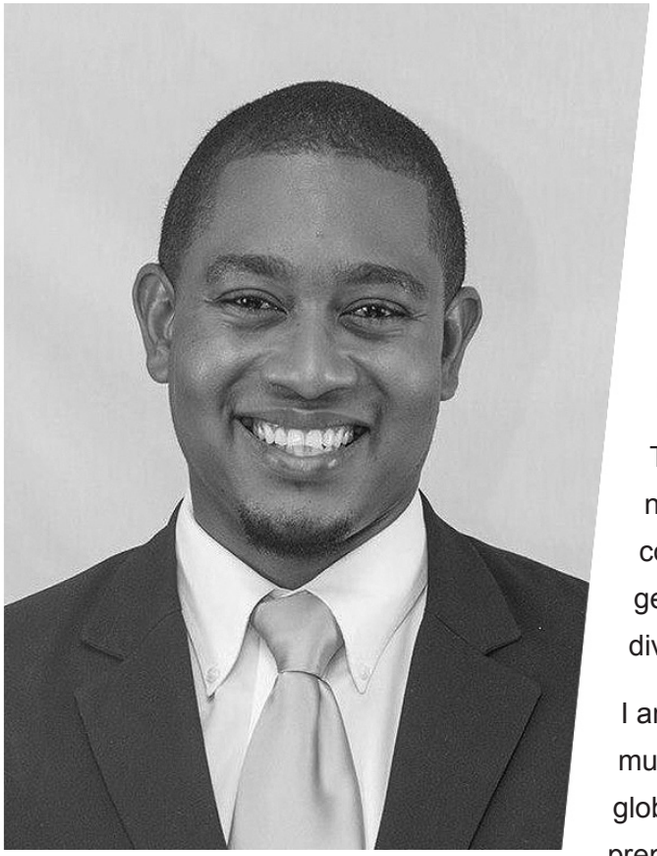
Our commitment to the development of each learner and our support and appreciation of the various stakeholder groups that are partnering with us in providing quality education, remain at the forefront of our efforts in ensuring that this journey transforms education. This commitment is conveyed through our adoption of a Pathway Approach to learning that demands of us to provide customized programmes, differentiated learning experiences and specialized support for our learners. Our actions have been fruitful as is evident by the systems and conditions we have put in place for successful implementation.

Like the rest of Jamaica, I look forward to the testimonials of students, parents, teachers and other stakeholders of the empowering effect of this learner- centred curriculum and remain confident that it will contribute to make Jamaica renown.

## The Honourable, Senator Ruel Reid,CD

**Minister of Education, Youth & Information**

# MESSAGE



Building a modern society where young people can prosper and achieve their aspirations is paramount on the Ministry of Education, Youth and Information's (MOEYI) agenda. In its bid to advance this agenda the team at the MOEYI has developed the National Standards Curriculum (NSC) on a clear set of values that will permeate learning and become embedded in young people's approach to life. Young people need to be clear about their Jamaican identity. Justice, democracy, tolerance and respect need to be more than mere words; they need to become an essential part of people's lives. Young people's understanding of, and commitment to, sustainable development is critical to the future of Jamaica and of the world. These values that permeate the new curriculum and more importantly, will by its use, be ingrained in the fabric of the Jamaican society.

The development of a new curriculum is a major achievement in the life of any country. It is even more noteworthy because this curriculum embodies the set of knowledge, skills, values and attitudes that our country deems relevant at this particular time. It is intended that these attributes be conveyed to the next generation as a means of cultural continuity in preparation to cope with the future, both nationally and individually.

I am particularly excited about the prospects of the NSC honing key twenty-first century skills such as communication, collaboration, critical thinking and creativity in our youth as they prepare to take on their roles as global citizens. I encourage parents, students, teachers and indeed the community to partner with us as we prepare our young people not just for today, but for the rapidly changing times ahead.

**The Honourable, Floyd Green, MP**

**State Minister in the Ministry of Education, Youth & Information**

# MESSAGE

In responding to the challenges confronting education in Jamaica, The Ministry of Education Youth and Information has taken strategic measures to address the need for a national curriculum that is relevant for the 21st century, the dynamics of the Jamaican context and the profile of the learners at the pre-primary, primary and secondary levels. One major output of these strategic actions is the National Standards Curriculum. This curriculum is intended to be one of the means by which the Jamaican child is able to gain access to the kind of education that is based on developmentally-appropriate practice and the supporting systems and conditions that are associated with high quality education.

This curriculum has the potential to inspire and provide challenges in the form of problem situations that all our learners can handle in ways that are developmentally appropriate. It compels us to move beyond the traditional functional perspectives of being literate to a focus on the physical and physiological as well as the ethical, social and spiritual.

I invite all our stakeholders to fully embrace this new curriculum which promises to excite imaginations, raise aspirations and widen horizons. Learners will become critical and creative thinkers with the mindset required for them to be confident and productive Jamaicans who are able to thrive in global settings as they take their place in the world of uninhibited change.

## Mr. Dean Roy Bernard

**Permanent Secretary , Ministry of Education, Youth & Information**

# MESSAGE

It was the mandate of the Curriculum Units of the Ministry of Education, Youth and Information to spearhead the crafting of a new curriculum for the nation, in keeping with international standards, global trends in the educational landscape and societal goals and aspirations. The mandate had several facets: to establish clear standards for each grade, thereby establishing a smooth line of progression between Grades 1 and 9; to reduce the scope, complexity and amount of content; to build in generic competencies such as critical thinking across the subjects; to ensure that the curriculum is rooted in Jamaica's heritage and culture; to make the primary curriculum more relevant and more focused on skills development, and to ensure articulation between primary and secondary curricula, especially between Grades 6 and 7. To achieve this, the MoEYI embarked on an extensive process of panel evaluations of the existing curricula, consultation with stakeholders, (re)writing where necessary and external reviews of the end products.

Today, we are indeed proud that, the curriculum development teams have succeeded in crafting a curriculum which has met these expectations. Under the National Standards Curriculum (NSC) focus will be given to project-based and problem-solving learning, with an integration of Science, Technology, Engineering and Mathematics/Science, Technology, Engineering, Arts and Mathematics (STEM/STEAM) methodologies across the system. Learners will benefit from more hands-on experiences which should enhance the overall learning experience and cater to the different kinds of learners in our classroom. In addition, they will be exposed to work-based learning opportunities that will help them become productive citizens of Jamaica and the world at large.

It is anticipated that as school administrators and teachers system-wide implement the National Standards Curriculum that improvements will be evident in the general academic performance, attitude and behaviour of our students.

We anticipate the participation of all our stakeholders in this process as we work together to improve the quality of life and prospects for all the children of Jamaica and to realize our mantra that *every child can, and must, learn.*

## Dr. Grace McLean

**Chief Education Officer, Ministry of Education, Youth & Information**

# MESSAGE

The Ministry of Education Youth and Information (MoEYI) is committed to providing high quality education to all Jamaican children. We have heard the cries from the various sectors of the Jamaican society about the level of preparedness/readiness of our students for life in the 21st century; and we are taking the necessary steps to ensure that our students graduate with marketable skills. The MoEYI has reviewed and redesigned the Grades 1-9 curricula around the principles of Vision 2030 Goal number one; “Jamaicans are empowered to achieve their fullest potential”.

The National Standards Curriculum (NSC) will lay the foundation for students by preparing them for working lives that may span a range of occupations, many of which do not currently exist. This has been done by way of designers carefully integrating the theoretical principles of Science, Technology, Engineering and Mathematics/Science, Technology, Engineering, Arts and Mathematics (STEM/STEAM) methodologies into the curricula at all grade levels. The NSC illustrates that in order to make education effective for our 21st century children; we need to change how we teach, and what we teach.

We are satisfied that the curriculum designers and writers have produced a curriculum that is indeed fitting for the 21st century. The NSC was designed to develop students’ understandings of subject matter and their ability to apply what is learnt; it fosters their ability to communicate and solve problems collaboratively, think critically and create novel solutions.

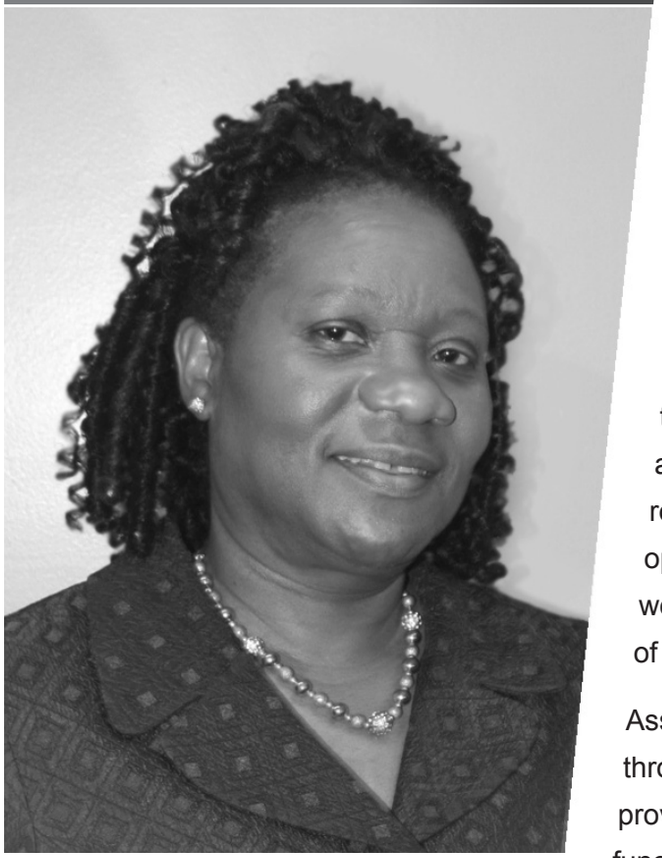
The success of our children is dependent on the participation of all stakeholders in the learning process. We encourage you all to be our committed partners in education as the true impact of this curriculum will only be felt when we have all hands on board. I am indeed proud to be associated with the development and implementation of this curriculum; it will inspire hope in our nation and future generations; kudos to the various teams that contributed to its development.

**Mrs Lena Buckle Scott**

**Deputy Chief Education Officer,**

**Curriculum and Support Services, Ministry of Education, Youth & Information**

# MESSAGE



The National Standards Curriculum (NSC) rests on the belief that all learners are endowed with the capabilities, gifts and talents to fulfil their divine purpose. These attributes are to be further enhanced or improved in a nurturing, inspiring and inclusive environment; one that caters to the whole person (soul, spirit and body - spiritual, emotional, social, physical and mental). As learners assume their roles and responsibilities individually and as communities of learning in such an environment, they become critical-reflexive thinkers, creative problem solvers, effective communicators and natural collaborators.

A curriculum design of this nature, calls for transformative change at the societal level (Elkind, 2004)[1] and not just at the school and classroom levels. This is a call for all stakeholders, as users of the curriculum, to adopt a critical -reflective and reflexive stance and join learners in the quest for meaning, purpose and stability as they help to shape the world. By integrating principles from various disciplines and their related methodologies, learners who interact with the curriculum are provided with enriching experiences, opportunities for creative expressions and authentic exploration of problems from a classical standpoint as well as in the context of workplace learning. This is due to the fact that the NSC recognizes the importance of each discipline in the problem solving process and in development.

Assessment as an element of the curriculum becomes primarily a learning process for charting progress through self-corrective measures that are informed by feedback from peers and teacher-facilitator. By providing assessment criteria statements in the curriculum, teachers are encouraged to facilitate learners functioning as self and peer assessors. This approach should see the learner developing self-direction with the support of mentors and coaches and forming an intrinsic desire to succeed. These attributes prepare them to face high stakes assessment as problems to be confronted with courage, a sense of readiness, insight and creative prowess.

These features of the NSC have the potential to influence learners' profile as Jamaicans who are gratified by an identity of cultural excellence that embodies moral obligations, intellectual rigour, innovativeness, environmental stewardship and productivity. The curriculum echoes the sentiments of our National Anthem, National Song and Pledge and serves as rich and credible source of the values and virtues that are woven together to convey the Jamaican identity. I wish for our school administrators, teachers, students and other stakeholders much success as they work with the document.

## Dr Clover Hamilton Flowers

**Assistant Chief Education Officer, Core Curriculum Unit, Ministry of Education, Youth & Information**

[1] Elkind, D. (2004). The problem with constructivism. The Educational Forum, 68(4), 306–12.

| TERMS | DEFINITIONS/MEANINGS |
|---|---|
| Range of Content | Provides an overview of the concepts, knowledge, skills and attitudes that will be developed in a unit of study. |
| About the Unit | Gives a brief overview of the content, skills that are covered in the unit and the methodologies that are used. As well as the attitudes to be developed. |
| Standards | Statements that explain what all students are expected to know and be able to do in different content areas by the end of a course of study e.g. by the end of period spanning grades 4 – 9. |
| Attainment Targets | An attainment target is a desired or expected level of performance at the end of a course of work, within a given/specified teaching- learning period. Attainment targets identify the knowledge, skills and understanding which students of different abilities and maturities are expected to have by the end of each Grade. It is the standard that we expect the majority of children to achieve by the end of the grade. |
| Benchmarks | Behaviours students are expected to exhibit at different stages of development and age/ grade levels. |
| Theme/Strands | Unifying idea that recurs throughout a course of study and around which content, concepts and skills are developed. |
| Prior Learning | It is what students are expected to already know through learning and experience about a topic or a kind of text. |
| Specific Objectives | Specific objectives state what the student is expected to know or understand as a result of the learning experience. The specific objective is usually framed in the areas of the knowledge, skills and attitudes that the students are expected to achieve. Specific objectives tell us what the children will learn or will be taught. |

| TERMS | DEFINITIONS/MEANINGS |
|---|---|
| Suggested Teaching/Learning Activities | A teaching/learning activity is an organised doing of things towards achieving the stated objectives. They are suggested activities that are crafted in a way to be an efficient vehicle which can move the student between what is to be learnt (objective) and what the student is to become (outcome). |
| Key Skills | Gives a brief overview of the content, skills that are covered in the unit and the methodologies that are used. As well as the attitudes to be developed. |
| Assessment | An assessment is a determination of whether intended results have been achieved. This section of the curriculum speaks to both the product that will be judged as well as the criteria against which it will be judged. It must be noted that this section does not introduce new activities. Instead, it speaks to the judging of the suggested teaching and learning activities.<br><br>Formal assessment may be conducted with the aid of instruments (e.g. via writen test, portfolio) or by requiring students to complete assigned tasks (e.g. performance), and is usually recorded against a predetermined scale of grading. Informal assessment (e.g. via observation or spontaneous student expression) may also reveal important evidence of learning. |
| Points to Note | This section provides technical information that must be considered in delivering the unit. It may also include information that provides additional explanation of key concepts that may be unfamiliar to the teacher as well as suggestions for infusion within the unit. |
| Extended Learning | These are opportunities for students to utilise the knowledge and skills they would have acquired in the unit in authentic situations/experiences. |
| Learning Outcomes | A learning outcome is a demonstration/ behavioural evidence that an intended result has been achieved at the end of a course of study. The learning outcome tells us if pupils have understood and grasped what they have been learning. |
| Links to other Subjects | Suggests opportunities for integration and transfer of learning across and within different subject areas. |
| Key Vocabulary | This section consists of a number of words/phrases that addresses the skills, topics and content that must be covered in the unit. |

Computing Education is constantly being reshaped. New thinking and new technologies continue to influence and reshape computing education. There are three 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 theoreti-

cal 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.

The 21st 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

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 then 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. This methodology 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.***

There are three (3) Strands within Information Technology as outlined below:

**STRAND 1:**
**Computer Components and Operations/ Foundations of Hardware and Software**

**STANDARD**

Students demonstrate an understanding of how computers work as well as develop competence in the use of hardware devices and software-tools.

*(Guided by ISTE and CSTA Standards)*

| Foundations of Hardware and Software: | Data Communication and Networking and Internet: | Productivity tools and Multimedia Authoring: |
|---|---|---|
| Students demonstrate an understanding of the concepts of computing, computer systems and their architecture | Students demonstrate an understanding of using a wide range of technologies, standards and protocols involved in the electronic transmission of data within various configurations | Students apply knowledge of a wide range of productivity and multimedia authoring tools to create a variety of products |

**STRAND 2:**
**Digital Citizenship**

**STANDARD**

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.

*(Guided by ISTE and CSTA Standards)*

| Health, Safety and Environmental Issues: | Computing Careers: | Computer Ethics and Research: |
|---|---|---|
| Students demonstrate an understanding by practising health and safety, ethics and moral principles when using computer systems | Students demonstrate an understanding of different computing and technology careers | Students apply principles of different risks and ethical issues when using the internet to conduct research |

**STRAND 3:**
**Computational Thinking and Practice**

**STANDARD**

Students use critical and creative thinking and analytical skills to solve problems by selecting and applying relevant strategies and tools.

*(Guided by CSTA Standards)*

| Problem Solving: | Algorithm Development: |
|---|---|
| Students identify problems encountered in everyday life and understand the fundamentals of logic in solving realworld problems<br><br>Decompose a problem by defining input, output and processing component | Students develop algorithms to solve simpleproblems.<br><br>Evaluate different algorithms for solving the same problem |

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

| | Computer Components and Operations | | | Digital citizenship | | | Computational Thinking & Practice |
|---|---|---|---|---|---|---|---|
| **Sub Theme** | **Foundations of Hardware & Software** | **Data Communication, Networking & Internet** | **Productivity Tools & Multimedia Authoring** | **Health and Safety** | **Computing Careers** | **Computer Ethics and Research** | **Problem- Solving & Algorithm Development** |
| **Grade 8** | Investigate key characteristics of the types of computers.<br><br>Evaluate peripheral devices based on their functions andapplication<br><br>Explain how instructions are stored and executed in a computer system<br><br>Understand the key functions of an operating system and utility software<br><br>Identify different types of system software<br><br>Know the different categories of application software<br><br>Assist peers in the use of computer software | Understand and be aware of different data communication devices, networks, protocols and media and their application in everyday life<br><br>Display knowledge of resources available on the World Wide Web<br><br>Know advanced Internet terminologies and demonstrate an ability to use Internet-related software. | Manipulate advanced word processing software features<br><br>Manipulate the spreadsheet software<br><br>Demonstrate their understanding of the use of multimedia authoring tools to create videos | Understand why it is important to exercise safety measures while operating the computer system.<br><br>Appreciate the importance of software installation for the proper functioning of the computer system<br><br>Practise proper care and maintenance of computer equipment and accessories.<br><br>Implement measures to reduce negative effects of computers on the environment | Discuss job functions in an IT department.<br><br>Be aware of and identify the duties associated with careers related to computing and technology | Display knowledge of resources available on the World Wide Web.<br><br>Evaluate and present accurate information.<br><br>Demonstrate an awareness of appropriate safety measures when using the Internet.<br><br>Understand the consequences resulting from unethical practices associated with Internet use<br><br>Research relevant information on the Internet by using successful search strategies | Demonstrate their understanding of constructing algorithms for real-world and computer- related problems.<br><br>Document simple algorithms using flowcharts, pseudocode, narratives<br><br>Explore tools to represent an algorithm<br><br>Demonstrate their understanding of how a single problem can be solved using different algorithms<br><br>Understand the importance of order and meticulousness when developing algorithms<br><br>Explore graphical programming languages |

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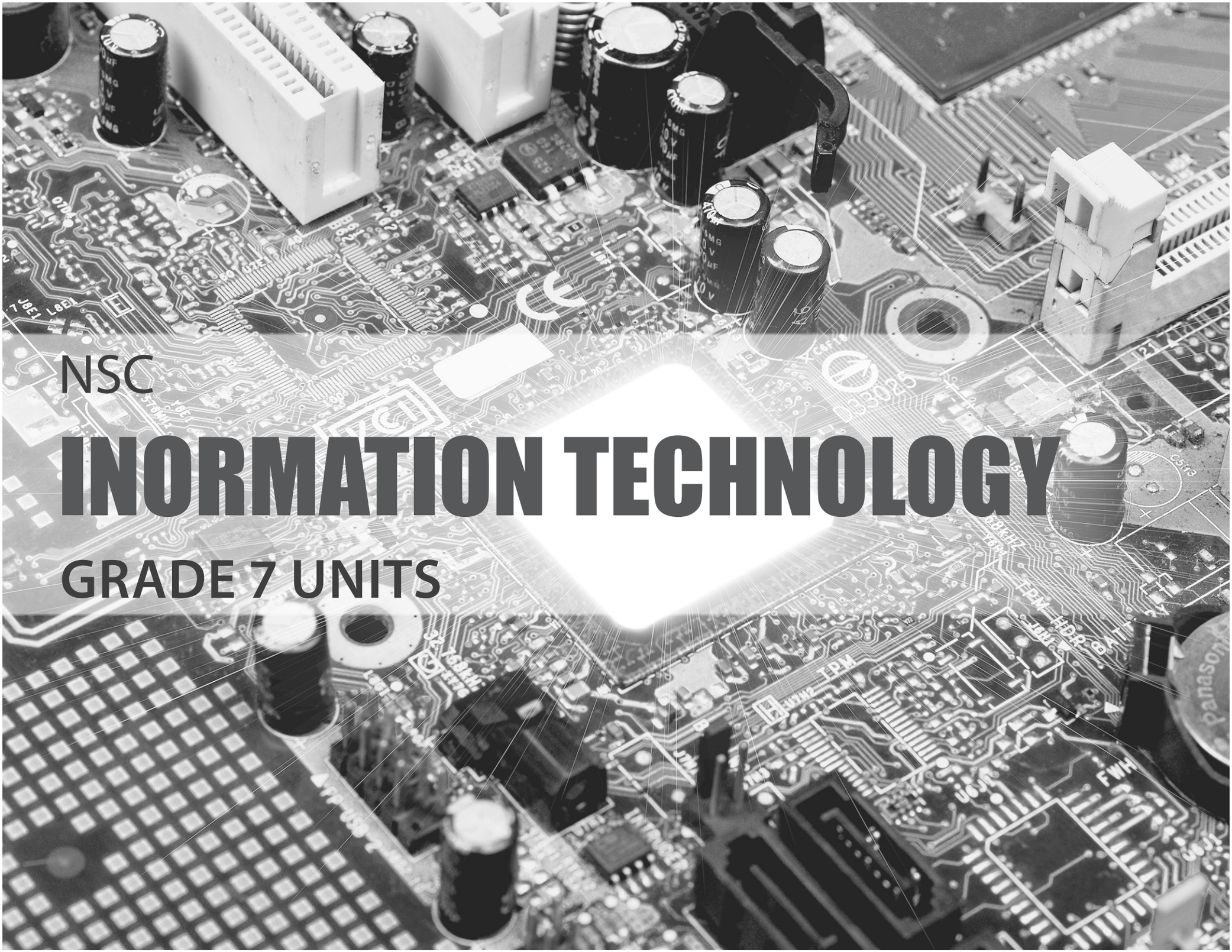
|---|---|---|---|---|---|---|---|
| **Sub Theme** | **Foundations of Hardware & Software** | **Data Communication, Networking & Internet** | **Productivity Tools & Multimedia Authoring** | **Health and Safety** | **Computing Careers** | **Computer Ethics and Research** | **Problem- Solving & Algorithm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



NSC

# INORMATION TECHNOLOGY

## GRADE 7 UNITS

## TERM 1

### Unit 1

**Health and Safety**

Demonstrate health and safety practices while operating the computer system

- The impact of the use of computers on the environment and on human health
- Safety (Correct use)
- Ergonomics
- Health (care and use)

### Unit 2

**Foundations of Hardware and Software**

Develop an appreciation for the development and use of computers.

Demonstrate competence in the use of hardware devices, and software productivity tools.

- History of Computers
- Computer Hardware
- Computer Software
- Productivity Tools (Word Processing and Presentation Software)

## TERM 2

### Unit 3

**Data Communication, Networking and Internet**

Understand the application of communication technologies in everyday life

- Basic data communication, networking and internet terms
- Components of data communication
- Communication Device – Modem

### Unit 4

**Computer Ethics and Research**

Demonstrate a responsible, moral and ethical approach to using (for example downloading and uploading) online and offline information and suitable resources on the Internet.

- Identifying bibliography from sources
- Investigate characteristics of online or offline credible sources
- Citing sources and using APA and MLA referencing using websites and books

### Unit 5

**Computing Careers**

Understand the importance of Computing careers in everyday life.

Traditional Computing careers

## TERM 3

### Unit 6

**Desktop Publishing**

Demonstrate competency in using

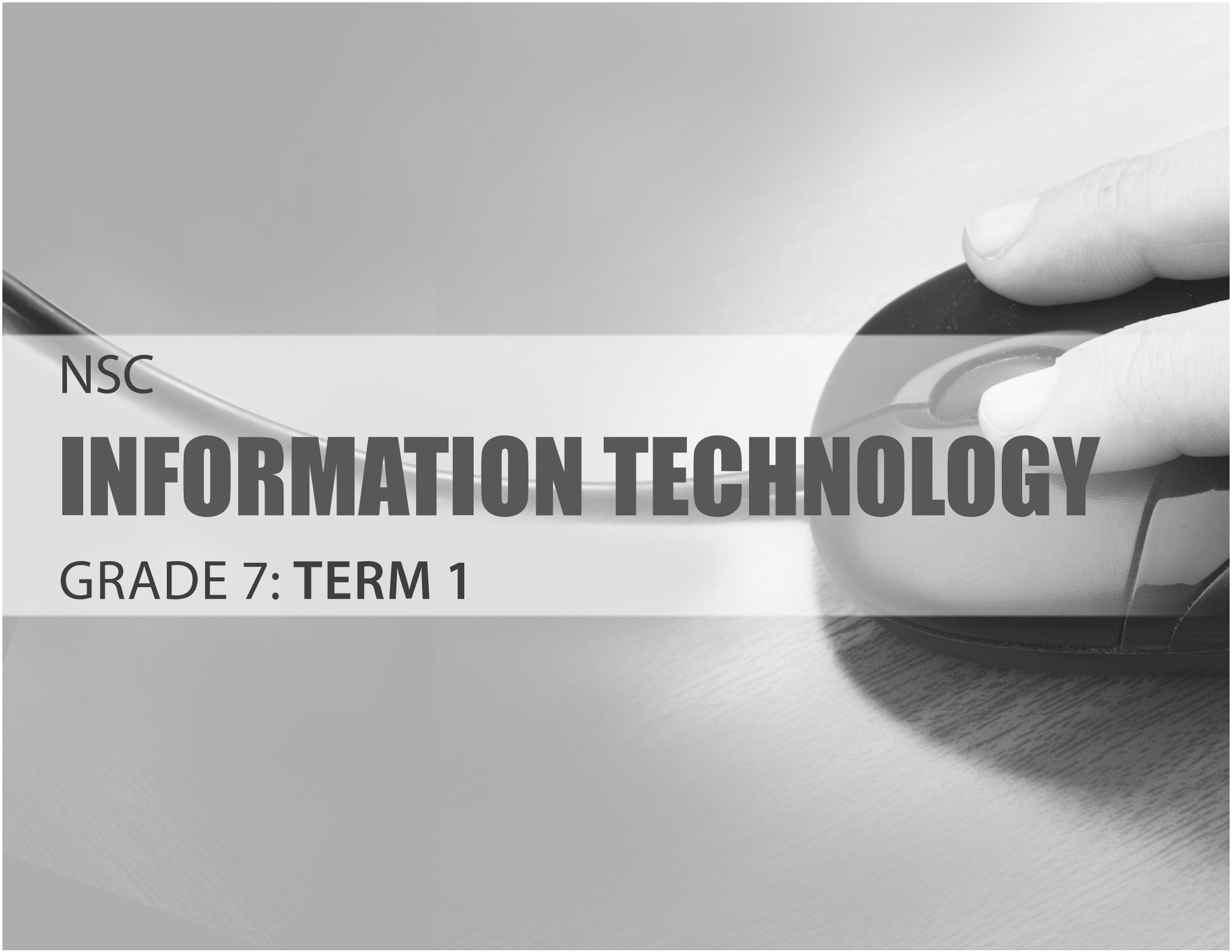
Desktop Publishing software.

### Unit 7

**Problem-Solving**

Use critical thinking and analytical skills to develop simple algorithms to solve problems

- Identify Problems
- Steps in Problem solving



NSC

# INFORMATION TECHNOLOGY

## GRADE 7: **TERM 1**

### Range of 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 for the Teacher

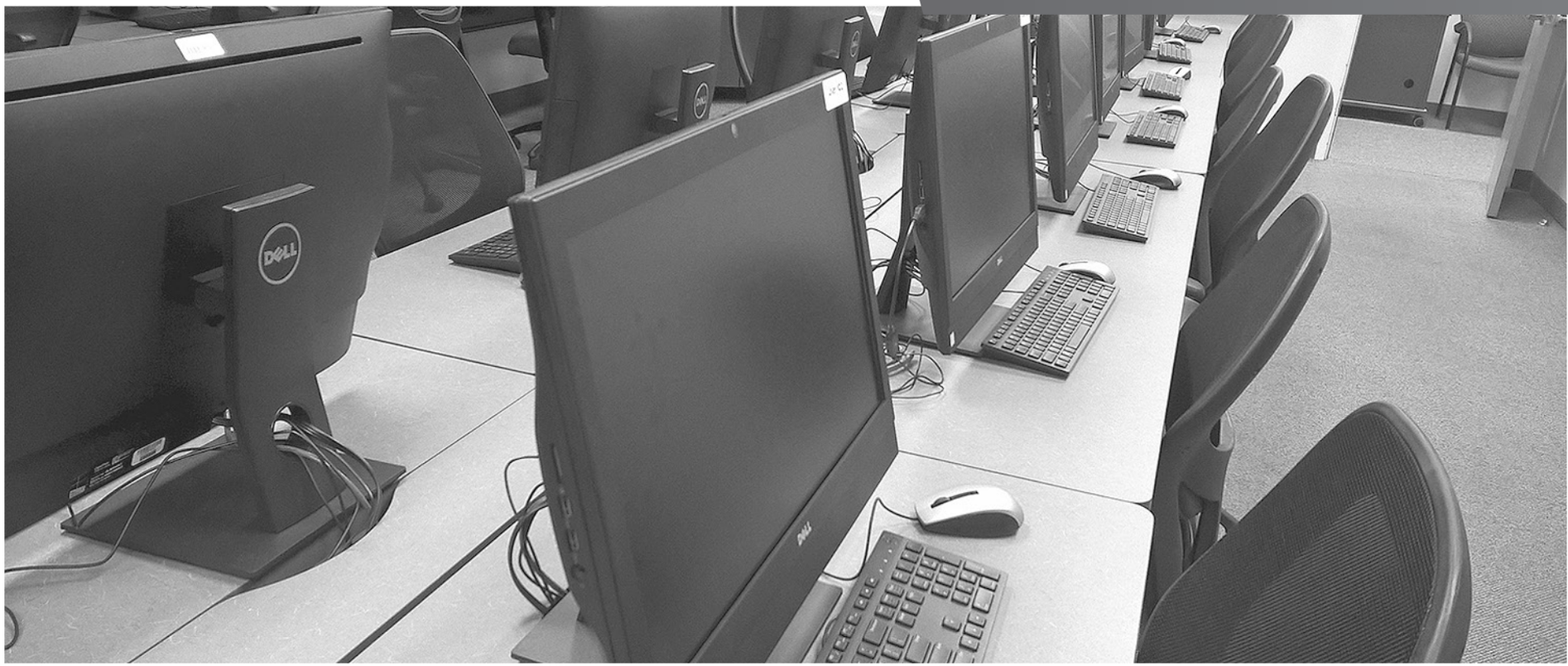
Some of the content of health and safety should be integrated with other topics and therefore should not only be confined to this unit. Teachers may create computer laboratory rules in collaboration with the students taking into consideration the school's culture. Teachers should observe/supervise students 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.

## UNIT 1: Health and Safety (2 weeks)

**Prior Learning**

Check that students can:

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



**ATTAINMENT TARGET(S):**

- Students understand health and safety procedures applied to the use of a computer system.
- Students demonstrate health and safety practices while operating the computer system.

**OBJECTIVES**

**Students will:**

- Display safe and healthy behaviours in the computer lab and while operating the computer system
- Discuss Ergonomics and how it affects computer related disorders
- Discuss various computer related disorders/illnesses and methods of prevention
- Apply and adapt appropriate health and safety practices while using a computer system
- Examine the negative effects of electronic devices on the environment
- Collaborate in group activities

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| **Students will:**<br>In groups, discuss and develop a list of computer lab rules and use available resources to present these rules.<br>Dramatize selected rules as per their listing to demonstrate their knowledge of computer lab safety operations | Collaborate in groups<br>Discuss and share ideas<br>Use appropriate media to present information<br>Perform and present information | Media appropriately used to communicate pertinent computer lab rules<br>Dramatization satisfactorily demonstrated an understanding of computer lab safety operations. |
| Review literature to discover the meaning of ergonomics and record definition in their own words. | | |
| View a video on ergonomically designed equipment and furniture and discuss its importance to computer usage. | View for information<br>Discuss and share ideas | |
| 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 | Create digital story or picture collage<br>Observe to collect information | Digital story or picture collage created accurately highlighted ergonomically safe and unsafe practices |
| View pictures of computer system usage and classify them into categories based on ergonomically safe or unsafe practices and justify decision. | View for information<br>Critique and classify information<br>Discuss ideas | Pictures correctly classified as ergonomically safe or unsafe practices. |
| 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. | Work collaboratively in groups<br>Select and use appropriate presentation methods<br>Read for information | Project, podcast, essay or blog correctly depicted evidence of computer related disorders/illnesses, cause and effect and suggested preventative measures. |
| Use dramatization or any other presentation style to communicate comparisons between correct and incorrect usage of computers.<br>List and discuss safety procedures observed at home when there is a power outage while using a computer system. | Dramatize and present information<br>Observe dramatization<br>Discuss ideas<br>Assessing scenario | Presentation portrayed evidences of correct and incorrect usage of computers |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| Discuss safety procedures to be observed in a computer lab.<br>Read the following scenario and discuss do's and don'ts that Jane should have observed.<br>"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 unplug the printer from its outlet to connect her computer. The cords are placed across the walk way." | Reading to draw conclusion<br>Apply knowledge | Correctly applied health and safety principles in analysis of scenario |
| Conduct an offline or online research to evaluate the negative effects of electronic devices on the environment. Present their findings in project form. | Research to gather information | Project satisfactorily captures the negative effects of electronic devices on the environment |
| Create a 3-D model lab from material in your environment. The model should highlight elements of ergonomics and safety in the computer lab. | Apply knowledge from STEAM areas to create model | 3-D model satisfactorily captures elements of ergonomics and health and safety in a computer lab |

## Learning Outcomes

Students who demonstrate understanding can:

- Articulate the importance of correct ergonomically safe practices
- Explain the consequences associated with the improper use of computers
- Discuss different methods to reduce adverse effects associated with the improper use of computers
- Model correct health and safety behaviours when using computer systems
- Articulate the negative effects of the electronic devices on the environment

## Points to Note

Teachers are encouraged to reinforce established rules for the care, use and maintenance of computer lab and equipment

Teacher must keep abreast of new developments in Computer related disorders/illnesses.

Dramatization can be recorded and be used for future class discussion.

## Extended Learning

Students can collaborate to design an ergonomic equipment/furniture.

Students can develop guidelines for facilitating a safe environment at home when using a computer system.

**RESOURCES**

Personal computers
Internet access
Multimedia presentation kit
Photographs of persons using the computer
Video on Ergonomics
Resource books/CDs

**KEY VOCABULARY**

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.

**LINKS TO OTHER SUBJECTS**

**Language Arts** (Grade 7 Attainment Target 1 "Speaking and Listening" and Target 2 "Reading")
**Technical Vocational Education** (Grade 7 Attainment Target 2 "Exploring methods and procedures" and Target 3 "Applying Solutions")
**Integrated Science**

### Range of 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 systems, 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 for the 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.

## UNIT 2: Foundation of Hardware and Software (12 weeks)

**Prior Learning**

Check that students:

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

**ATTAINMENT TARGET(S):**

- Students know the hardware and software components of a computer system.
- Students understand the purpose of hardware devices and software productivity tools in computer systems.
- Students demonstrate competency in the use of computer hardware devices.
- Students demonstrate competency in the use of computer software productivity tools.

**OBJECTIVES**

**Students will:**

- Define the terms: computer, computer system, computer hardware, computer software, multimedia
- Differentiate between a computer and computer system
- Differentiate between data and information
- Trace the historical development of computers
- Compare the different types of computers and assess their key hardware components and performance levels
- Analyse how technology tools impact productivity in homes, schools, community and at the workplace.
- Explain the basic functions of the hardware components (input, output, storage and processing)
- Classify hardware devices as input, output, storage, processing and communication
- Apply concepts of interdependency to hardware and software
- Practise keyboarding and mouse skills
- Classify software into the two main categories (system and Application)
- Appreciate the uses of software
- Cooperate in group activities
- Investigate the different sections in the layout of a word processing software
- Create documents using word processing software
- Create multimedia presentation using presentation software and apply animation and transition features to multimedia

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| **Students will:**<br>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. | Recall knowledge<br>Discuss and share ideas | Glossary or picture dictionary accurately defined the terms 'computer', 'computer system', 'computer hardware' 'computer software', 'data' and information'. |
| Along with teacher formulate a definition for the terms above and create a glossary or picture dictionary for class use. | Think critically and express ideas | |
| View 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. | Observe to make comparison<br>Classify components | Video created highlighting hardware components correctly classified according to functions. |
| Create a diagram to illustrate (electronically or manually) the relationships among hardware components of the computer system, highlighting input, storage, processing, output and communication. | Draw to represent information | Model of computer system accurately labelled, highlighting relationships among hardware components. |
| 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. | Gather, record, organize and evaluate facts | Facts meaningfully organised |
| 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. | Think critically and construct new ideas | Accurate differentiation between data and information |
| 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. | | Diagrams of timeline correctly created to show the development of computers from 19th century to present. |
| OR<br>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. | Collaborate in groups to gather, record, organize and present data | Scrapbook, song, skit, poem accurately portrayed the timeline of computer development. |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| 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. | Collaborate in groups to research and present information | At least two correct examples of science given for each category: home, school, community and industry |
| Prepare and conduct a debate on the moot "be it resolved that technological tools negatively impact productivity in homes, schools, community and at the workplace". | Debating moot | Debate satisfactorily presented, sound arguments to support points of view |
| 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. | Compare information to construct new knowledge | Correct information presented on Jamaican and |
| 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 presentation style | Research and present information | Table accurately displayed information on characteristics and performance capabilities of computer systems |
| Conduct online/offline guided research to identify the main categories of software used on a computer system then identify the type of programmes on the machines in the computer lab and on a personal computer,<br>Using a table categorize the software found on computers | Classifying software | Accurately prepare table<br>Categorizing software into the two main categories: Application and Systems |
| 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. | | Accurately classify and justify placing software into categories |
| In groups create puzzles (crossword/word search) of terms and concepts taught in the lessons and exchange among groups to solve. | Recall knowledge and share information, collaborate in groups to create puzzles | Accurately create and complete puzzles relating to terms and concepts used in the lesson |
| In groups, assembly keyboard puzzle pieces to label and describe the different sections of the keyboard and state their functions; | Demonstrate ability to assembly keyboard and state functions | Accurately assembled and labelled keyboard puzzle.<br>Satisfactorily described the functions of the keyboard sections |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| Click, drag and drop each item listed below in the correct column.<br>**Keyboard, Scanner, Touch Screen, Digital Camera , Light Pen, Barcode Reader, Speakers, Joystick, OMR. Webcam CD/DVD Monitor/Screen, Barcode Reader, CPU, Modem, Mouse, VDU, Laser Printer, Dot Matrix Printer, USB flash drive, Plotters** | Communicate, create, think critically - analyse, justify | Creative posters containing accurate information<br>Justifiable reasons given for importance of safety signs/ symbols |
| 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. | Demonstrate proper use of keyboard | Process skills correctly identified in each scenario. An acceptable sequence of skills used to solve problems is outlined. |
| In pairs, discuss their uses of a word processing software, highlighting how this software made their task(s) more efficient | Discuss and share ideas | |
| 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. | Observe to compare and contrast | |
| Launch a word processing program, describe the role of the different sections of the displayed word processing interface and draw/label the word processing window. | Recall and memorize information | |

| INPUT DEVICES | OUTPUT DEVICES | STORAGE DEVICES |
|---|---|---|
| | | |
| PROCESSING | COMMUNICATION DEVICES | |
| | | |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| 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. | Reproduce document using Word Processing Software | Document accurately reproduced and properly formatted based on instructions |
| 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. | Discuss and share ideas | |
| 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. | Demonstrate word processing skill | Letter satisfactorily created using formatting features of word processing software |
| In groups, investigate 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.<br>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. | Collaborate in groups to gather, record, organize and present data<br>Critical thinking | Table accurately displayed information on characteristics and performance capabilities of computer systems |
| Print a word processing file using different selections (current page, specific pages, entire document) | Use a Word Processing software to print documents | Document pages printed according to specifications given. |
| Create a portfolio (electronic or manual) and add their word processing documents to portfolio | Compile and organize data | |
| 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.<br><br>OR | Reflect and evaluate | |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| Through discussion, identify reasons for using presentation software e.g. at a school event, advertising a new product or delivering a lesson. | Discuss, share and evaluate ideas | |
| Imitate the creation of a multimedia presentation while viewing activity on video or demonstration by teacher. | Observe and reproduce/ model procedures to create multi-media presentation | |
| 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 | Use multi-media software to create multi-media presentation | Multimedia presentation satisfactorily created with the inclusion of appropriate slide design, transitions and effects |
| Use multimedia presentation software templates to create a new presentation file and print presentation as a 'hand-out' | Review, evaluate, organize and print information | Hand-outs of presentation satisfactorily printed |
| Create a multimedia presentation on aspects of Jamaican culture. Add this presentation to their portfolio (electronic or manual). | | |
| **Innovators Challenge**<br>*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.*<br>***Focus questions:***<br>1. What is the problem? *Provide evidence.*<br>2. What are some of the causes of the problem? *Explain/justify/defend.*<br>3. What would these innovators do to find a solution? *Demonstrate the process.*<br>4. What is the result of the solution chosen? *Showcase and report on the result.* | Collaborate in groups to discuss, research, record, organize and present solutions | Problem examined from multiple perspectives to include Sciences, Technology, Engineering and Mathematics<br>The Engineering design process used to arrive at the solution and to implement the solution<br>Evidence of the integration of Mathematical ideas<br>Most of the problem solving steps observed to include:<br>• Define the Problem<br>• Examine possible solutions<br>• Apply Solution and revise<br>• Look Reflectively to revise and make improvement<br>• Communicate solution |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| 5. How successful was the solution used?<br>6. Based on the solution presented how much money will the company expected to earn?<br><br>***Requirements***<br>1. Record all assumptions<br>2. Solution may be unique/original.<br>3. Evidence must be presented of the product and process<br>4. Must be done collaboratively<br>5. Make use of credible research | Think critically – analyse, | Report and experiments correctly reflect the |

## Learning Outcomes

Students who demonstrate understanding can:

- ✔ Explain the terms: computer, computer system, hardware, software
- ✔ Differentiate between a computer and a computer system
- ✔ Demonstrate an understanding of the development of early computers
- ✔ Differentiate among the different types of computer systems
- ✔ Classify hardware devices as Input, Output, Storage, Processing and Communication
- ✔ Demonstrate competence in the use of keyboard and mouse
- ✔ Group software into categories
- ✔ Operate Word Processing and Presentation Software

## Points to Note

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 the difference between a computer and a computer system.*

## Extended Learning

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.

**RESOURCES**

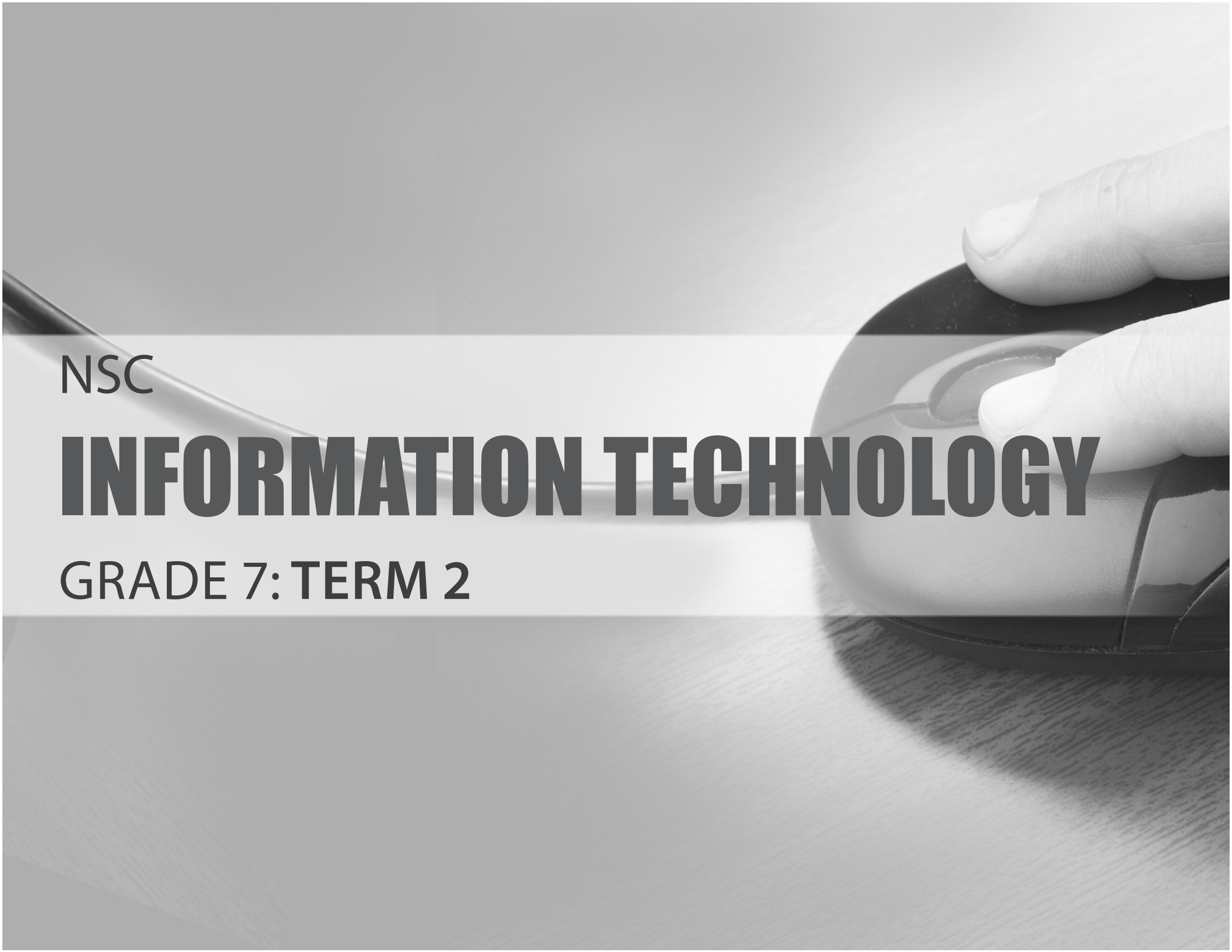
Personal computers
Internet access
Samples of hardware devices
Resource books/CDs
Rubric for grading presentations
Multimedia presentation kit
Sample memoranda
Drill and Practice software
Educational electronic games
Puzzles
Pictures of computers

**KEY VOCABULARY**

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

**LINKS TO OTHER SUBJECTS**

**Drama -** Grade 7 Attainment Target 1 "Exploring and Creating"
**Technical Vocational Education -** Grade 7 Attainment Target 1 "Creativity and Innovation" and Attainment Target 3 "Apply solutions"
**Visual Arts** - Grade 7 Attainment Target



NSC

# INFORMATION TECHNOLOGY

## GRADE 7: **TERM 2**

### Range of Content

Students will learn:

- Terms related to data communication: Communication, Data communication, Network, Modem, Internet, Web browser, Webpage, Website, 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 various opportunities available for modern communication through the use of new and emerging technological tools. It will develop students understanding of technical terms used in data communication, networking and the internet. In addition, students' internet skills will be improved tremendously as they will get opportunities to perform web searches as well as upload and download data/information.

### Guidance for the Teacher

Some 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, teachers can display to students how computers and devices are connected in a network. The delivery of this unit will be largely dependent on the available resources ; teachers 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.

## UNIT 3: Data Communication, Networking and the Internet (5 weeks)

**Prior Learning**

Check that students can:

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

**ATTAINMENT TARGET(S):**

- Students understand how computer systems communicate with each other
- Students develop an awareness of the application of various forms of communication technologies in everyday life
- Students evaluate the importance of implementing appropriate security measures when using a network

**OBJECTIVES**

**Students will:**

- Define the following terms as they relate to data communication: Communication, Data communication, Network, Modem, Internet, Web browser, Webpage, Website, search engine, URL, e-mail, Upload, Download
- Describe a Network and highlight the services available in a networked environment
- Explain the functions of the hardware required for a basic network (sending, receiving, communication device, etc.)
- Identify the components of data communication
- Describe various forms of electronic communication (email, SMS)
- Differentiate among the types of network (Personal Area Network, Local Area Network, Metropolitan Area Network, Wide Area Network)
- Discuss the advantages and disadvantages of using a Network such as the Internet
- Differentiate between the Internet and the World Wide Web
- Investigate basic internet resources – Email, Instant messaging and Social Networking
- Explain the relationship between key terms (World Wide Web, website, web page, hyperlink, web browser, URL, search engine)
- Collaborate in group activities to gather, record or present information
- Formulate ethical judgment when using the internet

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| **Students will:**<br>Play the Chinese telephone game to demonstrate the communication process; Identify elements involved in this game as necessary elements of communication – sender, channel, receiver | Demonstrate the communication process and identify the necessary elements of communication | Chart/game correctly shows the communication process. |
| Create a diagram depicting the communication process based on their interpretation of the process | Create diagram to represent information | |
| Conduct guided research to define common terms related to data communication, network and the internet such as modem, web browser, search engines and so on. | Research and define terms | Terms accurately defined as related to data communication |
| Examine the following scenario: The School Board has purchased 55 computers and wants to distribute one to each classroom, 5 each to the library and staffroom. There will be a meeting to decide if these computers should be networked or be stand-alone. As a member of the computer club you were asked to present arguments for and against networking of 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<br><br>In pairs, produce a list of different ways in which data communication can be carried out then share the list with class. | Present arguments<br>Gather, record, organize and present information | Arguments satisfactorily highlight advantages and disadvantages of using Networks.<br>Correct hardware were used to support network |
| Classify transmission media as wired or wireless from a list of different media. | Classify media | Transmission media correctly classified as wired or wireless |
| Create a scrapbook that shows pictures of sending and receiving device, communication device(MODEM) and different types of transmission media. | Create scrapbook | Scrapbook correctly shows the components of data communication |
| Conduct a guided research to explain the various components of data communication (sending device, communication device, communication channel/transmission, media and receiving device). | Research and present information | Components of data communication correctly explained |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| 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:<br><br>**Places** / **PAN** / **LAN** / **MAN** / **WAN**<br>Church<br>Travel Agency<br>Bank<br>University<br>Library<br>Home | Research and present information | Satisfactorily justified type of network based on various scenarios |
| Create models of the different types of communication network using recycled materials (Plastic, string, paper, soda can, etc.) comparing the features of the various networks | Create models to represent information | Models created correctly shows the different types of network, highlighting the features |
| Create puzzles (crossword, find-a-word etc.) using terms from data communication. | Create puzzles | Puzzles created satisfactorily using data communication terms |
| After watching an appropriate video, identify the differences between the terms Internet World Wide Web. | Discuss and share ideas | Accurately list differences between the Internet and World Wide Web and resources needed to connect to the Internet and the World Wide Web |
| List and draw examples of web browsers and identify the ones that are used on computers and other electronic devices. | Identify types of web browsers | |
| Debate the moot: "The world today, without the Internet, would be a better place." Incorporating the advantages and disadvantages of using the internet. | Debate moot | Satisfactorily identified advantages and disadvantages of using the internet |
| Discuss the difference between upload and download and identify instances in their Internet experience when they have uploaded or downloaded data. | Demonstrate uploading and downloading | Assignment downloaded, adjusted and uploaded successfully |
| 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. | Demonstrate proper use of search engines and URL | 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 |

| Question | Website | Search Engine | Answer |
|---|---|---|---|
| Which parish is the largest in Jamaica? | | | |
| What is the highest mountain in Jamaica? | | | |
| How many medals did Jamaica receive in the Summer Olympics in 2008 and 2012? | | | |
| The population of Jamaica is approximately | | | |
| What is the most common language spoken throughout the Caribbean? How many people speak this? | | | |
| What is the tallest building in the Caribbean? Where is it? When was it built? What is its height?? | | | |
| Name the longest river in Jamaica? What is its length? In which parish is it located? | | | |

Recall information

Discuss and share ideas

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In pairs, create different posters highlighting the following:

- How to compose and send an email with attachment
- How to compose and send an Instant Message
- How to use Social Networks highlighting some basic rules

Create poster

Posters correctly depicts information on Emails, Instant Messaging and Social Networking

Create a **podcast**, poem or use dramatic mode to depict good and bad practices when using the Internet.

Create podcast/poem or using dramatic mode

Presentation satisfactorily captures good and bad practices when using the internet

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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.

## Learning Outcomes

Students who demonstrate understanding can:

- 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

## Points to Note

Teachers must refer to 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!

## Extended Learning

Students can navigate between web pages using hyperlinks

**RESOURCES**

Personal computers
Internet access
Multimedia presentation kit
Diagrams of networks
Resource books/CDs

**KEY VOCABULARY**

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

**LINKS TO OTHER SUBJECTS**

**Language Arts** - in Grade 7 Attainment Target 1 "Speaking and Listening" and Target 2 "Reading"
**Technical Vocational Education** - Grade 7 Attainment Target 1 "Creativity and Innovation"
**Drama** - Grade 7 Attainment Target 1 "Exploring and Creating"

### Range of Content

Students will learn:

- The meaning of computer ethics and ethical behaviour 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)
- To identify bibliography information from online and offline sources
- To identify characteristics of credible online and offline sources (for example, author's name, publication date, last update, credentials/qualifications)
- To determine the credibility of online or offline sources 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 ethical behaviours that govern downloading or uploading of information from online/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 for the 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 adhering 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.

## UNIT 4: Computer Ethics and Research (3 weeks)

**Prior Learning**

Check that students can:

- Distinguish between right and wrong
- Identify socially ethical behaviours


**ATTAINMENT TARGET(S):**

- Students demonstrate a responsible, moral and ethical approach to using online and offline information
- Students use search technologies effectively while carefully evaluating digital content
- Students determine the ethical, social and moral issues and implications surrounding the use of technology.

**OBJECTIVES**

**Students will:**

- Define terms associated with computer ethics and its practice (ethics, moral, computer ethics, intellectual property right, plagiarism, trademark, copyright, etc.)
- Discuss moral and ethical practices in downloading and uploading online and offline information.
- Investigate to determine credible online or offline sources based on specific criteria.
- Apply the APA and MLA styles when making reference to online and offline sources
- Demonstrate willingness to question information available on the Internet
- Collaborate in group activities

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| **Students will:**<br>Through guided discussion construct the meaning of the following terms: moral, ethics, computer ethics, intellectual property right, plagiarism, trademark, copyright, etc) | Recognize meaning | Terms accurately defined |
| Match computer ethics terms with their description to appropriately define the term. | Analyze and evaluate visual and aural information | Correctly match terms to their description |
| Determine what is regarded as online and offline sources based on their uses/application by viewing video(s) on various uses of online and offline sources. Identify online and offline sources from a list of sources provided. | Communicate, define | Accurately distinguish between online and offline sources |
| Create a scene using two or more of the terms (moral, ethics, computer ethics, intellectual property rights, plagiarism, trademark, copyright, etc) and role play to show an understanding of terms and their consequences. | Demonstrate to present information, teaming | Dramatization satisfactorily demonstrated an understanding of the terms and their consequences |
| Through guided discussion, identify ethical practices in using online and offline information and share ideas with the class. | Discuss and share ideas<br>Identify issue, analyze, evaluate and present information | Identification of ethical practices in using online and offline information |
| Illustrate ethical practices governing the use of online or offline information by creating a short video/cartoon/poster/brochure. | Represent information | Video/cartoon/poster/brochure satisfactorily illustrates ethical practices governing the use of online and offline information |
| 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. | | Issues discussed shows an understanding of ethical behaviours |
| Use a checklist to assist in identifying the components of bibliography from given resources (such as IT textbooks, websites among other resources) | Utilise checklist | Accurately identified bibliography information from resources |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| Work in groups; to conduct a research on criteria that makes an online or offline source credible. Present findings to the class. | Collaborate in groups to research and present information | Information presented correctly shows criteria that makes an online or offline source credible |
| 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. | View for information and identify information<br>Analyze, evaluate, research and present information | Presentation accurately justifies why sources are credible.<br>Accurately define terms from credible sources without plagiarising the content as well as use bibliography information to cite sources. |
| 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. | | |
| Given various online and offline sources and differentiate categorize references written using either APA or MLA styles from a list of references | Categorize information | Accurately categorize references as APA or MLA formats |

## Learning Outcomes

Students who demonstrate understanding can:

- Define the terms: ethics, computer ethics, moral, intellectual property right, plagiarism, trademark, copyright
- Discuss moral and ethical practices in using online and offline information
- Identify the bibliographic information from online and offline sources
- Recall the characteristics/features that makes an online or offline source credible
- Analyze a given source to determine credibility

## Points to Note

Teachers must refer to the Guidance to Teacher notes at the beginning of this Unit.

## Extended Learning

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.

## Points to Note

Plagiarism does not only mean copying text, word for word, from a published work but it also means copying ideas. Breeches of the practice comes in different forms:

- Replacing a word with the synonym
- Passing on someone's work as your own
- Quoting, summarizing or rephrasing without citation

Breaches of ethical practices are commonly performed when uploading or forwarding information such as pictures, videos and audio to online sources

## Extended Learning

Students can create a poster/brochure that explains to their school mate what the term intellectual property rights means and the laws (copyright, trademark) that protect this right.

**RESOURCES**

Internet access

Multimedia presentation kit

Personal computer

Videos

Resource books

**KEY VOCABULARY**

Ethics, computer ethics, moral, online source, offline source, ethical behaviour, plagiarism, trademark, copyright, intellectual property rights, bibliography

**LINKS TO OTHER SUBJECTS**

**Language Arts**- Grade 7 Attainment Target 1 "Speaking and Listening" and Target 2 "Reading"

**Civics** - Grade 7 Attainment Target 3 "Demonstrate an awareness of individual and collective rights, their application and attendant responsibilities"

**Drama** - Grade 7 Attainment Target 1 "Exploring and Creating" and Attainment Target 2 "Expressing and Enacting"

### Range of 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 develops new IT solutions or modifies existing system(s) to solve 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 ICT. Students will gain an understanding of the roles and responsibilities of personnel working in ICT. In addition, it will enable students to appreciate ICT careers.

## Guidance for the Teacher

Teachers should 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 n 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.

## UNIT 5: Computing Careers (3 weeks)

**Prior Learning**

Check that students:

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

**ATTAINMENT TARGET(S):**

- Students are aware of and understand the competencies and qualifications needed for computing careers and computing skills necessary for the world of work
- Students understand the roles of different personnel in Computing Careers
- Students understand the application of Computing Careers in everyday life

**OBJECTIVES**

**Students will:**

- Identify careers available in the field of ICT
- Describe the job functions of different personnel in ICT careers
- Discuss the importance of ICT careers in society
- Create job descriptions and advertisements on Computing careers
- Collaborate in group activities
- Appreciate the importance of computing careers in the Information age

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| **Students will:**<br>Research job opportunities in the field of ICT and create a Multimedia presentation to report findings | Research and present information | Presentation depicts accurate range of job opportunities in ICT |
| In groups conduct research to identify the job functions of specific Computing personnel. | Demonstrate to present information<br>Observe dramatization | Observations accurately capture changes |
| In class, dramatize the job functions of ICT personnel. The class should then determine/identify the job being dramatized. | Collaborate, investigate, | Dramatization accurately depicts job function of Computing personnel |
| Match Computing personnel with basic job functions in a tabular form. | Observe and make comparison<br>Match functions | Accurately match Computing personnel with job functions |
| Work in groups to brainstorm and develop questions for use in interview (s) with Computing personnel.<br>Use questions developed to participate in a panel discussion with ICT personnel to gain knowledge about various Computing careers. | Discuss and share ideas | Questions developed correctly highlight aspects of the related Computing career |
| In groups, create an advertisement along with a job description of an assigned Computing career to be placed in a local newspaper<br><br>Research job description for different IT careers. Create a poster in to display collage of IT personnel job descriptions. | Create job description and advertisement | Satisfactorily created Computing career job description and advertisement |

## Learning Outcomes

Students who demonstrate understanding can:

- ✔ Identify career opportunities in ICT
- ✔ Understand the basic job functions of ICT personnel
- ✔ Understand the importance of ICT careers

## Points to Note

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.

## Extended Learning

Students can film the dramatizations and use an image editing software to create a video

Conduct an interview with an industry personnel based on student's career

**RESOURCES**

Personal computers

Internet access

Multimedia presentation kit

Videos

Resource books/CDs

**KEY VOCABULARY**

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

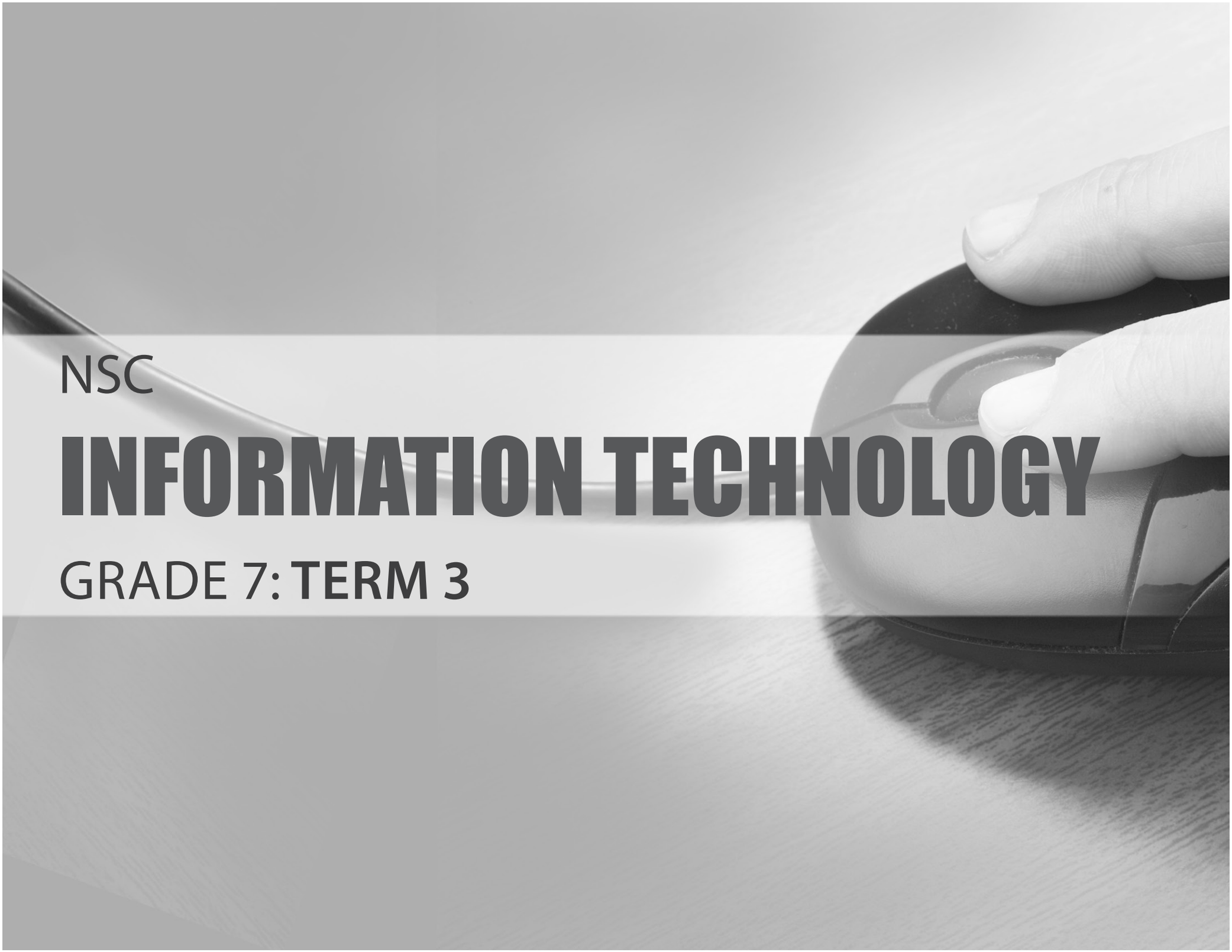
**LINKS TO OTHER SUBJECTS**

**Language Arts** - Grade 7 Attainment Target 1 "Speaking and Listening" and Target 2 "Reading"

**Technical Vocational Education** - Grade 7 Attainment Target 4: Career Awareness"

**Drama** - Grade 7 Attainment Target 1 "Exploring and Creating" and Attainment Target 2 "Expressing and Enacting"

**Guidance**



NSC

# INFORMATION TECHNOLOGY

## GRADE 7: **TERM 3**

### Range of 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
- The importance of Desktop Publishing.
  There are many processes and procedures in desktop publishing but the basic creation of a document using desktop publishing techniques involves 4 steps:
  1) **Design**: Research / Brainstorming / Planning
  2) **Create**: Document Setup / Text Retrieval or Acquisition / Image Retrieval or Acquisition / Page Layout
  3) **Digital Preparation**: Proofs to ensure creation is valid, correctly formatted, and of the desired type
  4) **Publish**: Printing and/or On-Screen / Electronic Distribution
- To 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 for the 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.

## UNIT 6: Desktop Publishing (DTP) (5 weeks)

**Prior Learning**

Check that students can:

- Create text based documents and insert graphics

**ATTAINMENT TARGET(S):**

- Students demonstrate competency in using productivity tools.
- Students understand and appreciate the benefits of using a DTP software for document creation

**OBJECTIVES**

**Students will:**

- Identify terms associated with Desktop Publishing
- Distinguish among Word Processing, graphics designing and Desktop Publishing
- Discuss the uses and importance of Desktop Publishing software
- Describe the steps involved in creating a Desktop Publishing document
- Design and create digital artefacts using Desktop publishing

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| **Students will:**<br>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.<br>Along with teacher, formulate a definition for these terms. | Construct and present information | Accurately defined terms |
| Discuss the relevance of desktop publishing and how it is applicable today. | Discuss and share ideas | |
| 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. | Research and present information | Portfolio/Scrapbook created accurately highlighted differences in word processing, graphic designing and desktop publishing products. |
| Discuss the steps that would be needed to create the DTP products collected. | Discuss and share ideas | |
| Explore and discuss available templates and features in a DTP software (brochure, business cards, greeting cards, flyers, posters). | Discuss and share ideas | |
| 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<br>OR<br>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. | Design and create business card | Business card created, correctly depicts DTP steps |
| 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. | Discuss and observe to create checklist | Checklist created accurately for assessing DTP products |
| 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. | Discuss and create | Invitation created satisfactorily using DTP template |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| 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 | Create a flyer/poster/ banner | Flyer/poster/ banner created demonstrates expected levels of competence in the use of DTP software based on checklist |

## Learning Outcomes

Students who demonstrate understanding can:

- ✔ Operate desktop publishing software
- ✔ State a variety of uses of desktop publishing software
- ✔ Create digital products using Desktop publishing

## Points to Note

Teachers must refer to Guidance to Teacher notes at the beginning of this Unit.

Teacher should also be aware of the importance of appropriate colour schemes when creating DTP documents.

You may wish to place one or more of these restrictions on student business cards.

- First names only, or First name and Initial.
- Use a fake address or use the school address.
- Use a fake phone number or the school phone number.
- Do not allow students to use a photograph of themselves on the card.

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.

## Extended Learning

Students will create a Sport's Day Banner for their respective sports houses.

Students can also create business cards for family members and friends.

Create a desktop publishing portfolio

**RESOURCES**

Personal computers

Internet access

Desktop Publishing software

Videos

Resource books/CDs

Business cards/brochures/flyers/posters from family, friends and businesses

**KEY VOCABULARY**

Desktop publishing, graphic design, Digital Preparation, publish template, place holder, element, colour schemes, textbox, clipboard

**LINKS TO OTHER SUBJECTS**

**Language Arts -** Grade 7 Attainment Target 1 "Speaking and Listening" and Target 2 "Reading"

**Drama -** Grade 7 Attainment Target 1 "Exploring and Creating"

**Technical Vocational Education -** Grade 7 Attainment Target 1 "Creativity and Innovation" and Attainment Target 3 "Apply solutions"

**Visual Arts -** Grade 7 Attainment Target

### Range of 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

This unit serves as an introduction to solution development, to engage 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 for the Teacher

Problem Solving is a skill needed to effectively develop programming skills. It is critical that the method used to deliver problem solving concepts 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.

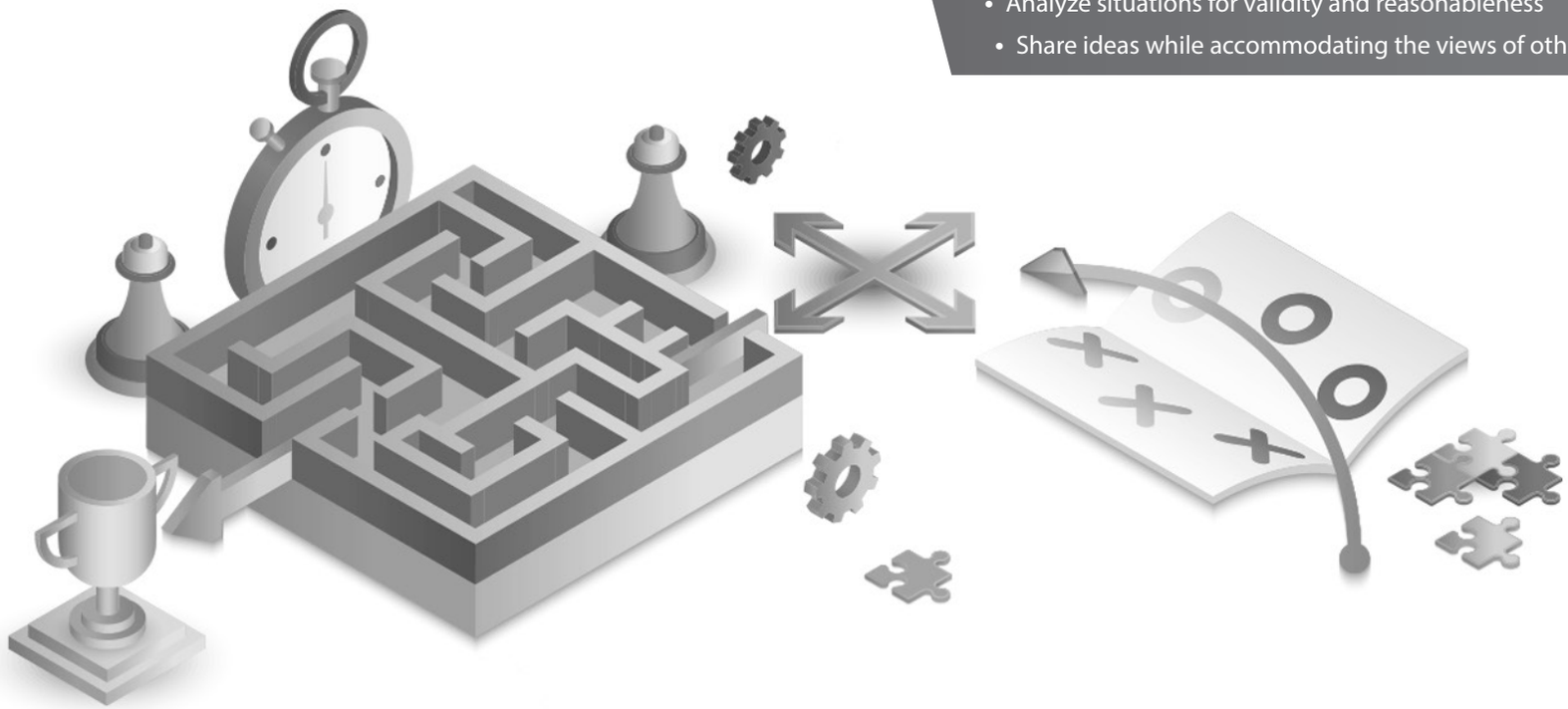
Students are to be stimulated and facilitated while learning. Time should be allocated for discovery learning and focus should not be on what is correct or accepted but on evaluating answers arrived at by the students and allowing them to analyze and critique their findings. Usually there are many ways 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).

## UNIT 7: Problem Solving and Algorithm Development (6 weeks)

**Prior Learning**

Check that students:

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



**ATTAINMENT TARGET(S):**

- Students demonstrate the skills of identifying a problem
- Students understand the steps in problem solving
- Students demonstrate an understanding of the importance of formulating a problem
- Students understand the importance of Algorithm in solving problems

**OBJECTIVES**

**Students will:**

- Define the terms: 'problem", 'process', problem solving', 'algorithm'
- Describe simple processes in everyday life
- Explain the steps involved in problem solving process
- Devise algorithms to solve real life problems
- Explore characteristics of a good algorithm
- Compare algorithms and select the best option
- Describe the importance of an algorithm
- Design storyboard(Visual or Textual)
- Collaborate in group activities

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| **Students will:**<br>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. | Communicate ideas and construct new knowledge | Acceptable explanations given for the terms drug |
| 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.<br>Select a problem from a "bag" and give the steps to solve the problem.<br>With teacher's assistance derive the problem solving steps process. | Collaborate in groups to share ideas<br>Construct information | Accurately described the problem solving process |
| 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. In small groups use the problem solving process to discuss and record examples of how they will solve the problem below.<br>In a small community, on Bernard Avenue there 5 houses in a row in the following colours: black, green, gold, white and purple.<br>• In each house lives the following families: Jones, Williams, Brown, Smith and Hall<br>• Each enjoys the following beverages: orange juice, coffee, milk, tea and water.<br>• Each family represents the following jobs: teacher, driver, manager, artist and lawyer.<br>• Each family keeps the following pets: cat, dog, pigeons, fish and snake.<br>• The Williams' drink tea<br>• The green house is on the left of the white, next to it.<br>• The owner of the green house drinks coffee.<br>• The teacher rears pigeons.<br>• The owner of the purple house is a lawyer.<br>• The person living in the house in the centre drinks milk.<br>• The Smiths' lives in the first house. | Problem identification<br>Evaluate situations and develop solutions<br>Collaborate and create solutions<br>Synthesize and make comparisons<br>Analyze problems and apply knowledge | Correctly apply the problem solving process to problems<br>Solution accurately reflects the problem solving process |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| • The artist lives next to the person who owns a cat.<br>• The man who keeps a dog lives next to the lawyer.<br>• The driver drinks orange juice.<br>• One of the Brown family members is a manager.<br>• The Smiths lives next to the black house.<br>• The Artist has a neighbour who drinks water.<br>Who owns the fish? Justify your answer. | Demonstrate the communication process and identify the necessary elements of communication | Chart/game correctly shows the communication process. |
| 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. | View for information<br>Share and discuss ideas | |
| 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.<br>Compare algorithms and determine the best solution based on the characteristics of a good algorithm.<br>OR<br>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. | Analyze and discuss problems apply problem solving process<br>Develop algorithm<br>Compare algorithms | Algorithm satisfactorily developed and illustrates elements of a good algorithm |
| 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 list on the following page in the sequence of being prepared for school. | Analyze and organize data in a logical order | List logically arranged |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|

| | | |
|---|---|---|
| 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.

Collaborate, design and present information

Satisfactorily used storyboard to illustrate solution to the problem.

Correctly developed algorithm observing problem solving process and algorithmic procedures

## Learning Outcomes

Students who demonstrate understanding can:

- Define the terms Problem and Algorithm
- Understand the steps involved in solving a problem
- Devise solutions to problems
- Provide alternate solutions to problems

## Points to Note

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.

## Extended Learning

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

**RESOURCES**

Multimedia presentation kit

Videos

Resource books/CDs

Interactive Digital games

**KEY VOCABULARY**

problem, problem-solving, algorithm, solution, decomposition, **Problem-Solving Step**s: 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

**LINKS TO OTHER SUBJECTS**

**Language Arts -** Grade 7 Attainment Target 1 " Speaking and listening" and Target 2 "Reading"

**Technical Vocational Education -** Grade 7 Attainment Target 1 "Creativity and Innovation" and Attainment Target 3 "Apply solutions"

**Language Arts -** Concept Mapping and Essay Writing

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# INFORMATION TECHNOLOGY

## GRADE 8 UNITS

## TERM 1

### Unit 1

**Health and Safety**

Demonstrate health and safety practices while operating the computer system

- Proper hardware handling when connecting and disconnecting peripheral devices
- Software compatibility
- Proper care and maintenance of computer equipment and accessories.

### Unit 2

**Foundations of Hardware and Software**

Demonstrate competence in the use of hardware devices, and software productivity tools.

Hardware

Software

Productivity Tools (Advanced Word & Basic Spreadsheet)

## TERM 2

### Unit 3

**Data Communication, Networking and Internet**

Understand the application of communication technologies in everyday life

- Data communication process
- Transmission Direction
- Data Communication and Networking devices
- Transmission media (Wired and Wireless)
- Internet Resources
- Protocols

### Unit 4

**Computer Ethics**

Demonstrate a responsible, moral and ethical approach to using information and suitable resources on the Internet.

- Understand the need for appropriate behaviour when using the Internet.
- Locate and select relevant information on the World Wide Web
- Evaluate and present accurate information

### Unit 5

**Computing Careers**

Understand the importance of ICT careers in everyday life.

- New careers in ICT
- Jobs functions in the IT department

## TERM 3

### Unit 6

**Multimedia Authoring**

Demonstrate their understanding of the use of multimedia authoring tools to create videos

### Unit 7

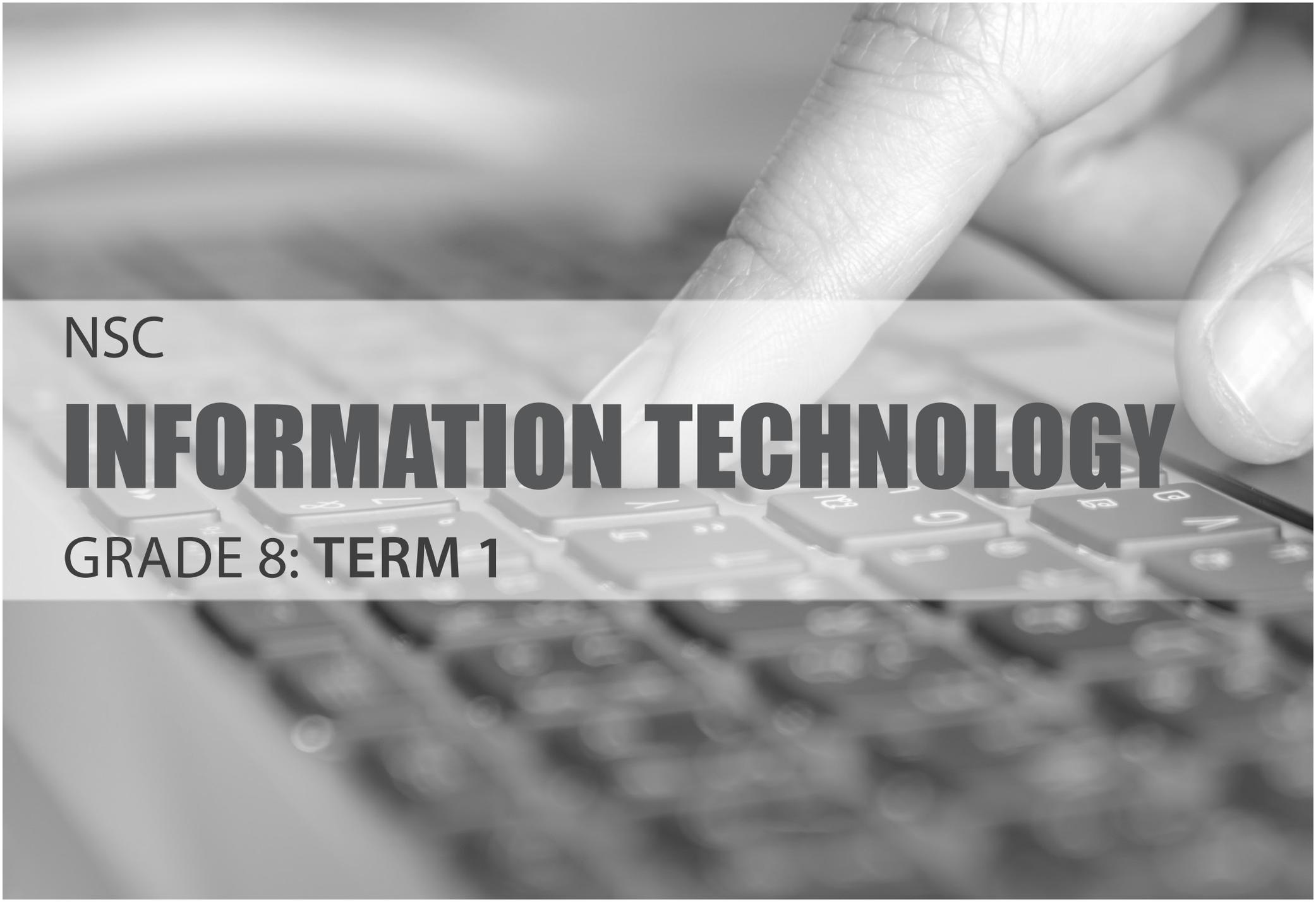
**Problem-Solving and Algorithm Development**

Demonstrate their understanding of constructing algorithms for real world problems

- Flowcharting

### Unit 8

**Algorithm Development**



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# INFORMATION TECHNOLOGY

GRADE 8: **TERM 1**

### Range of 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 hardware and software requirements for the efficient and effective operation of computer systems. They will also learn about the proper care and maintenance of computer systems.

## Guidance for the Teacher

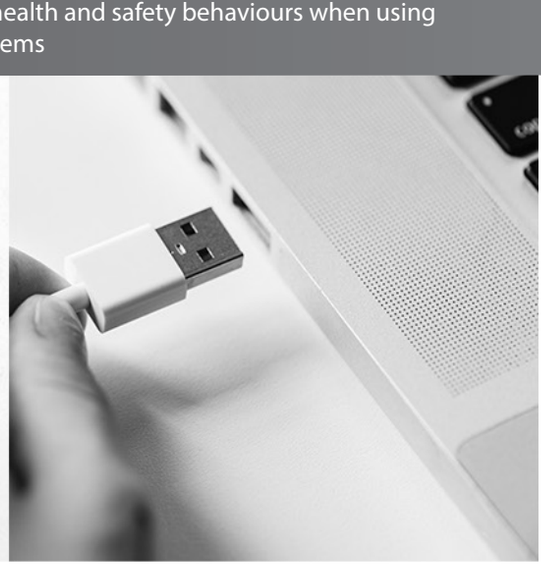
Teachers should equip students with the knowledge and skills they will need to provide proper care and maintenance of electronic devices. They should give students the opportunity to demonstrate proper care and maintenance of the computer system. In addition, teacher should ensure that students practise 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.

## UNIT 1: Health and Safety (3 weeks)

**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



**ATTAINMENT TARGET(S):**

- Students apply Health and Safety procedures to the use of a computer system.
- Students demonstrate Health and Safety Practices while operating the computer system.

**OBJECTIVES**

**Students will:**

- List at least three of the most common computer cable types
- Demonstrate correct procedure when connecting and disconnecting peripheral devices
- Demonstrate proper care and maintenance of computer equipment and accessories.
- Discuss system requirements for software compatibility
- Design a computer or electronic devices safety programme

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| **Students will:**<br>View video of people operating in a lab, discuss appropriate and inappropriate behaviours. In groups create a list of lab rules and share with whole class. | Observe to obtain information<br>Summarize information<br>Discuss and share ideas<br>Teamwork - ability to work cooperatively with others | Acceptable list of external adaptations given |
| Given pictures of computer cables and ports, match the cable to its appropriate port | Classifying | Correctly match computer cable to its appropriate port |
| Observe teacher/technician connect and disconnect peripheral devices and discuss procedure.<br>• Identify cables<br>• identify appropriate ports<br>• ensure that the cables are securely connected to ports<br>In groups, practise to connect and disconnect peripheral devices. | Analyze problematic situations and select appropriate solutions | Correctly connect and disconnect peripheral devices |
| 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 | Interpret system specifications | Correctly identify hardware specifications of a computer system |
| 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). | Verbally express ideas | Correctly determine software compatibility based on system properties |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| 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 | Devise and justify strategy | Safety program devised accurately depicts awareness of safety when using electronic devices and strategies are satisfactorily justified |

## Learning Outcomes

Students who demonstrate understanding can:

- Identify common computer cable types and their corresponding ports
- Practise appropriate procedures when connecting and disconnecting peripheral devices
- Identify hardware system requirements for software compatibility
- Practise proper care and maintenance of computer system peripheral devices
- Appreciate the importance of Health and Safety practises when using computer systems
- Strategize a safety plan on the use of electronic devices
- Work cooperatively to accomplish tasks

## Points to Note

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.

Refer to equipment manuals and other relevant material to keep current and up to date with recommended health and safety practises.

## Extended Learning

Students can visit a computer manufacturer's website which displays computers from which they customize one for personal use.

Field trip to an organization to observe procedures, operations and computer system requirements.

Discuss the impact computer usage has on our environment and on human health.

**RESOURCES**

Personal computers

Software (for installation)

Resource personnel (technician)

Textbooks

Selected list of software and their hardware requirements

Internet Access

**KEY VOCABULARY**

Peripheral devices, PC, installation, software/hardware compatibility, system specification, connect, disconnect

**LINKS TO OTHER SUBJECTS**

**Language Arts -** Grade 8 Attainment Target 1 "Speaking and Listening" and Target 2 "Reading"

**Technical Vocational Education -** Grade 8 Attainment Target 2 "Exploring methods and procedures" and Target 3 "Applying Solutions"

**Physical Education -** Grade 8 Attainment Target 3 "Health, safety and wellbeing"

**Drama -** Grade 8 Attainment Target 1 "Exploring and Creating" and Target 2 "Expressing and Enacting"

### Range of 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 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 components 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 for the 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.

## UNIT 2(A): Foundations of Hardware and Software (11 weeks)

**Prior Learning**

Check that students can:

- 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

**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, input, output, 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
- Discuss the functions of the different types of System Software
- Outline the functions of the Operating System
- Classify Application Software into their different categories
- Use Word Processing software to move blocks of text, apply page layout and paragraph formatting features within documents.
- Examine the use of a Spreadsheet software
- Define key terms associated with spreadsheets
- Investigate the different sections in the layout of a spreadsheet software
- Demonstrate the use of spreadsheet software by entering data, applying formatting features, using simple formulae and functions and creating simple charts in a spreadsheet
- Insert and manipulate tables using Word Processing software

**OBJECTIVES**

**Students will:**

- Demonstrate the use of spreadsheet software by sorting data and applying formatting features to numeric values
- Modify the layout of cells by adding borders and colour

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| **Students will:**<br>Examine case studies and answer questions to indicate prior knowledge of hardware components | Recall information | Questions satisfactorily answered |
| Create a glossary/dictionary with terms associated with the unit such as: input devices, output devices, data, processing, storage, storage device, storage media based on class discussions. | Think critically and express ideas | Glossary/ Dictionary created |
| 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.<br><br>OR<br>Play interactive online/ offline games related to CPU | Exploring ideas and presenting information | CPU terms correctly match their definitions |
| Draw a diagram illustrating the relationship among hardware components of a computer system to accomplish data processing | Graphically illustrate information | Diagram correctly indicates the relationship among hardware components of a computer system to accomplish data processing. |
| OR<br>In groups, describe a component of the computer system and describe its relationship to othercomponents | Presenting information orally | Explanation correctly indicates the relationship among hardware components of a computer system to |
| 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 | Compare information | Input devices correctly categorized as manual or automated |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| 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. | Categorize information | Output devices correctly classified as producing hardcopy OR softcopy output |
| 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. | Infer conclusions from clues | Output devices accurately categorized as hardcopy or softcopy output |
| Watch video clips of different output devices at work then complete a worksheet where they match different Output Devices and their functions. | Observe to obtain information | Output devices accurately matched with their functions |
| 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. | Verbally express ideas | Units of computer storage arranged in the correct order |
| Discuss different storage media and their uses. In groups, suggest with reasons, the most appropriate storage medium to be used in a given situation or for specific types of data. | Teamwork - ability to work cooperatively with others | Most appropriate storage medium suggested for each situation or type of data given |
| In groups, create a model of a computer system and label the parts. | Design and produce a model of a computer system | Model accurately depicts a computer system with correct labels. |
| Create a scrapbook of the different Hardware devices (Input Devices, Output Devices, Processing Devices, Storage Devices) giving their names and functions. | Compile information | Scrapbook satisfactorily completed on different hardware devices (Input Devices, Output Devices, Processing Devices, Storage Devices) |
| Participate in a guided online discussion forum sharing information on system software and their functions. | Discuss and share ideas | Accurately complete a closed question exercise on system software and their functions |
| View and discuss a multimedia presentation on the functions of an Operating System | Observe to obtain information | |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| Play a game of "Who am I?" to identify operating system functions– clues will be given describing functions. | Infer conclusions from clues | Accurately identify the functions of an Operating System from the "Who am I?" activity |
| 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) | Categorize information | Software correctly classified as general purpose, custom written, integrated or specialized. |
| 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. | Manipulate WordProcessor | Document satisfactorily completed according to the formatting features presented in the hard copy Text-based document |
| Retrieve a saved document and practise cut/copy/paste blocks of text within document. | Manipulate hardware and software tools | Reorganize information in given document using cut/copy/paste feature |
| Use table feature of a word processing programme to prepare an electronic copy of their school time table. | Manipulate WordProcessor | Timetable satisfactorily created |
| Through guided discussion, give examples of situations when it is more appropriate to use a Spreadsheet Software to manipulate documents. | Express ideas orally | |
| Discuss key terms associated with spreadsheet from a projected image of a spreadsheet window then complete a crossword puzzle using these terms. | Discuss and share ideas | Crossword puzzle with spreadsheet terms correctly completed |
| 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. | Observe to compare and contrast | Parts of the spreadsheet application interface correctly labelled |
| View a video demonstrating how data is entered into cells and formatted. | Observe and record information | |
| Observe teacher computing using simple arithmetic formulae/ functions in a spreadsheet, and then engage in a discussion about their observations. | Observe and record information | Formulae and functions appropriately used in a spreadsheet document to solve problems. |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| Demonstrate solving a problem using specific electronic spreadsheet arithmetic operations. | Use spreadsheet to solve problems | Output devices correctly classified as producing |
| 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. | Analyse information and draw conclusions | Appropriate chart type selected based on scenarios.<br>Data graphically represented using appropriate charts |
| Explore the use of a chart wizard in an electronic spreadsheet to create appropriate charts to graphically represent given data. | Observe spreadsheet software | |
| Create electronic portfolio of simple documents that were generated in spreadsheet application; for example, Mark book, Student's Time Table | Reproduce document using Spreadsheet Software | Electronic portfolio created satisfactorily |
| 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 like the table below:<br><br>Apply the following formatting features to their data:<br>• Make all the titles and names bold<br>• Give the Column titles a yellow background<br>• Give the names a blue background<br>• Place border around the cells (rows and columns)<br>• Sort the data by the different column headings | Collect data<br>Manipulate spreadsheet software | Document satisfactorily completed with specified formatting features applied |

| Name | Height | Age | Shoe Size |
|---|---|---|---|
| Anna | 120cm | 12 | 3 |
| Beth | 127cm | 11 | 2 |
| Simon | 140cm | 12 | 4 |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| 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. | Observe<br>Manipulate spreadsheet software | Document satisfactorily completed according to the formatting features presented in the hard copy text based document<br>Documents satisfactorily completed with appropriate formatting features applied |

## Learning Outcomes

Students who demonstrate understanding can:

- Recognize the functions of the hardware components of a computer system
- Understand the role of the CPU and its components
- Understand the uses of different input devices
- Identify different output devices and their uses
- Describe different storage media and their uses
- Organize units of storage into a specific order
- Explain the functions of the different types of system software
- State the functions of the operating system
- Differentiate among the categories of application software
- Explain the purpose of spreadsheet software
- Define key terms associated with spreadsheet
- Apply data formatting features, use simple formulae and functions and create simple charts in a spreadsheet

| Points to Note | Extended Learning |
|---|---|
| Teacher must refer to guidance note at the beginning of this unit.<br>Only Pie and Column/Bar Charts should be taught in this Unit. | Create a study timetable using a word processing software<br>Create a budget using a spreadsheet software |

**RESOURCES**

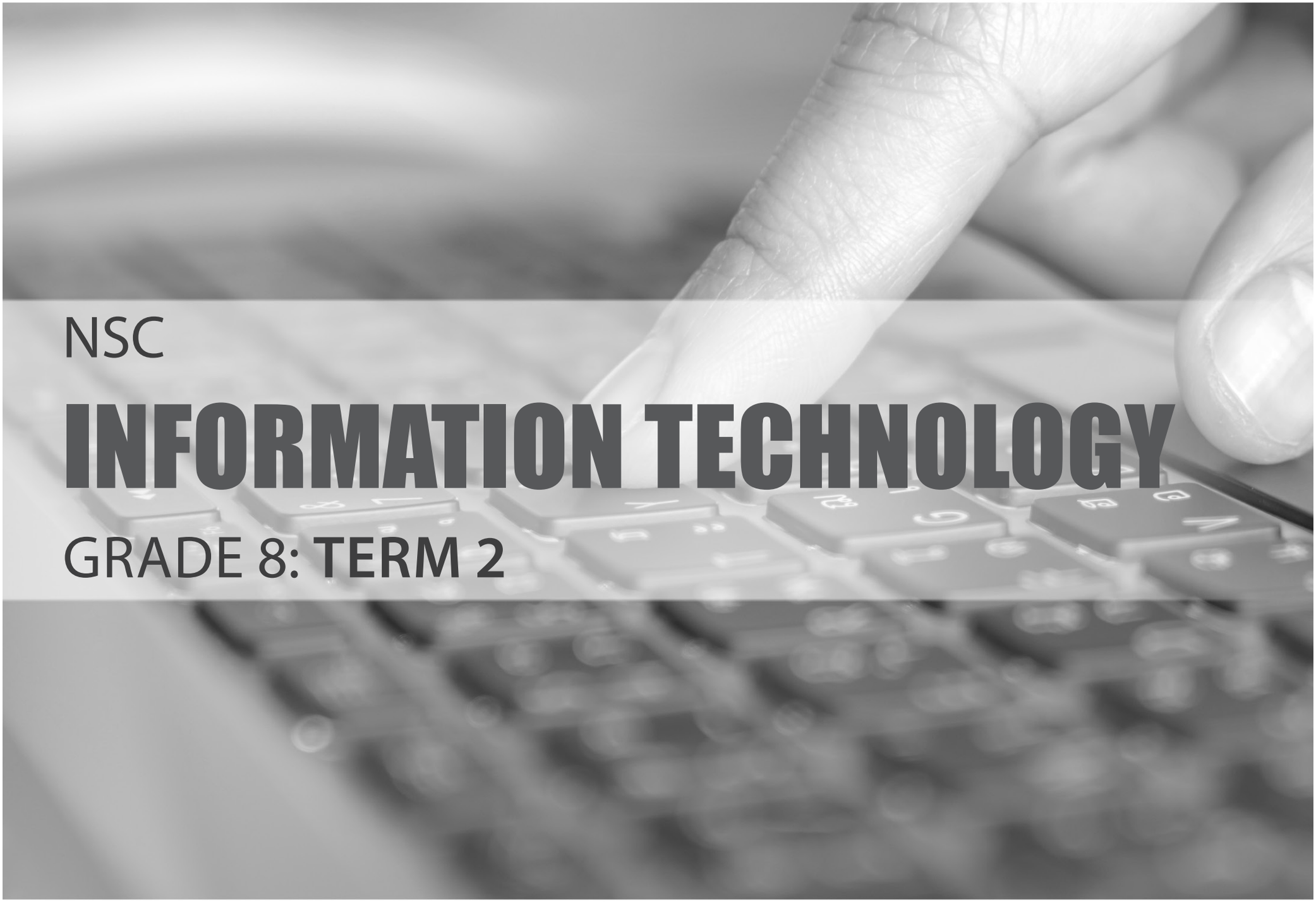
Personal computers
Spreadsheet software, word processing software
Multimedia Presentation Kit
Videos
Textbook/Worksheet
Cards
Internet Access

**KEY VOCABULARY**

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

**LINKS TO OTHER SUBJECTS**

**Language Arts -** Grade 8 Attainment Target 1 "Speaking and Listening" and Target 2 "Reading"
**Technical Vocational Education -** Grade 8 Attainment Target 2 "Exploring methods and procedures" and Attainment Target 3 "Applying Solutions"



NSC

# INFORMATION TECHNOLOGY

GRADE 8: **TERM 2**

### Range of Content

Students will learn:

Additional terms associated with data communication which include-

- 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, broad cast 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, using 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 for the Teacher

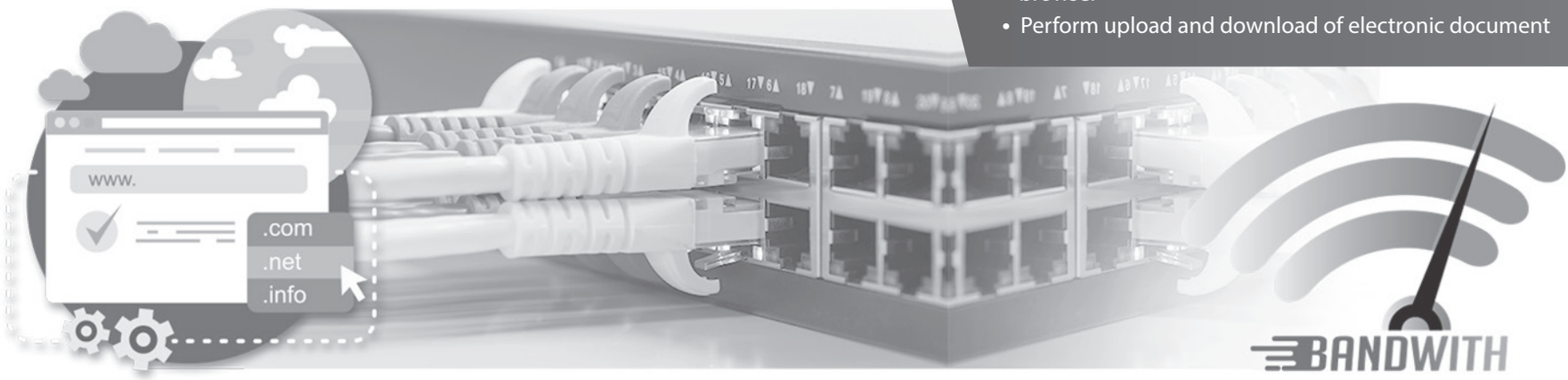
Where possible, teachers should demonstrate the communication process with several of today's common communication tools (whatsapp, Skype, Facebook, and email clients, among others); with the aim of having the students identify the required protocol(s).

## UNIT 3: Data Communication, Networking and Internet (5 weeks)

**Prior Learning**

Check that students can:

- 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




**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 theWorld 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, voiceband, 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 Criteria |
|---|---|---|
| **Students will:**<br>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. | Synthesize information | |
| 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 on another 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. | Listen, discuss to prove understanding | Discussion accurately contrasts the digital signal and the analogue signal |
| 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. | Observe and interpret | Transmission modes correctly identified |
| 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. | Collaborate to complete puzzle<br>Discuss and share ideas | Completed puzzle accurately and satisfactorily explained the components of data communications |
| Create a Picture Dictionary outlining data communication media along with their characteristics | Research and present information | Data communication media accurately characterized |
| View teacher prepared presentation on Protocols, highlighting the meaning of related and discuss cases in which each protocol is used e.g. HTTP found at the beginning ofsome web addresses.<br><br>Examine the scenario and determine the most appropriate data communication protocol. | Observe and interpret information | |

| Scenario | Protocol |
|---|---|
| Surfing from one webpage to another | |
| Downloading an attachment | |
| Error message that says a requested service is not available | |
| Accessing email | |

| | |
|---|---|
| Analysis of scenario | Matches the best suited protocol satisfactorily to a given Scenario |

## Learning Outcomes

Students who demonstrate understanding can:

- 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.

## Points to Note

Teacher must refer to guidance note at the beginning of this unit.

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.

Teacher must peruse all videos to be seen by students, ensuring to show content that is relevant to the lesson.

## Extended Learning

Use advance search features to locate content for their search text within other types of media, such as videos, images, and sound, among others.

Students create a portfolio/scrapbook with the aim of tracking additional protocols that are prominent.

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.

**RESOURCES**

Communication/VoIP software

Personal Computers equipped with microphones, speakers and webcams

Textbooks

Internet Access

**KEY VOCABULARY**

Simplex, Duplex, Half Duplex, Hyper Text Transfer Protocol, Transfer Control Protocol/Internet Protocol, Ethernet, File Transfer Protocol, Transmission Media, Wireless, Wired, Coaxial, Satellite, Microwave

**LINKS TO OTHER SUBJECTS**

**Language Arts**- Grade 8 Attainment Target 1 "Speaking and Listening" and Target 2 "Reading"

**Technical Vocational Education** - Grade 8 Attainment Target 2 "Exploring methods and procedures" and Target 3 "Applying Solutions"

**Drama** - Grade 8 Attainment Target 1 "Exploring and Creating"

### 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.

### Range of 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.

### Guidance for the 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.

## UNIT 2 (B): Foundations of Hardware and Software (6 weeks)

**Prior Learning**

Check that students:

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

```
    if (conn == NULL)
    {
      fprintf(stderr, "Failed to create CURL connection\n");

      exit(EXIT_FAILURE);
    }

    code = curl_easy_setopt(conn, CURLOPT_ERRORBUFFER,
errorBuffer);
    if (code != CURLE_OK)
    {
      fprintf(stderr, "Failed to set error buffer [%d]\n",
code);

      return false;
```

```
    if (COMPARE((char *)name, "TITLE"))
    {
      context->title = "";
      context->addTitle = true;
    }
    (void) attributes;
}

//
//  libxml end element callback function
//
static void EndElement(void *voidContext,
                       const xmlChar *name)
{
```

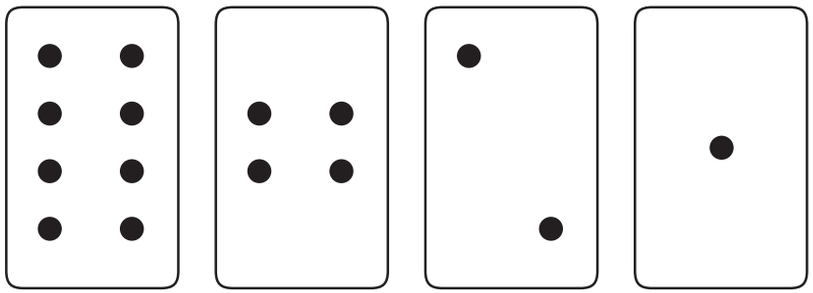
**ATTAINMENT TARGET(S):**

- 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 software applications
- Demonstrate copying sections of data created in a spreadsheet document to a word processing document.
- 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 |
|---|---|---|
| **Students will:**<br>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 document and type a report on their findings. Apply appropriate formatting features to their word processing document. | Research information<br>Manipulate spreadsheet and wordprocessing software | Documents satisfactorily completed with appropriate formatting features applied |
| 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:<br>  <br>After observing the cards, discuss the followingquestions:<br>Discuss:<br>• What do you notice about the pattern of the dots from one card to the next<br>• How many dots would be on subsequentcards<br>• 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 with four and two up and turn down the others. Once face up, a 1 is used to represent that card? And once turned down, a zero used; therefore, the solution would be 0 110. | Observe<br>Make inferences from patterns<br>Discuss | |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| View a video that shows tiny transistors/ switches inside a computer system that represents on/ off (1 and 0) switches. | Observe for information | |
| 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. | Convert numbers | Convert numbers accurately |

## Learning Outcomes

Students who demonstrate understanding can:

- ✔ 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

## Points to Note

Teacher should refer to guidance note at the beginning of this unit.

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.

Teacher should ensure that students understand that 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.

Teacher should explore with students to bridge the gap between the abstractness of binary concepts and how this applies practically to computing.

## Extended Learning

Use advance features of Word-processing and Spreadsheet to produce various documents

Students research on character representation in Binary for example ASCII and EBCDIC

Students explore the hexadecimal system

- 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

**RESOURCES**

Computers including word processing and spreadsheet software

Textbooks

Internet Access

Teacher created Binary cards

**KEY VOCABULARY**

Import, export, extract, copy, paste, integrated, bit, byte, bistable, binary, base 2, decimal, base 10, denary system

**LINKS TO OTHER SUBJECTS**

**Language Arts -** Grade 8 Attainment Target 1 "Speaking and Listening" and Target 2 "Reading"

**Technical Vocational Education -** Grade 8 Attainment Target 2 "Exploring methods and procedures" and Target 3 "Applying Solutions"

**Drama -** Grade 8 Attainment Target 1 "Exploring and Creating"

**Mathematics**

### Range of 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

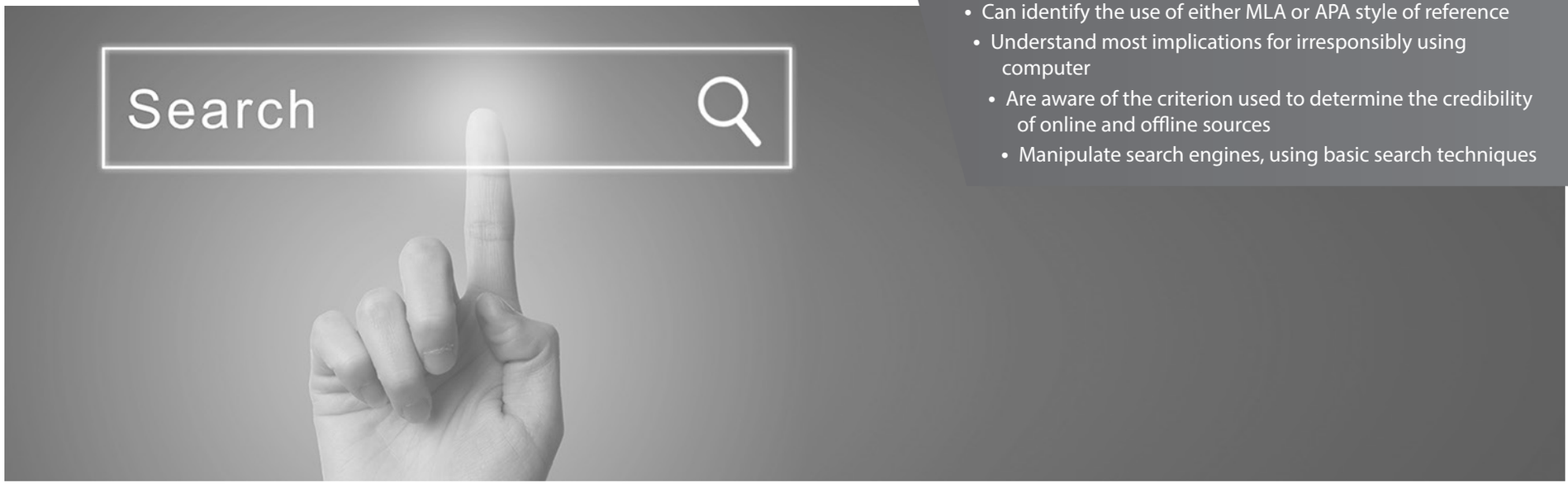
### About the Unit

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 assists in developing skills for the 21st century learnerand shows the 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 behaviours, 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 for the 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. Videos and role play should also be used to demonstrate responsible ethical behaviours when using the Internet.

## UNIT 4: Computer Ethics and Research (4 weeks)




### 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
- Manipulate search engines, using basic search techniques

**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 responsible/ethical practices
- 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 criteria
- 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 |
|---|---|---|
| **Students will:**<br>(Be given strips of paper with situations in which they must) 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 practice that should be applied. Examine the term "netiquette" and brainstorm to determine the definition. | Role play and brainstorm | The term netiquette satisfactorily defined |
| Read the following scenarios and then discuss and provide justification for whether theythink ethical or unethical behaviours ensued. Give arguments to support their stance:<br>• A Grade 8 girl types her age as 18 years old so as to gain access to a certain website.<br>• An employee is assigned PC, however, there is limited access to the software needed to do his/her job. The employee copies licensed software from a friend outside of the company to use at work.<br>• 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.<br>• 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 | Discuss information | Scenarios adequately described as ethical or unethical with justifications provided |
| Be placed in small groups and be given various settings, for example<br>1. Posting pictures on Social Media<br>2. Sending emails<br>3. Commenting on online articles<br>4. Participating in an online course thread<br>5. Posting information about persons on Social Media<br>Brainstorm and generate a list of Do's and Don'ts when involved in the settings above.<br>Present lists to peers/class for discussion. | Brainstorm and discuss information | List of Do's and Don'ts appropriately address behaviours on the internet |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| Examine the Jamaican Cybercrimes Act to identify at least three (3) practices that arepunishable by local laws.<br>OR<br>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. | Analysis of information<br>Conducting of interviews | |
| 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 | Collaborate to complete task | Presentation accurately describes the roles and functions of at least three Jamaican organizations which protect content developers |
| Brainstorm, discuss and compile a list of advance Internet search techniques. | Discuss information | List satisfactorily depicts advance internet search information |
| 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: | Conduct research | Presentation satisfactorily describes online research strategies |
| 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 foundon the Internet using the checklist generated. (Checklist should focus on criteria to evaluate information characteristics such as accuracy, currency, relevance and authorship/publishing body)<br>OR<br>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. | Create checklist<br>Evaluate information source | Checklist created accurately captures criteria used to evaluate information.<br>Information sources correctly evaluated.<br>Information sources correctly evaluated |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| 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. | Conduct research | Document prepared correctly, emphasized MLA or APA style of referencing |
| 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:<br>*2010. The Dream Maker. Brown, Paul*<br>Students should reorder it to read:<br>*Brown, Paul (2010). The Dream Maker* | Apply knowledge | References correctly reordered according to APA or MLA format |

## Learning Outcomes

Students who demonstrate understanding can:

- Define the term netiquette
- Use at least five criteria to Evaluate information accessed on the World Wide Web
- Demonstrate appropriate behaviours when using the Internet
- Practise responsible use of the computer and the Internet
- Use the MLA or APA styles of referencing to cite online and offline sources
- Articulate the steps to locate and select information on the WWW using advanced search strategies

## Points to Note

Teacher must refer to guidance note at the beginning of this unit.

Teacher should collect frequently researched topics from different subject teachers that they asked or will ask students to research.

Teachers should source cases about 'netiquette' issues and thoroughly discuss the required ethics of posting personal and sensitive information online.

Teacher must research and guide students in observing the Cybercrime Act and Obscene Publication Act, when examining the practices for which individuals are punishable.

## Extended Learning

Students Compare ethics observed in the physical world and the digital world (cyberspace)

Students observe international cases in which prosecution of irresponsible/unethical use of Internet occurs; comparison of local consequences and applied consequences should be done

Visit a wiki and examine information using evaluation checklist.

Use advance search features to locate content for their search text within other types of media, such as videos, images, and sound, among others

| Points to Note | Extended Learning |
|---|---|
| Teacher must teach students the skill of selecting keyword from a given topic, so as to aptly formulate their search text. | |

**RESOURCES**

Computer with Internet access

Evaluation checklist

**KEY VOCABULARY**

Netiquette, citation, VoiceThread, authorship, currency, accuracy, publishing body, credibility, Broadcasting Commission of Jamaica, JIPO, JARIA, Obscene Publications (Suppression of) Act, Cybercrime Act

**LINKS TO OTHER SUBJECTS**

**Language Arts** - Grade 8 Attainment Target 1 "Speaking and Listening" and Target 2 "Reading"

**Civics** - Grade 8 Attainment Target 3 "Demonstrate an awareness of individual and collective rights, their application and attendant responsibilities"

**Drama** - Grade 8 Attainment Target 1 "Exploring and Creating"

### Range of 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 for the 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. Cooperative learning group strategies should also be employed, thus giving students to share their observations and experiences related to IT careers.

## UNIT 5: Computing Careers (3 weeks)

### 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


**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 |
|---|---|---|
| **Students will:**<br>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. | Draw/Create chart | Organizational chart satisfactorily captures the main IT positions within a Government Ministry/ Agency or Private Company |
| 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. | Present to share facts | |
| 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. | Research to gather data | Reports accurately describe roles and functions of personnel interviewed and observed. |
| Match duties and responsibilities performed by IT personnel using a table. | Matching duties with personnel | Responsibilities of IT personnel accurately matched duties |
| Debate on the topic "Since the advent of Digital Technology many jobs are madeobsolete".<br>OR | Discuss to share ideas | Debate arguments satisfactorily stressed for and against points establishing implications of computing and technology |
| Create an informational brochure to educate readers about the implications of computing and technology towards non-IT careers. | Create informational brochure | Informational brochure accurately educates readers on implications |

## Learning Outcomes

Students who demonstrate understanding can:

- Describe an Information Technology (IT) Department
- Explain the functions and roles of both IT personnel and their department within an organization
- Articulate the implications of computing and technology on non-IT career

## Points to Note

A field trip will be required or interaction with personnel from the IT department in an organization.

Teachers must assist students with the construction of their questions for interview, so as to capture data that meets the objective.

Teacher must research trending issues in health, law, and society, as they result from the use of computing and technology in non-IT careers

## Extended Learning

Students create portfolio/scrapbook entries which hoard newspaper articles of the impact of computing and technology locally and internationally.

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

**RESOURCES**

Resource Books

Computer

Internet Access

Case studies

Multimedia Presentation Kit

Resource persons

**KEY VOCABULARY**

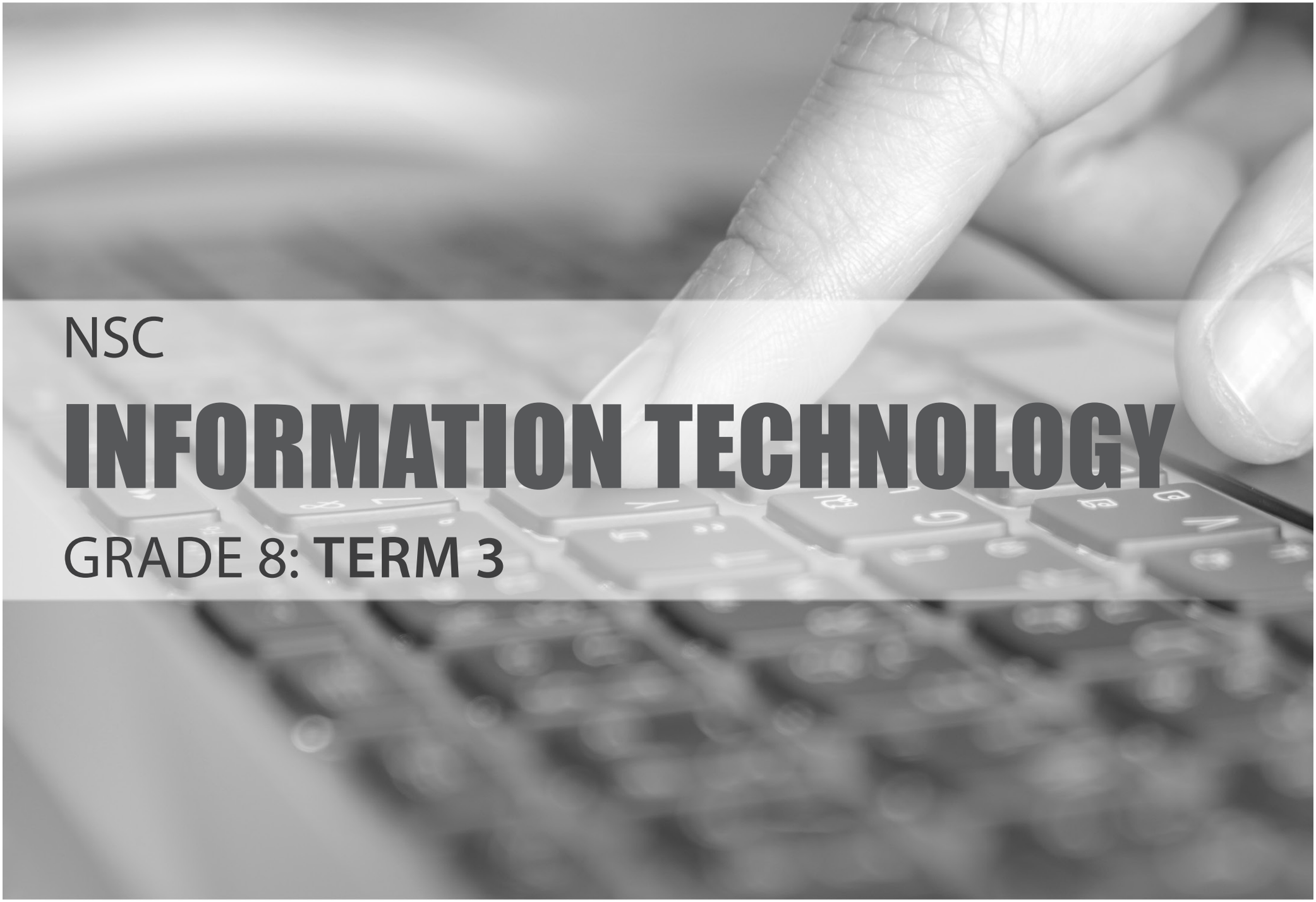
role, IT department, responsibility, duties, ICT Industry; issues (health, social, legal) of technology in non-IT career

**LINKS TO OTHER SUBJECTS**

**Language Arts** - Grade 8 Attainment Target 1 "Speaking and Listening" and Target 2 "Reading"

**Technical Vocational Education** - Grade 8 Attainment Target 4: Career Awareness"

**Guidance**



NSC

# INFORMATION TECHNOLOGY

GRADE 8: **TERM 3**

### Range of 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 c21reate simple multimedia products that integrates at least threemultimedia elements

### About the 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 21st 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 for the Teacher

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

| Copyrighted Material | Portion |
|---|---|
| Motion media | 10% or 3mins (whichever is less) sol bag |
| 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.) |

## UNIT 6: Multimedia Authoring (7 weeks)

**Prior Learning**

Check that students:

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

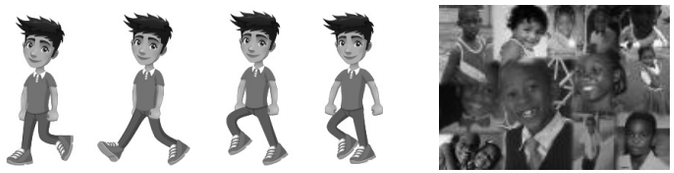
**ATTAINMENT TARGET(S):**

- 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 multi-media elements

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| **Students will:**<br>Brainstorm to derive definitions of the following terms; Multimedia, Multimedia Authoring, and Multimedia authoring tools. | Synthesize to construct knowledge | Terms correctly defined |
| View teacher created video on the historical development of Multimedia. Prepare a report on presentation viewed. | Observe for information | Report correctly captures information on the historical development of Multimedia |
| Conduct an online or offline research on the advantages and disadvantages of using multimedia. Discuss their findings | Conduct research | |
| 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. | Create picture collage<br>Collaboration | Picture collage satisfactorily shows applications in assigned field/space |
| Be shown a display of pictures highlighting five multimedia elements. Tell specific multimedia element that is shown and describe each element.<br>  <br>You can make it<br>  | Discuss pictures | |
| Match the multimedia element to its corresponding file format. For example: | Classification of elements | Multimedia elements correctly match to its corresponding file format |

| Multimedia Element | Common File Formats |
|---|---|
| Sound | .ani |
| Graphics | .mp3 |
| Text | .jpg |
| Animation | .avi |
| Video | .txt |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| In small groups, be given one of the multimedia elements (text, audio, video, animation, or graphics) conduct an online/offline research to obtain:<br>• two pictures of hardware devices used to capture assigned element<br>• the names of two software used to manipulate assigned element | Conduct research | Research satisfactorily shows hardware and software used to manipulate multimedia elements |
| Examine teacher selected areas of the Copyright Act and discuss issues and behaviours associated with legal and ethical practices governing reuse of intellectual properties. | Discuss and share information | |
| In groups, use any available graphics software to create/ edit any of the following:<br>• School crest<br>• A logo<br>• Cartoon Character<br>• 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.<br>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. | Design and create | Item created /modified satisfactorily using appropriate software |
| 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) | Create and manipulate variety of media forms | 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 who demonstrate understanding can:

- 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**

**Drama -** Grade 8 Attainment Target 1 "Exploring and Creating"

**Technical Vocational Education -** Grade 8 Attainment Target 1 "Creativity

**Language Arts -** Grade 8 Attainment Target 1 "Speaking and Listening" and Target 2 "Reading"

### Range of Content

Students will learn:

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

### About the Unit

The intention of this unit is to guide teachers in teaching the problem solving component of this curriculum. It serves as a precursor to algorithm development which will develop learners' computational thinking practices and help them to apply problem solving techniques to everyday scenarios. This unit uses a simplicity approach in its guide to demystify problem solving and program development concept. IPO charts and flowcharts will be used in the analysis of a problem.

## Guidance for the Teacher

Problem Solving is a skill needed to effectively develop computer programmes, 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 learners, this 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.

## UNIT 7: Problem Solving and Algorithm Development (4 weeks)

**Prior Learning**

Check that students can:

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


**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**

**Students will:**

- 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 |
|---|---|---|
| **Students will:**<br>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. | Conduct Research | Presentation adequately describes the purpose and components of IPO |
| In small groups (maximum three students), be given a problem (real world/computational). In groups, 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. | Analyse Problem<br>Decompose problem into given parts<br>Construct Knowledge | Problem accurately decomposed using IPO chart |
| In groups, conduct online or offline research and prepare a presentation on three methods used to represent algorithms (Pseudocode, Flow Chart, Narrative). | Conduct research | Electron shell diagrams for first 20 elements correctly done |
| Review literature to discover /record the meaning of terms such as; control structures, sequencing and selection. Discuss with class, using examples, their understanding of related terms. | Discuss information | Definition of terms accurately constructed |
| 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 pictures in correct sequencing order and explain their decision. Justify your selection. | Sequencing data<br>Justify decision | Pictures correctly placed in sequential order |
| 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 this 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. | Create scenarios<br>Evaluate decision | |
| Look at samples of completed flow charts (for e.g. billing system of a company). | Observe flowcharts | |
| 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. | Compile List | List adequately describe benefits and limitations of flow charts |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| In groups, create annotated charts showing images, names and functions of flowchart symbols: start/stop, input/output, processing, decision and flow. | Application of knowledge | Charts adequately show flow chart symbols and their meanings<br>Flow charts created adequately show the steps involved in the given algorithms.<br>Chart correctly depicting Flow Chart symbols, names and functions |
| 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. | Represent flowchart | Accurately represent algorithm using a flowchart |

## Learning Outcomes

Students will be able to:

- Use IPO charts to partition simple problems into input, processing and output components
- Explain 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

## Points to Note

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 toinsert symbols.

Developing problem solving skills require much nurturing and time so teachers should be cognizant of factors in selecting teaching strategies.

## Extended Learning

Identify problems in their environment and use the pseudocode method to develop solutions

**RESOURCES**

Textbooks, Word processing software
Chart with flow chart diagrams

**KEY VOCABULARY**

Flowchart, pseudocode, narrative, logical, parallelogram, diamond, rectangle, arrow, oval, rhombus, control structure, sequencing, selection decompose, IPO charts, Ambiguity, commands/Keywords.

**LINKS TO OTHER SUBJECTS**

**Technical Vocational Education -** Grade 7 Attainment Target 1 "Creativity and Innovation" and Attainment Target 3 "Apply solutions"

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# INFORMATION TECHNOLOGY

## GRADE 9 UNITS

## TERM 1

### Unit 1

**Health and Safety**

Demonstrate health and safety practices while operating the computer system or handling parts thereof.

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

Proper care and maintenance of equipment and accessories (lab furniture, replacement of toner)

### Unit 2

**Foundations of Hardware and Software**

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

- Hardware (Device management)
- Software (File management)
- Data representation (Data management)
- Database management software
- Integration across Word-processors, Spreadsheets, and Database Management Software

## TERM 2

### Unit 3

**Data Communication, Networking and the Internet**

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

- Applications of ICT
- Network security
- Components of URL and types of services onthe internet

### Unit 4

**Computer Ethics and Researching**

Recognise and acknowledge the owners and creators of on-line and offline material; and understand the consequences resulting from unethical practices and beware of measures to avert their unethical practices.

- Advanced Search Criteria
- Investigate characteristics of online or offline credible sources
- Citing sources and using APA and MLA referencing using websites and books

### Unit 5

**Computing Careers**

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.

- Emerging ICT careers
- ICT skills
- Computing competencies and qualifications

## TERM 3

### Unit 6

**Multimedia Authoring**

Use Hypertext Markup Language (HTML) tags to create a basic web-page; use multimedia authoring tools to create a website

- HTML tags
- Web authoring tools

### Unit 7

**Problem Solving and Algorithm Development**

Use critical thinking and analytical skills to develop simple algorithms to solve problems

- Algorithms

### Unit 8

**Algorithm Development**

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# INFORMATION TECHNOLOGY

## GRADE 9: **TERM 1**

### Range of Content

Students 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/burning/broken cables/furniture/malfunction computer systems, observe/obey no eating/drinking signs in the computer laboratory, practise proper seating/typing posture/proper disposal of carcinogenic materials such as printer toners.)
- To Diagnose and resolve basic hardware and software problems (e.g. continuous beeping sound from the keyword, monitor not powering)
- The proper care and maintenance of computer lab and electronic devices (e.g. Update anti-virus software, change printer toner, check proper connection of keyboard and mouse cables, return all devices and accessories are accounted for after use)

### About the Unit

This unit will equip students with the requisite skills needed for safe use of computer laboratories 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 for the Teacher

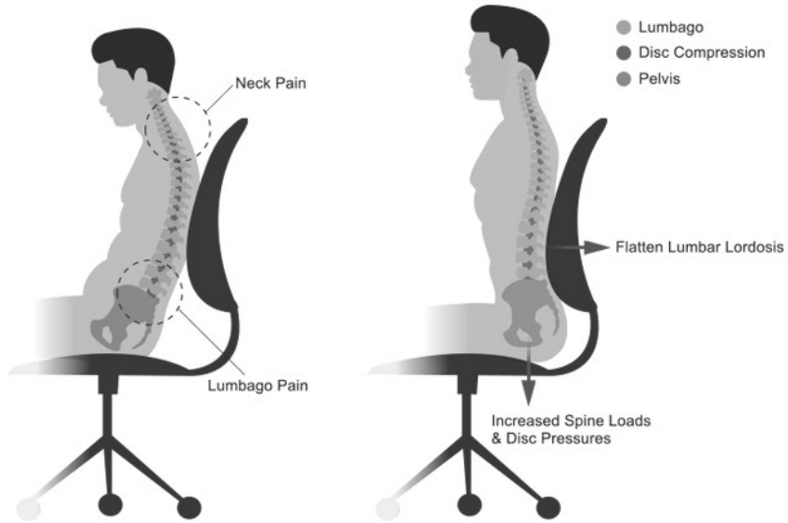
The aim of this curriculum is to encourage learning that will stimulate innovation, discovery, exploration, analysis and problem solving. Hence, teachers are expected to create opportunities where students will use the knowledge and troubleshooting skills acquired to solve everyday computer hardware 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.

## UNIT 1: Health and Safety (3 weeks)

### Prior Learning

Check that students can:

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




**ATTAINMENT TARGET(S):**

- Students understand the impact of computer systems usage has on the environment.
- Students demonstrate health and safety practices while operating the computer system or handling parts thereof.

**OBJECTIVES**

**Students will:**

- Investigate and resolve basic computer hardware problems
- Explain how Government Agencies with responsibility for Health and Safety Acts carry out their mandate in relation to ICT/IT industry
- Discuss the impact of the use of computer usage on health, safety and environment
- Revise judgments and change behaviour in light of health and safety practices when using computer system

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| **Students will:**<br>Work in pairs to investigate various scenarios related to input, output or storage devices to identify problems and determine possible solutions For example, *"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."* | Collaborate with others to identify and solve problem(s) | Computer hardware problems are properly investigated, and reasonable solutions suggested |
| In groups, use a checklist to identify and determine problems with peripheral devices and possible resolution. | Troubleshoot to solve problems | Problems correctly identified and solved |
| Through guided discussion, review the National Health and Safety Act for ICT industry. Identify Government Agencies responsible and analyze selected components of the Act. Present findings on the Agencies' mandate | Review literature | Presentation satisfactorily captures the mandate of the Government Agencies |
| 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. | Compile findings from research and communicate information. | Flyer /song /poem/multi-media presentation reasonably communicate the advantages and disadvantages of green computing. |
| 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. | Research and investigate. | Presentation depicts environmentally friendly ways of disposing of old or non-operational computer |

## Learning Outcomes

Students who demonstrate understanding can:

- Practice proper care and maintenance of computer equipment
- Correct simple hardware malfunctions
- Recognize health hazards in work environment and practice safety when using computer equipment
- Apply aspects of the Health and Safety Act for ICT to guide practices in their work environment.

## Points to Note

Teachers must refer to Guidance notes at the beginning of this Unit.

Teachers must also ensure that extreme care is taken when students are involved in troubleshooting that involves plugging/unplugging electrical equipment.

## Extended Learning

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.

**RESOURCES**

Computers
Internet access
Multimedia presentation kit
Hardware troubleshooting checklist
Personal computers and other devices to be used for trouble-shooting and
software installation
Videos
Resource books/CDs
World Wide Web

**KEY VOCABULARY**

backup, restore, hardware, printer, monitor, system unit, keyboard, speaker, install, reinstall, setup, software, troubleshoot, power outlet, carcinogenic, OSHA.

**LINKS TO OTHER SUBJECTS**

**Language Arts -** Grade 7 Attainment Target 1 "Speaking and Listening" and Target 2 "Reading"
**Technical Vocational Education -** Grade 9 Attainment Target 2 "Explore Methods and Procedures" and Attainment Target 3 "Apply Solutions"
**Physical Education -** *Grade 9 Attainment Target 3 "Health, Safety and wellbeing"*

### Range of Content

Students 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.

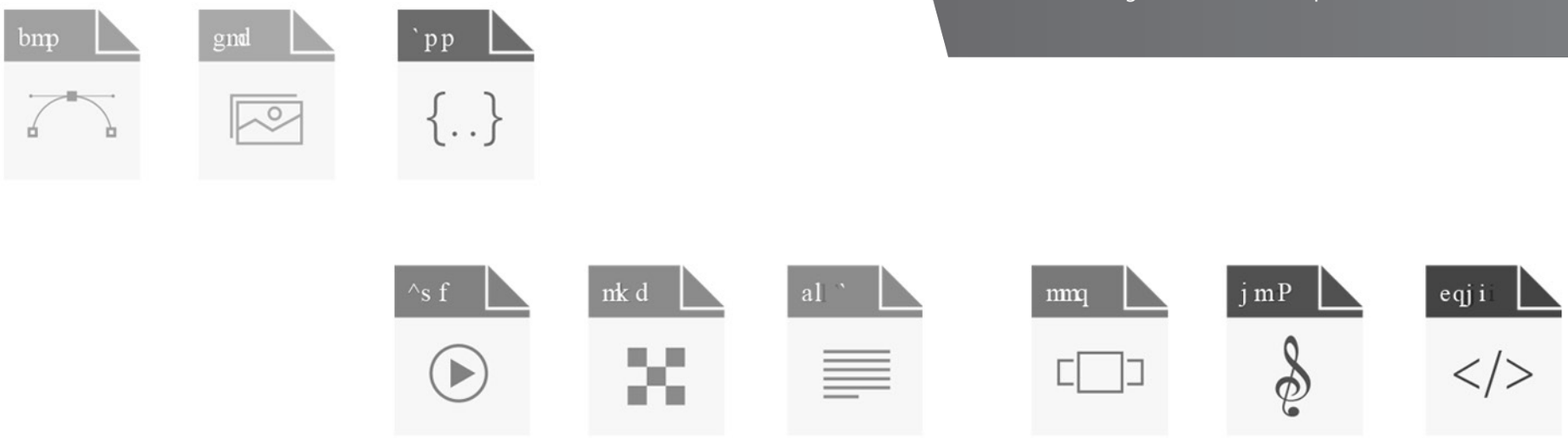
### About the Unit

As the world is becoming increasing 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 for the Teacher

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.

## UNIT 2: Foundations of Hardware and Software (3 weeks)



### Prior Learning

Check that students can:

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

**ATTAINMENT TARGET(S):**

- Students understands the purpose of hardware devices and software productivity tools in computer systems
- Students demonstrate competency in the use of computer hardware devices.
- Students demonstrate competency in the use of computer software productivity tools.

**OBJECTIVES**

**Students will:**

- Define the terms 'file' and 'file management'
- Categorize files based on their file extensions
- Solve the path to a file, with the tree directory structure
- Perform file management related tasks in a directory folder
- Discuss the role of drivers in device management
- Explain and justify the need for database management systems
- Compare electronic databases and manual databases
- Design and populate a database table
- Create simple queries and reports from single tables
- Apply the concepts of importing and exporting database objects to a word processor or spreadsheet
- Perform mail merge using a spreadsheet or database table as the source
- Perform simple binary operations such as addition and subtraction

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| **Students will:**<br>Brainstorm to arrive at definitions for the terms 'file', 'file management', and 'fileextension' | Discuss and share ideas | Accurately defined terms |
| Using the Graphical User Interface (GUI) of an operating system, categorize files into folders (according to their purpose). | Categorize files into folders | |
| Classify files into applications based on the file extensions. | Classify application files | Files are correctly classified into applications based on file extensions |
| Be given some binary numbers to carry out addition and subtraction | Compute numbers | Binary numbers accurately computed |
| 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 | Discuss and share information | |
| Discuss scenarios illustrating classification structures and explain how this is like file management for example:<br>• **Scenario # 1:** Mr. Drummond the new IT teacher at the school has been asked to identify his position on the school's organizational chart.<br>• **Scenario # 2:** Students are visiting a zoo/farm. A classmate needs directions to visit the parrot named Sue. | Discuss, analyze and share information | |
| 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. | Draw directory structure | Diagram accurately depicts path to a stored file |
| Use the Graphical User Interface (GUI) of an operating system to create, delete, rename, and move folders and files. | Create, delete, rename and move folders and files. | Correctly create, rename, delete, and move specified files and folders using GUI |
| Use a command driven interface to explore the directory structure, as well as create, delete, rename and move folders and files. | | Correctly create, rename, delete, and move specified files and folders using command line |
| Using the tree directory structure, outline the path to a specific file | | Tree directory structure accurately outlined file path |
| Practice classifying files and storing them in appropriate folders. | Classify files | |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| Conduct online/offline research to determine the meaning of the term 'device driver'. | Research information | Accurately defined terms |
| Install a new device and observe the process especially where the system indicates thatit is installing the device driver. | Install device | |
| Conduct an online/offline research to arrive at appropriate definitions of: data, database, Data Base Management System (DBMS), table/file, field, record primary key, foreign key and relationships | Research for information | Relationships correctly established between primary and foreign keys |
| Create a table to store personal information on five members of their class for example 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). | Identify elements of a database | Correctly created database |
| 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). | Recognize and establish relationship among tables | Tables use appropriate<br>-field names<br>-data types<br>-basic field properties (field size, format) |
| Arrange the elements of a database in the appropriate hierarchy. Create an appropriate concept map to demonstrate their understanding of the relationship among the terms. | | |
| Through discussion<br>• identify situations in their environment where databases are presently used<br>• compare an electronic database with a manual database system to identifyadvantages and disadvantages<br>• describe situations in their environment where a DBMS would be more suitable | Use knowledge to identify databases<br>Compare to identify advantages and disadvantages<br>Use knowledge to make decisions | Reasonable advantages and disadvantages of electronic databases highlighted |
| Create a database file using a DBMS program. Interact with the database window and identify database objects (Tables, Forms, Queries and Reports). | Create a database using application software | |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| Create tables using design view: appropriately name fields, select data types and apply basic field properties (field size, format). | Create a database using application software | Accurately defined terms |
| Select and set an appropriate field as the primary key in a table.<br>Establish relationship between tables using primary and foreign keys. | Select primary key<br>Select foreign key | |
| Use the wizard feature to create a database form. Enter, delete and modify records in a table using the datasheet view and the form. | Use database wizard | Binary numbers accurately computed |
| Perform simple select queries using query design.<br>(a) single table<br>(b) multiple tables<br>(c) single criterion<br>(d) multiple criteria | Create queries | |
| Using the wizard, create simple reports based on:<br>(a) Single table<br>(b) Multiple tables | Generate reports using wizard | |
| Revise productivity tools concepts previously learnt by:<br>• completing a simple word processing document using selected formatting features e.g. bold, italics<br>• completing a simple spreadsheet using basic functions and formulae | Recall concepts | |
| Import completed spreadsheet to create a database table. | Integrate spreadsheet and database | |
| Create queries and generate reports from the new table. | Create, delete, rename and | |
| Export queries from the database to a spreadsheet and use it to create graphs/charts. | | |
| Export graphs/charts to a word processing document. | | |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| Export database report to the created word processing document. | Integrate spreadsheet and wordprocessing | |
| Perform a mail merge operation using word processing, database and spreadsheet documents. | Integrate spreadsheet, databaseand word processing | |
| Add completed work to their electronic Information Technology portfolio | | |

## Learning Outcomes

Students who demonstrate understanding can:

- Use the operating system's features to manage the storage of files
- Demonstrate how data are manipulated in a computer system
- Produce and populate an electronic database
- Questions database using simple queries
- Generate reports from a database
- Transfer data among multiple programs in an integrated software package
- Manipulate a word-processor to create mass mailings

## Points to Note

Teachers need to be aware of the possibility for confusion when students depict files and folders in them? drawing of a file structure. Teachers should ensure that these files are not showing files having 'sub-files'.

In cases where software installation is required the teacher or technician must supervise this activity.

Teachers should feel free to incorporate new/current storage units. 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.

The creation of tables and queries should be done using design view. Forms and Reports should be done using wizards.

## Extended Learning

Students can use their DBMS skills to manage the data for inter-house competitions, clubs and societies at school

Students can collaborate to design and create a simulated information system, incorporating Database, Spreadsheet and Word Processing (mini SBA project)

## Points to Note

Teacher must revise word processing and spreadsheet with students before starting the integration activities.

Examples of databases should relate to/ target students' life experiences. 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 is manipulating these data is one of the main focus. Students many 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.

## Extended Learning

Research modern chemists who have made new contributions to the field (Nobel Prize winners in Chemistry could be a start)

**RESOURCES**

Personal computers

Internet access

Multimedia presentation kit

Hardware troubleshooting checklist

Out of use but operational personal computers and other devices to be usedfor software installation

Integrated productivity tools software package including a DBMS - free software (from the Internet) can be used

Binary worksheet

Videos

Resource books/CDs

**KEY VOCABULARY**

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

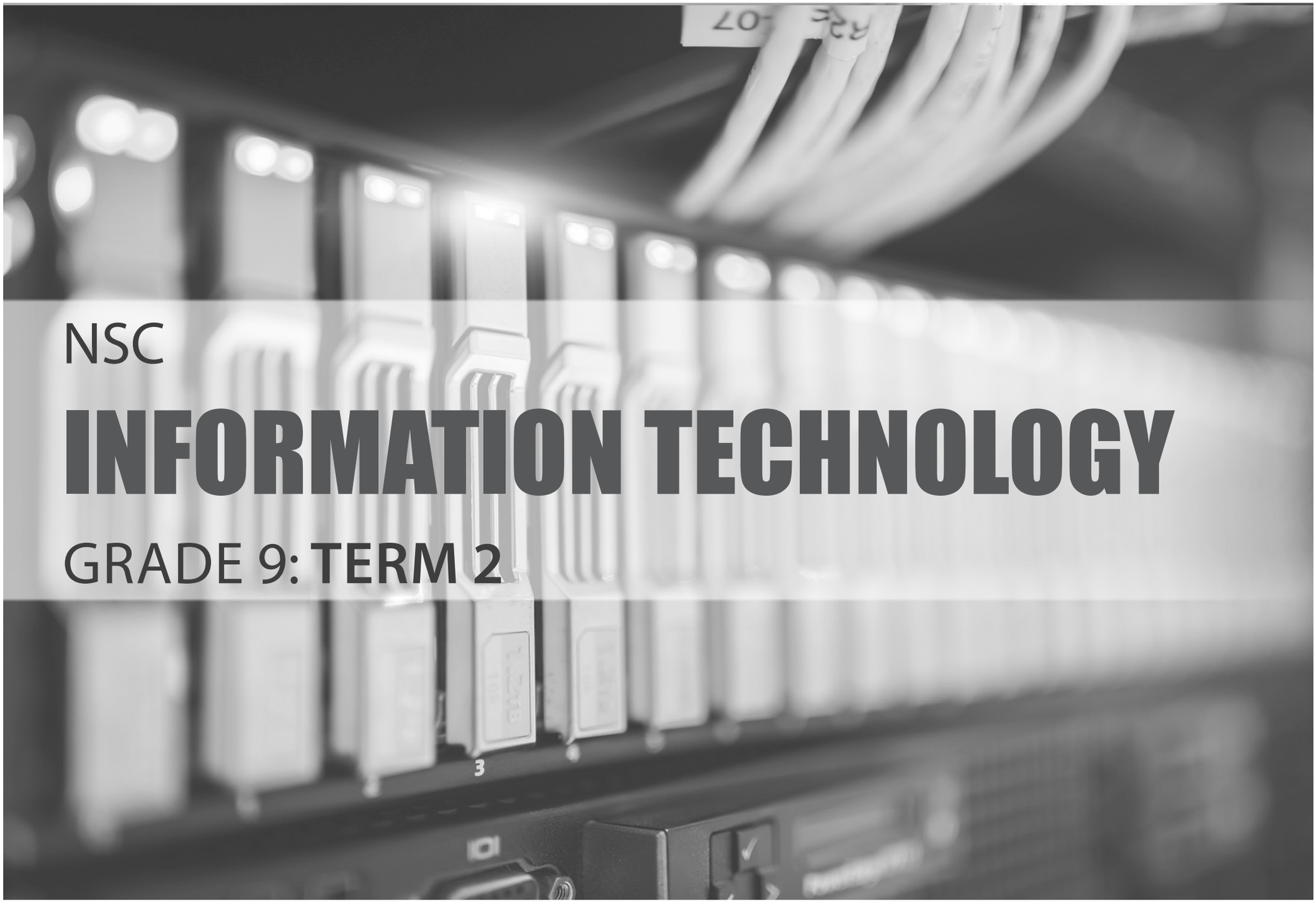
**LINKS TO OTHER SUBJECTS**

**Language Arts - Grade 7 Attainment Target 1 "Speaking and Listening" and Target 2 "Reading"**

**Mathematics** - Grade 7 Attainment Target 4 "Interpret, model and solve problems involving unknown quantities"

**Mathematics** - Grade 8 Attainment Target 1 "Number operation and Application"

**Technical Vocational Education** - Grade 9 Attainment Target 2 "Explore Methods and Procedures"



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# INFORMATION TECHNOLOGY

## GRADE 9: TERM 2

### Range of Content

Students will learn:

- To recommend and justify appropriate communication devices and communication software, for use in computer networks that are prominent in today's society (aspects of society to 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.
- The available internet services and how these can be accessed of sectors in society where 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 students thus advancing their understanding and uses of communication technologies. Additionally, upon completion of this unit student should better appreciate the uses of communication devices and related software for effective data communication. Also, students understanding of the services offered on the Internet today, and their demonstration of steps to accessing these services will be strengthen.

## Guidance for the Teacher

The Internet is a major source for 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.

## UNIT 3: Data Communication, Networking and the Internet (6 weeks)

### Prior Learning

Check that students can:

- 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

**ATTAINMENT TARGET(S):**

- 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 theeffects of a threat upon a computer network

**OBJECTIVES**

**Students will:**

- Identify at least five communication devices used with computer net works today's society
- Describe correctly at least three communication software that are used in computer networks
- Compare at least four uses of communication technologies in different types of computer networks
- Propose a modification to an existing computer network, for future expansion
- Describe the purpose of each component within a web address
- Explain how a web browser retrieves a desired web page
- Identify some characteristics of at least five distinct types of web sites
- Justify the use of two or more Internet services in an organization's department
- Describe accurately at least six threats to a computer network
- Identify correctly whether a computer network threat has compromised the availability, integrity, or confidentiality of a company's resources and services
- Determine appropriately which security measure(s) is applicable for a given situation
- Cite whether a computer network security measures is either physical or logical

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| **Students will:** | | |
| Observe two or more departments within organizations of today's society. Such observations should gather data on how the departments use the communication device and/or software to accomplish their tasks. | Research to gather data<br>Classify similar characteristics | Presentation accurately shows and explains how communication technologies are used in distinct organizations |
| Create a properly labelled diagram of an organization's computer network (physical layout). By using a legend, such diagrams must detail the type of communication devices and their locations within the computer network. | Draw to show components<br>Read diagram to establish relationships | Diagram correctly matches communication software with tasks performed within departments |
| Work in groups to conduct guided research (eg. WebQuest) which determine the technologies that are used in organizations. 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. | Compute numbers | Research/WebQuest satisfactorily depicts technologies that are used in organizations |
| Conduct explorations of computer networks for organizations, to determine the administration that is being used (intranet and/or extranets). | Explore to attain a goal<br>Follow directions to a goal | Communication devices for an organization's computer network are satisfactorily justified |
| In groups, (eg Expert groups), learn the purpose of each component of a URL. Group experts will then return to their original groups to share what they have learnt. | Collaborate to problem-solve<br>Explain facts<br>Prepare a report<br>Use steps to solve tasks | Presentation accurately describes thepurpose of each URL component |
| 1. Examine a tutorial which details the steps/procedures of how a web browser accesses a web page. Prepare a brochure or a poster which depicts the steps/procedures. | | Brochure or posture indicates correctly whether a result for a step in retrieving a web page is true or false |
| Participate in a guided discovery activity, to determine the primary traits of each type of web site. *Prepare a check list of web site traits, as well as a list of web site to examine and find the given traits.* | Follow directions to a goal<br>Identify specific traits | Check list of web site correctly matches corresponding traits |
| Prepare a videocast which educates participants about using at least six services of the Internet. | Present to share facts | Videocast satisfactorily informs on services on the Internet |
| Listen and discuss presentations or reports on companies that have had experiences with threats to their computer network. Then create a cross wordpuzzle highlighting words that provides adequate description of | Analyse to derive conclusion<br>Identify cause and effect | Crossword puzzle successfully captures word clues that provides adequate description of computer network threat for students |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| Examine case studies about computer networks for organization that have been hacked and share/report their findings and suggest suitable security measures for implementation. | Establish coherent patterns<br>Synthesize information | Report accurately describes a computer network threat and satisfactorily suggests security measures to mitigate against threats |
| Demonstrate, by use of role play, how at least six distinct computer network threats affect organizations today. | Reproduce a practice/idea<br>Collaborate to meet goals | Relationships correctly established between |
| Create a storyboard which depicts the application of both logical and physical security measures to a computer network for an organization. | Formulate original problem<br>Arrange steps to meet goals | Storyboard accurately depicts logical and physical security measures |
| Work in groups to create a wiki page related to concepts learnt about computer network threats. *Ensure students are guided to describe the computer network threat, as well as recommend apt solutions.* | Recommend solutions<br>Apply information | Wiki page correctly captures information on computer network threats |

## Learning Outcomes

Students who demonstrate understanding can:

- Describe prominent communication devices which are used in computer networks
- Explain the importance of communication devices and communication software for organizations
- Identify prominent computer network threats
- Justify an appropriate security measure for an identified computer network threat
- Use search operators to locate information
- Perform the steps for conducting an advanced search

## Points to Note

Teachers must refer to Guidance notes at the beginning of this Unit.

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.

## Extended Learning

Students interview their parents or a family friend to ascertain how they use technologyat work.

Students can investigate and report on what type of network configurations are in effect in their school

## Points to Note

Teacher must peruse videos to be seen by students, ensuring relevance of content. Teacher must be aware of physical and logical means of protecting computer networks.

Teachers must conduct a site visit prior to carrying students on excursion to verify the organization's computer network devices and software. Teachers must seek permission to create recordings of field trip observation.

Teachers must be aware of the varied computer network threats that exist,and appropriate computer security measures to address them.

*Allow students to document their observations and then apply and note the steps so as to verify their findings with popular web browsers.*

## Extended Learning

Students create a portfolio tracking several types of web sites that are prominent, while comparing those of the same type.

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.

**RESOURCES**

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

**KEY VOCABULARY**

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.

**LINKS TO OTHER SUBJECTS**

**Language Arts -** Grade 9 Attainment Target 1 "Speaking and Listening" and Target 2 "Reading"

**Social Studies -** Grade 9 Attainment Target 2 "Develop understanding of the interdependent relationship between man and his environment"

### Range of 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 APA/MLA
- The ethics of posting personal and sensitive information online.
- The legal consequences of unethical behaviours (such as software piracy, cyber bullying, 'cyber stalking')
- Associated psychological consequences of unethical behaviours on victims
- Techniques and strategies associated with searching for multiple content on the Internet (searching for text, document, images, sound, and video; using operators n 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 21st 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 a responsible digital citizen.

## Guidance for the Teacher

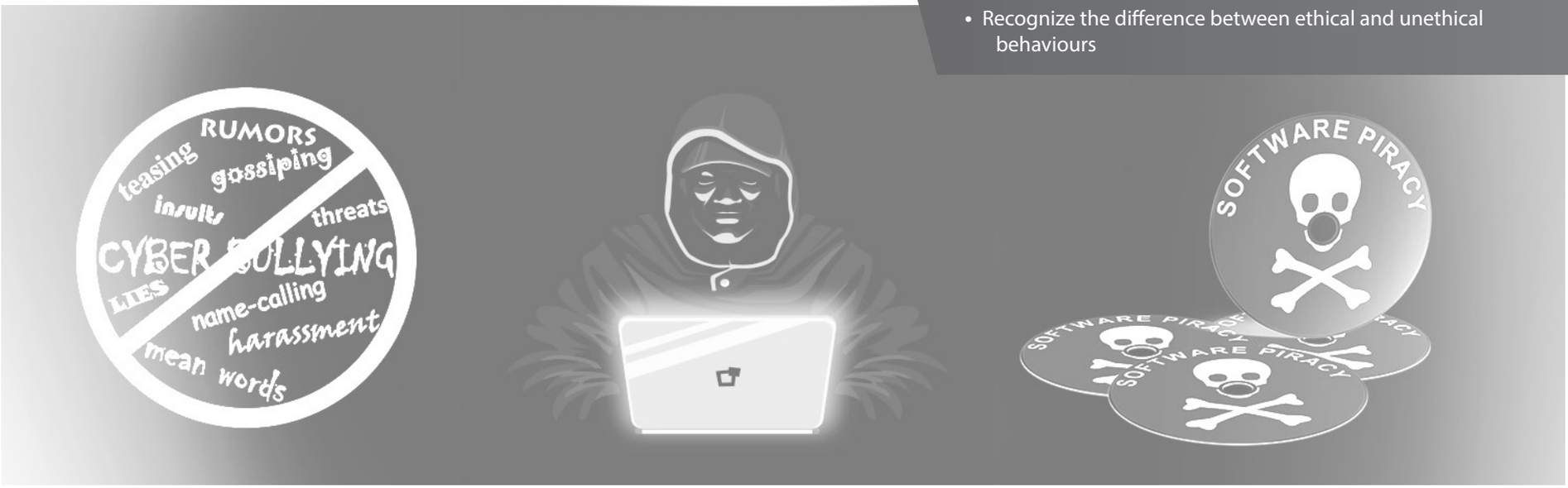
This is a unit that spans several subject areas and efforts should be made to make relevant and important links. Violations of intellectual property rights and all legal consequences should be reinforced. Representatives from relevant authorities in Jamaica should be invited in to make presentations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

## UNIT 4: Computer Ethics and Research (2 weeks)

### Prior Learning

Check that students:

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




**ATTAINMENT TARGET(S):**

- Studen tunderstands the ramifications of unethical behaviours online
- Student demonstrates a responsible, moral and ethical approach to using information and suitable resources on the Internet and offline
- Students appreciate using advance search criteria to refine an Internet search

**OBJECTIVES**

**Students will:**

- Define terms related to unethical behaviours such as 'trolling', 'cyber bullying'" cyber stalking", and software piracy
- Describe the possible results of unethical practices using online resources
- Appropriately present information sourced from offline (such as CDs) and online (such as text, graphics, video, audio among others) resources
- Restate a search text/phrase, for an efficient search on the Internet
- Construct accurately a search text with two or more operators to refine the search result
- Specify correctly two or more search criterions for narrowing a search result

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| **Students will:**<br>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<br>OR<br>Be presented with a case/scenario illustrating/outlining unethical practices and engage in discussion on the case scenario to highlight ethical and unethical behaviours. For example:<br>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. | Discuss to share awareness on information presented<br>Research to gather data | Presentation accurately distinguishes between ethical and unethical behaviours |
| 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. | Identify correct terms | |
| Prepare and conduct a debate on the pros and cons of Software Piracy | Debate moot | Debate satisfactorily examined the issue of Software Piracy |
| Work in groups to create a short documentary (movie) about the impact of Software piracy on society | Collaborate to create movie | Short documentary (movie) satisfactorily depicts impact of software piracy on Society |
| 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. | Conduct research and interviews and present information | Discussion indicates intellectual property rights and the consequences of violating these rights |
| 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. | Compose email or letters and share ideas | Letter accurately captures examples of intellectual property violations |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| Use various oral presentation styles such as dub poetry and songs to demonstrate their awareness of intellectual property rights. | Creatively present information | |
| 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. | Collaborate in groups to research and present information | Discussion shows knowledge of APA and MLA and which is more applicable in various scenarios |
| Practice presenting researched data using the appropriately chosen referencing style (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. | Research and present information | Researched data accurately referenced<br>Sources accurately referenced in research reports |
| 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.<br>Apply two or more criteria to narrow search results for scholarly topics. | Investigate to inspect change<br>Surmise possible outcomes | |

## Learning Outcomes

Students who demonstrate understanding can:

- Reflect on the factors that intensify online cruelty (such as cyber bullying)
- Identify what 'targets' and 'upstanders' can do when online cruelty occurs
- Recognize their own role in escalating or de-escalating online cruelty
- Understand why it is important to respect intellectual property rights.
- Create appropriate references
- Make ethical choices in their use of Internet resources

## Points to Note

Teachers must refer to Guidance notes at the beginning of this Unit.

Teachers must be aware of intellectual property rights.

Teachers must be aware of legislation governing IT practices

Teachers must be aware of legislation governing unethical practices

Teachers must demonstrate /model ethical practices when working online and in the computer lab.

## Extended Learning

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.

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

Students can create a short documentary(movie), flyers, brochures, to promote awareness of" cyber bulling"

Students can develop an anonymous school survey on incidents of cyber bullying (including how often students have acted as upstanders, by bystanders, and offenders).

**RESOURCES**

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

**KEY VOCABULARY**

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

**LINKS TO OTHER SUBJECTS**

**Language Arts -** Grade 9 Attainment Target 1 "Speaking and Listening" and Target 2 "Reading"
**Civics -** Grade 9 Attainment Target 3 "Demonstrate an awareness of individual and collective rights, their application and attendant responsibilities"
**Religious Education -** Grade 9 Attainment Target 2 "Learning from Religions"

### Range of 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, to obtain post-secondary training for skills in computing. The unit's relevance is established through a discovery of the computing professionals which are 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 for the 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.

## UNIT 5: Computing Careers (3 weeks)

### Prior Learning

Check that students can:

- Define terms: career, salary, qualification, certification, professional body, college, university, training institution
- Identify sectors and/or organizations in society where employment is trending: businesses, hotels, schools, and banks, among others
- Describe most Information Technology skills
- Read and write a resume

**ATTAINMENT TARGET(S):**

- Student understands the significance of Computer Science and Information Technology careers in today's society
- Student appreciates the course of studies to be undertaken, for a career in Information Technology and Computer Science
- Student derives a career plan for a profession in the field of computing (Computer Science/Information Technology

**OBJECTIVES**

**Students will:**

- Identify accurately at least four IT skills needed for a non- IT Specialist
- Describe accurately at least three job functions for new and emerging careers in Computer Science and Information Technology
- Explain concisely four benefits from obtaining certification in computer related studies
- State appropriately the salary range for a professional in the field of Computer Science and/or Information Technology
- Give correctly three differences among two or more certifications in the field of computing
- List correctly at least one required certification, each, for at least five careers in the field of computing
- Recommend academic path for obtaining IT professional qualification
- Identify relevant professionals who are needed for completing computing related projects in society
- Design a resume for a profession in the field of Information Technology /Computer Science

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| **Students will:**<br>View videos to examine and report on the use of common/popular Information Technology tools by non-IT professionals/specialists in their environment. | Infer to draw conclusion<br>Convey to share facts | Report correctly states Information<br>Technology tools for personnel in non- IT professions |
| Participate in guided panel discussions with persons who are engaged in emerging computing careers. *Make notes or record discussions using image capturing devices of the findings from the panel discussions and present findings for class discussion.* | Think critically to find relation | Presentation on findings accurately captures information on emerging computing careers |
| Use expressive forms such as drama/poetry/painting to explain the benefits of obtaining an IT certification for employers and employees. | Collaborate to present idea | Expressive form accurately describes the benefits of obtaining computer related certification/qualification |
| 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. | Identify to sort information<br>Research to be informed | Information in table accurately presents salary ranges based on its certification and classification for a computing professional |
| Work in groups to produce a project, by conducting online/offline research on four or more institutions offering computing programmes. The project should compare matriculation requirements, course duration, skills to be certified, and applicability of skills in society, among others. | Record to disseminate facts | Project accurately provides information on computing programmes |
| After reviewing the classified/career sections of local/regional/international newspapers, produce an information booklet noting IT skills and certifications being requested for computing jobs today. | Investigate to find relations<br>Document observations | Information booklet correctly captures information on computing professions with its required certification |
| Identify groups and programs that are available to support students interested in pursuing career choices in computing fields. | Investigate to be informed | |
| 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, to identify the various computing qualifications and institutions attended. | Communicate ideas | Mock symposium/interview discussions indicate relevant information on pathways to achieving a career in computing |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| Create three or more distinct scenarios using storyboards, to depict required computing professionals for meeting objectives within an organization. | Collaborate to meet goals | Storyboard scenarios accurately depicts need for computing professionals |
| 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. | Present to share awareness | Justification for selection is accurate |

## Learning Outcomes

Students who demonstrate understanding can:

- Describe emerging computing career options
- Articulate the advantages of IT certifications
- Tell the IT skills required for completing tasks within two or more organizational departments
- Demonstrate writing a resume for a computing profession

## Points to Note

Teachers must refer to Guidance notes at the beginning of this Unit.

Teacher must keep abreast of new developments in computing, whereby being aware of the emerging IT careers.

Teacher must guide students to construct properly an interview instrument which will be used to identify qualifications and career path.

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.

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.

Encourage students to conduct searches for mentor programs and professional social network sites, among others when pursuing career choices in computing fields.

## Extended Learning

Students will collaborate with each other and with the Guidance Department to set up a career booth highlighting ICT careers, certifications and benefits

Conduct an interview with an industry personnel based on student's career

## Points to Note

Teacher must emphasize the need for computing professionals joining work unions/association and professional bodies for networking. Teacher must indicate prominent computing professional bodies, such as: JCS, ACM, IEEE Computer Society, AIS, and AWC among others.

**RESOURCES**

Computers
Internet access
Multimedia presentation kit
Videos
Recent copies of newspapers
Resource persons (computing professionals)
Resource books/CDs

**KEY VOCABULARY**

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

**LINKS TO OTHER SUBJECTS**

**Language Arts -** Grade 7 Attainment Target 1 "Speaking and Listening" and Target 2 "Reading"
**Technical Vocational Education** - Grade 7 Attainment Target 4: Career Awareness"
**Drama** - Grade 7 Attainment Target 1 "Exploring and Creating" and Attainment Target 2 "Expressing and Enacting"
**Guidance** - Grade 9

NSC

# INFORMATION TECHNOLOGY

## GRADE 9: TERM 3

### Range of Content

- 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 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 and appreciation of Web Authoring Tools while providing opportunities/appreciation on their uses in society. 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 for the Teacher

Students should be aware of Web Authoring Tools, their relevance and application 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, historically, has 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. Also, explain to students that a storyboard is a visual plan for a website. A display of the html editor may enhance students' knowledge of the unit. Students are only required to create a simple website of no more than 4 web pages.

## UNIT 6: Web Authoring (5 weeks)

**Prior Learning**

Check that students can:

- Competently manipulate hardware devices and interact with software application programs


**ATTAINMENT TARGET(S):**

- Students use digital media to design and develop multimedia products such as websites

**OBJECTIVES**

**Students will:**

- Define terms related to website design
- Analyze website to determine domain names
- Examine steps to be followed when creating webpages
- Understand the website development process
- Create a storyboard for a webpage
- Design a website using HTML syntax and tags
- Identify various web authoring tools
- Create a website using online or offline web authoring Software
- Analyze the design characteristics that makes a good website design
- Collaborate in group activities

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| **Students will:** | | |
| 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.) | Research and define information | Glossary of terms accurately defines relevant terms |
| Investigate websites with different domain names and create a poster explaining what they (domain names) are and what they represent. | Research and create | Poster created correctly captures domain names |
| 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 | Discuss ideas | List accurately captures characteristics of a good website |
| Use their web browser to view the source 'code' for their favourite web pages. With teachers' assistance discuss source codes. | Observe source codes | Information in table accurately presents salary ranges based on its certification and classification for a computing professional |
| Create a storyboard for a website containing at least three (3) pages. | Create storyboard | Storyboard created satisfactorily |
| Use a simple editor program to set up the structure of a web page using the tags: *html, head, title and body.* | Manipulate HTML tags | HTML tags used correctly to design Web pages |
| Use additional HTML formatting tags to display text on their web page. Add images and links to actual web pages, to their web page.<br>Open their web page using their favourite browser. | | Website created contains several pages and hyperlinks are correct and functional |
| 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 offline). | Research for information | Mock symposium/interview discussions indicate relevant information on pathways to achieving a career in computing |
| 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. | Create website | Website created satisfactorily using appropriate software |
| Develop a website evaluation checklist to critique each other's web pages both in terms of style and content and use the list of characteristics of a good website design' to reinforce claims and critique.<br>Add their products to their electronic Information Technology portfolio. | Design website evaluation checklist | Website evaluation checklist satisfactorily captures good website design |

## Learning Outcomes

Students who demonstrate understanding can:

- Construct basic web pages using basic HTML
- Use a web authoring tool to create a website

## Points to Note

Teachers must refer to Guidance notes at the beginning of this Unit.

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.

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.

## Extended Learning

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.

**RESOURCES**

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

**KEY VOCABULARY**

HTML, webpage, website, web authoring, hyperlinks, storyboard, web server, homepage, navigation, domain, audience, content, layout, structure, tag, tags: html, head, title, body, strong, a, img

**LINKS TO OTHER SUBJECTS**

**Language Arts -** Grade 9 Attainment Target 1 "Speaking and Listening" and Target 2 "Reading"
**Visual Arts -** Grade 9

### Range of Content

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

### About the Unit

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

Students should be exposed to different control structures and begin writing simple programmes 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.

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.

## UNIT 7: Problem Solving and Algorithm Development (6 weeks)

**Prior Learning**

Check that students can:

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


**ATTAINMENT TARGET(S):**

- Students demonstrate competence in the use of pseudocodes and flow-charts to solveproblems
- Students demonstrate their understanding of algorithm concepts and their applicationto programming languages
- Students use computational thinking and analytical skills to solve problems

**OBJECTIVES**

**Students will:**

- Discuss the relationship between algorithms and programming languages
- Decompose problems into input, processing and output
- Represent algorithms using flowchart and pseudocode
- Explain the concepts variable and constant as they relate to algorithm development
- Identify factors to consider when choosing an appropriate variable name
- Describe and select appropriate data types based on problems
- Describe sequencing, selection and iteration control structures
- Distinguish among the different generations of programming languages
- Explain the importance of good programming styles
- Develop simple programmes to solve specific problems
- Collaborate in group activities

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| **Students will:**<br>Revise concepts in problem solving and flowcharting (symbols, names and function) using an interactive game or a puzzle | | |
| Draw a flowchart to indicate one of the following activities and use pseudocode statements to capture the same activity step by step:<br>1. Directions from home to school.<br>2. How to top up bus card or add credit to mobile phones.<br>3. Baking a cake | Construction of flowchart and pseudocode | Flowchart and pseudocode satisfactorily developed |
| Compare flowchart diagrams and pseudocode statements | Comparison of flowchart and pseudocode | |
| Discuss or view a video on how algorithms are linked to Programming Languages | Discuss to share information | Acceptable explanations of results. |
| 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 | Think critically and express ideas | Glossary accurately lists all relevant terms |
| Write an algorithm (flowchart or pseudocode) to determine if a number is prime number. Present flowcharts or pseudocode for class discussion and feedback. | Create flowchart or pseudocode | Satisfactorily created flowcharts |
| Write algorithm (flowchart or pseudocode) to solve problems involving basic calculations such as area, volume and GCT. | Create flowchart or pseudocode | |
| Identify errors in Flowcharts and Pseudocodes based on given problems | Detect error | Correctly identified errors |
| 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. | Discuss and share ideas | Accurately assign data types to appropriate variables and data types to data |
| View a video explaining the iterations: While, For, Repeat and discuss scenarios or cases where these iterations (While, For and Repeat) could be captured. | | |

| Suggested Teaching and Learning Activities | Key Skills | Assessment Criteria |
|---|---|---|
| Write algorithm using pseudocode/flowchart to solve problems involving iterations. | Infer to draw conclusions | Pseudocodes/algorithm correctly represented |
| Trace the development of computer languages by using a diagram to record examples of languages that fall in each generation and distinguish their characteristics. | | Diagram accurately depicts programming languages generations |
| In groups, 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 student to assist him in designing an examination score calculator programme that should do the following:<br>• Input examination scores<br>• Assign a grade based on scores<br>• Calculate the average examination score<br>• Output the results | Create flowchart or pseudocode<br><br>Discuss and share ideas | |
| Discuss and document the solutions for class presentation and discussion. | Apply various data types and control constructs to solution | Appropriate control structures used to represent solutions |

## Learning Outcomes

Students will be able to:

- ✔ Construct Defining Diagrams/IPO charts
- ✔ Construct simple algorithms using pseudocode or flowchart

## Points to Note

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. Iteration is not a requirement. Students should be aware that a problem may be solved using different algorithms.

## Extended Learning

Students can learn the iteration constructs and construct more complex algorithms.

Students are encouraged to develop more complex solutions to problems

**RESOURCES**

Multimedia presentation kit
Resource books/ CDs
Worksheets

**KEY VOCABULARY**

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;

**LINKS TO OTHER SUBJECTS**

**Language Arts -** Grade 9 Attainment Target 1 "Speaking and listening" and Target 2 "Reading"
**Technical Vocational Education -** Grade 9 Attainment Target 1 "Creativity and Innovation" and Attainment Target 3 "Apply solutions"

NSC

# INFORMATION TECHNOLOGY

## GRADES 7-9: APPENDICES

## GLOSSARY OF IT TERMS

| TERMS | DEFINITIONS/MEANINGS |
|---|---|
| Accounting | The process of keeping track of a user's activity while accessing a network's resources, including the amount of time spent in the network, the services accessed while there and the amount of data transferred during the session. |
| Accuracy | The degree to which the result of a measurement, calculation, or specification conforms to the correct value or a standard. The **accuracy** obtained from calculations depends on using bug-free **computer** chips as well as the quality of the input. |
| Algorithm | A process or set of rules to be followed in calculations or other problem-solving operations, especially by a computer |
| Alignments | Arranging data to line up with a required format on a screen or printed form. |
| Ambiguity | The quality of being open to more than one interpretation |
| Animation | The technique of photographing successive drawings or positions of puppets or models to create an illusion of movement when the film is shown as a sequence |
| American Psychological Association - APA | A writing style and format for academic documents such as journal articles and books |
| Application software | A computer program designed to perform a group of coordinated functions, tasks, or activities for the benefit of the user |
| Arithmetic logic unit | The part of a computer processor (CPU) that carries out arithmetic and logic operations on the operands in computer instruction words |
| Arrow | Keys are buttons on a **computer** keyboard that are either programmed or designated to move the **cursor** in a specified direction. |
| Assignment | Statement sets and/or re-sets the value stored in the storage location(s) denoted by a variable name; in other words, it copies a value into the variable. In most imperative programming languages, the **assignment** statement (or expression) is a fundamental construct. |

| TERMS | DEFINITIONS/MEANINGS |
|---|---|
| Audience | The person who will view the system /people who the final product is aimed at. |
| Authorship | The state or fact of being the person who wrote a particular book, article, play |
| Availability | The general term that is used to describe the amount of time over a one year period that the system resource is available in the wake of component failures in the system. |
| Back strain | A strain is a stretching or tearing of muscle or tendon |
| Backup | A copy of a file or other item of data made in case the original is lost or damaged |
| Bar chart | A chart or graph that presents grouped data with rectangular bars with lengths proportional to the values that they represent. The bars can be plotted vertically or horizontally |
| Barcode reader | An electronic device that can read and output printed barcodes to a computer. |
| Base 2 | The numbering system in common use that uses decimal numbers |
| Base10 | provide reasons or an acceptable explanation of a phenomenon |
| Bibliography | A list of sources you used when writing a scholarly article or paper or a list of books or articles an author has published on a specific subject. |
| Binary | They store data and perform calculations using only zeros and ones. Sometimes referred to as Base 2 |
| Bio- information | The science of collecting and analyzing complex biological data such as genetic codes |
| Bio-metric reader | An electronic device used to determine a person's identity by detecting and matching the person's physical features, such as fingerprints or the eyes, to a database |
| Biometric security | A security mechanism used to authenticate and provide access to a facility or system based on the automatic and instant verification of an individual's physical characteristics |
| Bit | The smallest unit of measurement used to quantify computer data |

| TERMS | DEFINITIONS/MEANINGS |
|---|---|
| Bold | In typography, emphasis is the strengthening of words in a text with a font in a different style from the rest of the text, to highlight them |
| Bullets | A bullet is an asterisk, black dot, circle, or other mark that is found before the text that identifies key items or other important text. Below are examples of a bulleted text and list. |
| Byte | A storage unit capable of representing a single character, such as a letter, number or symbol |
| Calculation | A mathematical determination of the amount or number of something |
| Carpel tunnel syndrome | A medical condition due to compression of the median nerve as it travels through the wrist at the carpal tunnel. |
| Cell | A cell is the intersection between a row and a column on a spreadsheet that starts with cell A1. |
| Cell address | A combination of a letter and a number that specifies the column and row in which a cell is located on a spreadsheet |
| Certification | The confirmation of certain characteristics of an object, person, or organization. This confirmation is often, but not always, provided by some form of external review, education, assessment, or audit |
| Channel | A band of frequencies used in radio and television transmission, especially as used by a particular station |
| Citation | Used to describe the process of quoting or mentioning an author, book, passage, or website when referencing or backing up an argument, especially in school work |
| Clipboard | A special location in your computer's memory that temporarily stores data that has been cut or copied from a document. |
| Coaxial | Transmitting by means of two concentric conductors separated by an insulator |

| TERMS | DEFINITIONS/MEANINGS |
|---|---|
| Color schemes | The choice of colors used in design for a range of media. |
| Column chart | A vertical series of cells in a chart, table, or spreadsheet |
| Communication | The act of conveying intended meanings from one entity or group to another through the use of mutually understood signs and semiotic rules. |
| Component | A part or element of a larger whole, especially a part of a machine or vehicle. |
| Computer Career | An occupation undertaken in the field of computing |
| Computer engineer | A person that is responsible for developing, testing and evaluating the software that make our computers work. |
| Computer ethics | A part of practical philosophy concerned with how computing professionals should make decisions regarding professional and social conduct |
| Computer forensic expert | The person responsible for the application of investigation and analysis techniques to gather and preserve evidence from a particular computing device in a way that is suitable for presentation in a court of law. |
| Computer network | A set of computers connected together for the purpose of sharing resources |
| Computer network threat | Anything that has the potential to cause serious harm to a computer system |
| Computer technician | A person who repairs and maintains computers and servers |
| Computer vision syndrome | |
| Confidentiality | In a way that is intended to be private or secret |
| Connect | Something that is to be expressed through some medium, as speech, writing, or any of various arts |

| TERMS | DEFINITIONS/MEANINGS |
|---|---|
| Control structure | A block of programming that analyzes variables and chooses a direction in which to go based on given parameters |
| Control unit | A component of a computer's central processing unit (CPU) that directs the operation of the processor |
| Copyright | The exclusive and assignable legal right, given to the originator for a fixed number of years, to print, publish, perform, film, or record literary, artistic, or musical material. |
| Counterfeiting | Made in exact imitation of something valuable with the intention to deceive or defraud |
| Central Processing Unit (CPU) | It is the electronic circuitry within a computer that carries out the instructions of a computer program by performing the basic arithmetic, logical, control and input/output (I/O) operations specified by the instructions or the part of a computer in which operations is controlled and executed. |
| Credibility | The quality of being trusted and believed in |
| Cryptographer | The person who practice and study of techniques for secure communication in the presence of third parties called adversaries |
| Currency | Anything that holds value and can be exchanged for other goods or services |
| Custom written | Is software that is specially developed for some specific organization or other user. |
| Cut | The moving of files, folders and selected text to another location |
| Cyber bullying | The use of electronic communication to bully a person, typically by sending messages of an intimidating or threatening nature |
| Cybercrime act | Crime that involves a computer and a network |

| TERMS | DEFINITIONS/MEANINGS |
|---|---|
| Data | Facts, in a coded form, which are acceptable for input and processing by a computer system. The quantities, characters, or symbols on which operations are performed by a computer, which may be stored and transmitted in the form of electrical signals and recorded on magnetic, optical, or mechanical recording media. |
| Data communication | The transfer of data (a digital bit stream or a digitized analog signal[1]) over a point-to-point or point-to-multipoint communication channel. |
| Data integrity | The overall completeness, accuracy and consistency of data |
| Data source | This is the location where data that is being used comes from |
| Database | A structured set of data held in a computer, especially one that is accessible in various ways |
| Database administrator | This person is responsible for the performance, integrity and security of a database |
| Database management system | Software that handles the storage, retrieval, and updating of data in a computer system |
| Database query | TA request for data or information from a database table or combination of tables. |
| Database report | The formatted result of database queries and contains useful data for decision-making and analysis |
| Database type | A computer-software application that interacts with end-users, other applications, and the database itself to capture and analyze data. |
| De- escalate | Reduce the intensity |
| Decimal | A fraction whose denominator is a power of ten and whose numerator is expressed by figures placed to the right of a decimal point |
| Decomposition | The separation of a substance into simpler substances or basic elements. |
| Degree | A qualification awarded to students upon successful completion of a course of study in higher education, normally at a college or university |

| TERMS | DEFINITIONS/MEANINGS |
|---|---|
| Denary system | The standard number system used around the world |
| Desktop publishing | The production of printed matter by means of a printer linked to a desktop computer, with special software. The system enables reports, advertising matter, etc., to be produced cheaply with a layout and print quality similar to that of typeset books. |
| Device | A thing made or adapted for a particular purpose, especially a piece of mechanical or electronic equipment |
| Device driver | A program that controls a particular type of device that is attached to your computer |
| Diagram | A symbolic representation of information according to some visualization technique |
| Diamond | A figure with four straight sides of equal length forming two opposite acute angles and two opposite obtuse angles |
| Digital camera | A camera that produces images that can be stored in digital memory, displayed on a screen and printed on physical media |
| Digital portfolio | A collection of electronic evidence assembled and managed by a user, usually on the Web |
| Disconnect | Break the connection of or between. |
| Document | A file created by a software application |
| Domain name | The part of a network address which identifies it as belonging to a particular domain |
| Download | Copy (data) from one computer system to another, typically over the Internet. |
| Duplex | The transmission of two signals simultaneously in opposite directions. |
| Duties | Something that is required by one's religion, job, position or the laws |
| Element | An element is a single part of a larger group |

| TERMS | DEFINITIONS/MEANINGS |
|---|---|
| Emergency procedures | A plan of actions to be accompanied in a particular order or way in response to an emergency event. |
| ENIAC | Electronic Numerical Integrator And Computer was the world's first general-purpose computer |
| Ergonomics | The study of people's efficiency in their working environment |
| Escalate | As to increase quickly, to become more serious or to become worse. |
| Ethernet | A computer network architecture consisting of various specified local-area network protocols, devices, and connection methods. |
| Ethical behavior's | Characterized by honesty, fairness and equity in interpersonal, professional and academic relationships and in research and scholarly activities. |
| Ethics | Moral principles that govern a person's behaviour or the conducting of an activity. |
| Export | To convert a file into another format than the one it is currently in. |
| Extract | To remove or take out, especially by effort or force |
| Extranet | An intranet that can be partially accessed by authorized outside users, enabling businesses to exchange information over the Internet in a secure way. |
| Eye strain | Conditions in the eye that manifests itself through general signs such as weariness, aching around the eyes, blurry images, headache, and occasional double vision. |
| Feedback | The return of a fraction of the output signal from an amplifier, microphone, or other device to the input of the same device; sound distortion produced by this. |
| Field | A user interface element designed for entering data |
| File | The standard number system used around the world |
| File Management | A type of software that manages data files in a computer system. |

| TERMS | DEFINITIONS/MEANINGS |
|---|---|
| File extension | A file extension is an identifier used as a suffix to a name of the computer file in an operating system. |
| File format | A standard way that information is encoded for storage in a computer file |
| File transfer protocol | A client/server protocol used for transferring files to or exchanging files with a host computer |
| Firewall | A part of a computer system or network which is designed to block unauthorized access while permitting outward communication |
| Flowchart | A graphical representation of a computer program in relation to its sequence of functions |
| Footer | In a document or report, common text that appears at the bottom of every page. It usually contains the page number. |
| Form | A document (printed or electronic) with spaces in which to write or enter data |
| Formatting | To prepare the chosen partition on the drive to be used by an operating system by deleting all of the data1 and setting up a file system. |
| Formulae | An expression telling the computer what mathematical operation to perform upon a specific value. |
| Freeware Software | Software that is available free of charge |
| Function | A relation that associates an input to a single output according to some rule |
| Game/Application developer | A software developer that specializes in video game development |
| General purpose | A programming language designed to be used for writing software in a wide variety of application domains |
| Graphic | The products of the graphic arts, especially commercial design or illustration |

| TERMS | DEFINITIONS/MEANINGS |
|---|---|
| Graphics | Visual images or designs on some surface, such as a wall, canvas, screen, paper, or stone to inform, illustrate, or entertain. In contemporary usage it includes: a pictorial representation of data, as in computer-aided design and manufacture, in typesetting and the graphic arts, and in educational and recreational software. |
| Graphics Design | The art or skill of combining text and pictures in advertisements, magazines, or books |
| Grills | A grating or screen of metal bars or wires, placed in front of something as protection or to allow ventilation or discreet observation |
| Hacking | The unauthorized intrusion into a computer or a network |
| Half duplex | Allowing the transmission of signals in both directions but not simultaneously. |
| Hard disk loading | A commercial software piracy |
| Hardcopy | A printed version on paper of data held in a computer |
| Hardware | Tools, machinery, and other durable equipment |
| Hardware compatibility | A list of computer hardware (typically including many types of peripheral devices) that is compatible with a particular operating system or device management software. |
| Head | This refers to supplemental data placed at the beginning of a block of data being stored or transmitted |
| Header | This refers to supplemental data placed at the beginning of a block of data being stored or transmitted |
| Health | The state of being free from illness or injury |
| Help desk specialist | A commercial software piracy |
| Home page | The initial or main web page of a website or a browser |

| TERMS | DEFINITIONS/MEANINGS |
|---|---|
| HTML | Hypertext Markup Language (HTML) is the standard markup language for creating web pages and web applications |
| Hyperlinks | A reference to data that the reader can directly follow either by clicking, tapping, or hovering |
| Hypertext transfer protocol | A set of rules for transferring text, graphic images, sound, video, and other multimedia files on the World Wide Web |
| ICT industry | It stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals), computers as well as necessary enterprise software, middleware, storage, and audio |
| IF | A programming conditional statement that if proved true, performs a function or displays information |
| Img | Disk image files that store information otherwise available on the disk the image was created from. |
| Import | To use raw data produced by another application |
| Index | An alphabetical list of names, subjects, etc. with reference to the pages on which they are mentioned. |
| Information | An alphabetical list of names, subjects, etc. with reference to the pages on which they are mentioned. |
| Input | What is put in, taken in, or operated on by any process or system |
| Install | To place in position or connect for service or use |
| Instillation | Is the process of making hardware and/or software ready for use |
| Integrated | Two or more components merged together into a single system |

| TERMS | DEFINITIONS/MEANINGS |
|---|---|
| Instillation | To place in position or connect for service or use |
| Integrated | Two or more components merged together into a single system |
| Integrated circuits | A set of electronic circuits on one small flat piece (or “chip”) of semiconductor material, normally silicon. |
| Intellectual property | Intangible property that is the result of creativity, such as patents, copyrights |
| Intellectual property rights | The general term for the assignment of property rights through patents, copyrights and trademarks |
| Internet | The Internet is the global system of interconnected computer networks that use the Internet protocol suite (TCP/IP) to link devices worldwide |
| Intranet | A local or restricted communications network, especially a private network created using World Wide Web software |
| IPO Charts | Shows the input data, the process that the data will undergo, and the end result. |
| IT Department | The department within a company that is charged with establishing, monitoring and maintaining information technology systems and services. |
| IT skill | An ability to do an activity or job well in Information technology |
| IT trainer/manager | An Information Technology Manager is responsible for implementing and maintaining an organization’s technology infrastructure |
| JIPO | (Jamaica Intellectual and Property Office) the primary agency with responsibility for matters relating to intellectual property rights in Jamaica |
| Key loggers | A type of surveillance software (considered to be either software or spyware) that has the capability to record every keystroke you make to a log file, usually encrypted |
| Keyboard | A typewriter-style device which uses an arrangement of buttons or keys to act as a mechanical lever or electronic switch. |

| TERMS | DEFINITIONS/MEANINGS |
|---|---|
| Landscape | Orientation of a page that prints the image horizontally across the page instead of vertically. |
| Last date used | The date in which a program was last used |
| Layout | The arrangement of text and graphics |
| Licenses | A permit from an authority to own or use something or to do a particular thing |
| Light pen | A computer input device in the form of a light-sensitive wand used in conjunction with a computer's CRT display. It allows the user to point to displayed objects or draw on the screen in a similar way to a touchscreen but with greater positional accuracy. |
| Local area network (LAN) | A network that connects computers and other devices in a relatively small area, typically a single building or a group of buildings. |
| Locks | A facility on a computer or mobile phone that requires a user to verify their identity with a passcode or other form of authentication in order to access the full functionality of the device |
| Logical | Of or according to the rules of logic or formal argument |
| Logical protection | A software safeguards for an organization's systems, including user identification and password access, authenticating, access rights and authority levels |
| Lower back pain | Discomfort, muscle tightness, or arduousness localized below the costal margin and above the inferior gluteal folds, with or without sciatica. |
| Mail merge | A process to create personalized letters and pre-addressed envelopes or mailing labels for mass mailings from a form letter |
| Mainframe | Are computers used primarily by large organizations for critical applications, bulk data processing, such as census, industry and consumer statistics, enterprise resource planning, and transaction processing |

| TERMS | DEFINITIONS/MEANINGS |
|---|---|
| Manual | A book or pamphlet that contains information about a program or piece of hardware. |
| Margin | Margins are invisible lines that keep text away from the edges of the page. |
| Memory | Any physical device capable of storing information temporarily or permanently. |
| Merge field | A field you can put in an email template, mail merge template, custom link, or formula to incorporate values from a record. |
| Micro computer | A small computer that contains a microprocessor as its central processor. |
| Microwave | An electromagnetic wave with a wavelength in the range 0.001–0.3 m, shorter than that of a normal radio wave but longer than those |
| Minicomputer | A computer of medium power, more than a microcomputer but less than a mainframe. |
| Modern Language Association – (MLA) | A style of writing used for college-level writing |
| Modem | A combined device for modulation and demodulation, for example, between the digital data of a computer and the analogue signal of a telephone line |
| Monitor | A screen which displays an image generated by a computer |
| Moral | Concerned with the principles of right and wrong behavior |
| Mouse | A pointing device (hand control) that detects two-dimensional motion relative to a surface. This motion is typically translated into the motion of a pointer on a display, which allows a smooth control of the graphical user interface. |
| Mp3 | A means of compressing a sound sequence into a very small file, to enable digital storage and transmission |
| Mp4 file format | It is used to store audio and/or video data, rather than to code the information |

| TERMS | DEFINITIONS/MEANINGS |
|---|---|
| Multimedia | These are content that uses a combination of different content forms such as text, audio, images, animations, video and interactive content |
| Multimedia authoring | The use of several types of communication channels, such as texts, graphics, computers and videos, to convey information to an audience |
| Multimedia projector | A compact, high resolution, full-color projector capable of projecting text, images, video and audio content. |
| Musical engineer | A person that helps to produce a recording or a performance, editing and adjusting sound tracks using equalization and audio effects, mixing, reproduction, and reinforcement of sound. |
| Narrative | A spoken or written account of connected events; a story |
| Navigation | It refers to clicking or tapping buttons and menus or making multi-finger gestures to activate functions in an application or to jump to other sections of a website |
| Netiquette | The correct or acceptable way of using the Internet |
| Network | A group or system of interconnected people or things |
| Network engineer | A technology professional who has the necessary skills to plan, implement and support the computer networks that support in-house voice, data, video and wireless network services. |
| Obscene | Offending against moral principles; repugnant |
| Offender | A person who commits an illegal act |
| On-line cruelty | Online behavior which causes physical or mental harm to another |
| Online source | An online source is material you find online. It can be an online newspaper, magazine or television website |

| TERMS | DEFINITIONS/MEANINGS |
|---|---|
| Open source software | Computer software with its source code made available with a license in which the copyright holder provides the rights to study, change, and distribute the software to anyone and for any purpose |
| Operating system | A software that manages computer hardware and software resources and provides common services for computer programs. |
| Operating system software | This is software that manages computer hardware and software resources and provides common services for computer programs. |
| Optical mark reader | A method of entering data into a computer system. Optical Mark Readers reads pencil or pen marks made in pre-defined positions on paper forms as responses to questions or tick list prompts. |
| Orientation | The direction in which a document is displayed or printed. |
| OSHA | (Occupational Safety and Health Administration), is responsible for protecting worker health and safety |
| Output | The amount of something produced by a person, machine, or industry. |
| Oval | An XML- based language that provides a standard for how the presence of vulnerabilities issues on computer systems. OVAL standardizes the three main steps of the process: collecting system characteristics and configuration information from systems for testing; testing the systems for the presence of specific vulnerabilities, configuration issues, and/or patches; and presenting the results of the tests. |
| Page number | The process of applying a sequence of numbers (or letters, or roman numerals) to the pages of a book or other document. |
| Parallelogram | A four-sided plane rectilinear figure with opposite sides parallel |
| Password | A string of characters that allows access to a computer, interface, or system |

| TERMS | DEFINITIONS/MEANINGS |
|---|---|
| Paste | An operating system and programs action that allows you to copy an object or text from one location and place it to another location |
| Path folder | The general form of the name of a file or directory, specifies a unique location in a file |
| PC | A computer designed for use by one person at a time |
| Peer-to-peer sharing | This allows users to access media files such as books, music, movies, and games using a peer-to peer software program that searches for other connected computers on a peer to peer network to locate the desired content. |
| Percentage | A rate, number, or amount in each hundred |
| Peripheral | Relating to or situated on the edge of something |
| Peripheral devices | Any auxiliary device such as a computer mouse or keyboard that connects to and works with the computer in some way. |
| Pharming | The fraudulent practice of directing Internet users to a bogus website that mimics the appearance of a legitimate one, in order to obtain personal information such as passwords, account numbers |
| Phishing | The fraudulent practice of sending emails purporting to be from reputable companies in order to induce individuals to reveal personal information, such as passwords and credit card numbers |
| Physical protection | A variety of measures to protect nuclear facilities and material against sabotage, theft, diversion, and other malicious acts. |
| Pie chart | A vertical series of cells in a chart, table, or spreadsheet. |
| Place holder | A character, word, or string of characters that may be used to take up space until such a time that the space is needed |
| Plagiarism | The practice of taking someone else's work or ideas and passing them off as one's own |

| TERMS | DEFINITIONS/MEANINGS |
|---|---|
| Plotter | A printer that interprets commands from a computer to make line drawings on paper with one or more automated pens |
| Portrait | A mode in which the printer orients content for reading across the shorter length (the width) of the sheet of paper. |
| Post- secondary qualification | Those whose highest level of educational attainment is an apprenticeship or trades certificate or diploma |
| Power outlet | A place in a wiring system where current can be taken to run electrical devices |
| Presentation | A speech or talk in which a new product, idea, or piece of work is shown and explained to an audience |
| Primary storage | The area in a computer in which data is stored for quick access by the computer's processor |
| Primary key | A key in a relational database that is unique for each record. |
| Printer | A printer is a peripheral device which makes a persistent human-readable representation of graphics or text on paper or similar physical media. |
| Problem | An inquiry starting from given conditions to investigate or demonstrate a fact, result, or law |
| Problem-solving | The process of finding solutions to difficult or complex issues |
| Processor | Is the logic circuitry that responds to and processes the basic instructions that drive a computer |
| Programmer | A person who writes computer programs |
| Proprietary software | Software that is owned by an individual or a company |
| Pseudo code | A notation resembling a simplified programming language, used in program design |

| TERMS | DEFINITIONS/MEANINGS |
|---|---|
| Query | A computer programming language used to retrieve information from a database |
| Range | In data entry validation, a group of values from a minimum to a maximum. (2) With spreadsheets, a series of cells that are worked on as a group. It may refer to a row, column or rectangular block defined by one corner and its diagonally opposite corner. |
| Receiver | the part of a telephone apparatus contained in the earpiece, in which electrical signals are converted into sounds |
| Record | A database entry that may contain one or more values |
| Rectangle | A plane figure with four straight sides and four right angles, especially one with unequal adjacent sides, in contrast to a square |
| Region language | A language spoken in an area of a sovereign state, whether it be a small area, a federal state or province, or some wider area. |
| Reinstall | To put in place and connect |
| Repair technician | This is a person who repairs and maintains computers and servers |
| Repetitive strain injury | Term used to describe the pain felt in muscles, nerves and tendons caused by recurrent movements and overuse. |
| Report | A collection of information about something or rumors or gossip that is being spread |
| Responsibility | The state or fact of having a duty to deal with something or of having control over someone |
| Restore | To bring back or re-establish |
| Rhombus | A quadrilateral all of whose sides have the same length |
| Role | A part that someone or something has in a particular activity or situation |

| TERMS | DEFINITIONS/MEANINGS |
|---|---|
| Row | A horizontal line of entries in a table. |
| Safety | The condition of being protected from or unlikely to cause danger, risk, or injury |
| Satellite | An artificial object which has been intentionally placed into orbit. |
| Scanner | A device that captures images from photographic prints, posters, magazine pages, and similar sources for computer editing and display |
| Search criteria | A website whose primary function is providing a search engine for gathering and reporting information available on the internet or a portion of the internet |
| Search engine | A program that searches for and identifies items in a database that correspond to keywords or characters specified by the user, used especially for finding particular sites on the World Wide Web |
| Secondary storage | A non-volatile memory (does not lose stored data when the device is powered down) that is not directly accessible by the CPU, because it is not accessed via the input/output channels |
| Security administrator | A person who supports a multi-user computing environment and ensures continuous, optimal performance of IT services and support systems. |
| Selection | The process of highlighting text or picking an object |
| Sender | A person who sends or transmits a message, letter, email, etc |
| Sequence | A particular order in which related things follow each othe |
| Sequencing | A continuous or connected series |
| Set up | The way in which something, especially an organization or equipment, is organized, planned, or arranged |
| Sexting | The sending, receiving, or forwarding sexually explicit messages, photographs or images |

| TERMS | MEANING |
|---|---|
| Shareware | A software that is available free of charge and often distributed informally for evaluation, after which a fee may be requested for continued use |
| Shoulder pain | Pain in the shoulder due to an injury or disease |
| Simplex | A communications mode in which only one signal is transmitted and it always goes in the same direction |
| Site license | A type of software license that allows the user to install a software package in several computers simultaneously, such as at a particular site (facility) or across a corporation |
| Softcopy | A legible version of a piece of information not printed on a physical medium, especially as stored or displayed on a computer |
| Soft-lifting | A common type of software piracy in which a legally licensed software program is installed or copied in violation of its licensing agreement |
| Software | Operational information and other programs used by a computer |
| Software compatibility | A characteristic of software components or systems which can operate satisfactorily together on the same computer, or on different computers linked by a computer network. |
| Software engineer | A licensed professional engineer who is schooled and skilled in the application of engineering discipline to the creation of software. |
| Software piracy | The illegal copying, distribution, or use of software |
| Solution | A means of solving a problem or dealing with a difficult situation. |
| Spam | Irrelevant or unsolicited messages sent over the Internet, typically to a large number of users, for the purposes of advertising, phishing, spreading malware |
| Speaker system unit | An electroacoustic transducer;[1] which converts an electrical audio signal into a corresponding sound. |
| Specialized | Requiring or involving detailed and specific knowledge or training. |

| TERMS | DEFINITIONS/MEANINGS |
|---|---|
| Spreadsheet | A sheet of paper that shows accounting or other data in rows and columns |
| Stop | A cessation of movement or operation |
| Storage | The action or method of storing something for future use |
| Storage medium | Any technology (including devices and materials) used to place, keep, and retrieve data |
| Storyboard | A graphic organizer in the form of illustrations or images displayed in sequence |
| Structure | A specialized format for organizing and storing data |
| Super computer | A computer that performs at or near the currently highest operational rate for computers |
| Surveillance camera | The use of video cameras to transmit a signal to a specific place, on a limited set of monitors |
| System administrator | A person who is responsible for the upkeep, configuration, and reliable operation of computer systems; especially multi-user computers, such as servers, uptime, performance, resources, and security of the computers |
| System analyst | A person that works to solve problems related to computer technology |
| System operator | A person who manages the operation of a computer system or particular electronic communication service |
| System software | A type of computer program that is designed to run a computer's hardware and application programs. |
| System specification | This system helps to define the operational and performance guidelines for a system |
| System unit | The part of a computer that houses the primary devices that perform operations and produce results for complex calculations |
| Table | A data structure that organizes information into rows and columns |

| TERMS | MEANING |
|---|---|
| Target | A person, object, or place selected as the aim of an attack |
| Text | The original words and form of a written or printed work; an edited or emended copy of an original work. |
| Textbox | A text box is a rectangular area on the screen where you can enter text |
| Title | A bar located at the top of a window or a dialog box that displays the name of the window or software program being used |
| Touch pad | A device for pointing (controlling input positioning) on a computer display screen. It is an alternative to the mouse |
| Trackball | A computer cursor control device used in many notebook and laptop computers. The trackball is usually located in front of the keyboard toward the user |
| Trademark | A symbol, word, or words legally registered or established by use as representing a company or product. |
| Transfer control protocol/ internet protocol | A set of rules governing the format of data sent over the Internet or other network |
| Transistors | A semiconductor device used to amplify or switch electronic signals and electrical power. It is composed of semiconductor material usually with at least three terminals for connection to an external circuit |
| Transition | A change from one thing to the next, either in action or state of being |
| Transmission media | The means through which we send our data from one place to another |
| Tree directory | A hierarchy of directories that consists of a single directory, called the parent directory or top level directory, and all levels of its subdirectories |
| Trolling | Sows discord on the Internet by starting quarrels or upsetting people, by posting inflammatory, extraneous, or off-topic messages in an online community such as a newsgroup, forum, chat room, or blog with the intent of provoking readers |

| TERMS | DEFINITIONS/MEANINGS |
|---|---|
| Troubleshoot | Trace and correct faults in a mechanical or electronic system |
| Underline | A more or less horizontal line immediately below a portion of writing |
| UNIVAC | (Universal Automatic Computer) is a line of electronic digital stored-program computers |
| Up stander | A person who stands up for something, as contrasted to a bystander who remains inactive |
| Upload | Transfer (data) from one computer to another, typically to one that is larger or remote from the user or functioning as a server |
| URL | The address of a World Wide Web page |
| Utility program | A program for carrying out a routine function |
| Vacuum tubes | A device sometimes used to amplify electronic signals |
| Value | An expression which cannot be evaluated any further |
| Variable | A value that can change, depending on conditions or on information passed to the program |
| Video | A recording of moving visual images made digitally or on videotape |
| Virus | A type of malicious software program (“malware”) that, when executed, replicates itself by modifying other computer programs and inserting its own code |
| Voice thread | A collaborative, multimedia slide show that holds images, documents, and videos and allows people to navigate slides and leave comments in 5 ways - using voice, text, audio file, or video |
| Web authoring | The practice of creating web documents using modern web authoring software and tools |
| Web browser | is a software application for retrieving, presenting and traversing information resources on the World Wide Web |

| TERMS | MEANING |
|---|---|
| Web designer | Someone who is both creative and technically inclined, and uses both these attributes to build or redesign websites |
| Web server | A computer system that processes requests via HTTP, the basic network protocol used to distribute information on the World Wide Web |
| Webpage | a hypertext document connected to the World Wide Web |
| Website | A set of related web pages located under a single domain name |
| Wide area network (WAN) | A telecommunications network or computer network that extends over a large geographical distance. Wide area networks are often established with leased telecommunication circuits |
| Wired | The use of computers to transfer or receive information, especially by means of the Internet |
| Wireless | A term used to describe telecommunications in which electromagnetic waves |
| Word processor | A program or machine for storing, manipulating, and formatting text entered from a keyboard and providing a printout |

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## ALTERNATIVE PATHWAYS TO SECONDARY EDUCATION (ASPE)

**T**he 21st century is a time of rapid technological growth and social change. The school curriculum must, therefore, ensure that young people are well prepared for the challenges and opportunities that they will meet as adults in this century. The MoEYI is making every effort to provide for the multiple intelligences of our children and cater to their diverse needs in order to fully maximize their capabilities. Hence, the MoEYI has created alternative pathways to receiving an education at the secondary level.

Providing alternative pathways will be far-reaching in carrying out the Ministry's mantra, "Every child can learn....every child must learn". Learning pathways will allow for an inclusive approach in which instruction is based on tailored curricula, enabling each learner to perform to his/her fullest potential based on aptitude, interest and ability. Alternative Pathways represent a new approach to secondary education. Secondary education in Jamaica is being reframed and re-positioned as customised, diverse, relevant, equitable, outcomes-based, and inclusive; and significantly, this approach will signal the introduction of a seven year (Grades 7-13) period of instruction for students on all secondary pathways.

### Goals of the APSE

- Design the school system to offer differentiated instructional programmes, informed by the National Standards Curriculum (NSC).
- Develop individualized intervention/learning plans based on students' performance profile.
- Provide special educators as Pathway Coaches to support subject teachers of students on Secondary Pathways II and III in the delivery of instruction.
- Facilitate a functional academic approach at the secondary level characterised by response to intervention (RtI) methodology, interactive, learner-centred, project-based and problem- based learning, reflection and alternative forms of assessment.
- Foster a system for ALL students to exit the secondary level with the knowledge, skills, competences and attitudes which will have them ready for the world of work or to access tertiary level education.

### Secondary Pathways I, II & III (SP I, II & III)

All students will access secondary education via the prevailing Grade Six examination. The exit examination will provide individual profiles to inform decisions for pathway access and standards for differentiation.

**SPI** is a 7-year programme with a curriculum based on the constructivist approach. At Grades 7-9 students will access the National Standards Curriculum (NSC), and at Grades 10, 11, 12 & 13, they will access the curricula/syllabi of the examining body.

**SP II** is a 2-year transitional programme with a curriculum based on the constructivist approach. Special educators/pathway coaches will work with teachers and students on this pathway. Students will be provided the required intervention and support to allow for transition. At the end of Grade 8 students will be re-evaluated through psycho-educational evaluation to determine their readiness for crossing over into either SP I or SP III.

**SP III** is a 7-year programme with a curriculum based on the constructivist approach. At Grades 7-9 students will access the National Standards Curriculum (NSC), and at Grades 10 & 11, they will access the curricula/syllabi of the examining body. At the end of Grade 11 SP III students will transition into the Career Advancement Programme.

At Grades 7-9 the NSC, will be modified to meet the needs of the SP III students. Students in SP III will be instructed through a functional academics curriculum in the core subjects- Mathematics, English Language, Communication, Social Studies and Science. Their instruction will be further enriched with Personal Empowerment, Technical and Vocational instruction, as well as the performing and creative arts. Pathway Coaches will collaborate with subject teachers to prepare content, ensuring differentiation in instruction for students on SP II and III. These students will also be supported through use of the Response to Intervention (RtI) methodology.

## PERSPECTIVES OF SCIENCE, TECHNOLOGY, ENGINEERING, MATHEMATICS & THE AESTHETICS (STEM/STEAM) IN RELATION TO THE NATIONAL STANDARD CURRICULUM (NSC)

### INTRODUCTION & BACKGROUND

The integration of theoretical principles that relate to STEM/STEAM Education in the NSC began in June 2014. This move was influenced by recommendations of the STEM Steering Committee that emphasized the need to develop learners who are not just productive, but who would also be innovative Jamaicans. STEM integration was also regarded as one of the strategic long term means of addressing the economic challenges being faced by Jamaica using education as a primary vehicle for the implied transformational change to happen, beginning from short term efforts.

Initial discussions and deliberations promoted an emphasis on STEM rather than STEAM Education. However, critical analysis of the conversations conveyed the perspective of STEM as a collection of related disciplines that all learners should have the opportunity of pursuing, to develop the competencies they offer and as a consequence be able to gain employment or become employers in STEM related areas. As stakeholders from different backgrounds processed their understanding of STEM, new meanings of the concept emerged from the discussions. One was the perspective of STEM as a methodology. There was, however, concern about the exclusion of “A” in STEM. This “A” component however, brought to the discussion, multiple meanings. In some Aesthetics as a field and was considered an important component to be included if educators are serious about issues of discrimination, holistic learning and current research on the iterative function of the brain that warrants attention to brain based learning and the role of the Arts in promoting knowledge integration to cater to multiple domains of learning. There was also discontent about neglecting the Performing Arts when related creative industries contribute significantly to economic development. The concern was that the role of the Arts to economic development was being trivialized.

The call for the integration of the Aesthetics or Art forms became more pronounced as STEM took on more national significance. This was supported by research that indicates the importance of the Aesthetics in developing values and attitudes, in promoting holistic learning and in serving as drivers of innovations. By integrating principles from STEM with those from the Arts/Aesthetics, the approach to problem solving would encourage greater appreciation for and reliance on the interdependent nature of knowledge when science and arts intersect. Additionally, STEAM as a methodology encourages the harmonizing of the cognitive and the emotional domains in the problem-solving process.

The concept of STEAM was adopted in 2015, as an integrative approach to education and a methodology that pays attention to the benefits to be derived from the inclusion of the Arts or Aesthetics with STEM related principles. These collective benefits are supported by Jolly (2014), Sousa and Pilecki (2013) and include divergent thinking; differentiated learning; Arts integration; focus on intrinsic motivation and informed decision-making.

## PERSPECTIVES OF STEM/STEAM IN THE CONTEXT OF THE NSC

In the context of the NSC, STEM/STEAM is used in a number of ways. These include:

STEM/STEAM as an integrative learning approach and methodology in facilitating learning. This perspective places emphasis on STEM/STEAM as a means of helping learners become creative or innovative problem solvers and lifelong learners who rely on scientific principles (laws and theories) to address issues/concerns or to deal with observed phenomenon that are puzzling for them or that inspire interest. As an approach, the focus is on solving problems based on principles. As methodology, the focus is on the system of practical procedures to be used to translate principles into the problem - solving processes or to choose from available problem- solving models.

STEM/STEAM as an Experiential-Vocational Learning Framework that is based on problem solving through the project-based approach. Emphasis is placed on solving real life problems in a context that requires learners and their facilitators to observe work-based principles. The primary purpose for this focus is for learners to: (i) become employable (ii) prepare for further education and/or for occupational or work readiness.

STEM as types of institutions in which learning is organized as a meta-discipline as described by Morrison and Bartlet (2009). Based on this perspective, STEM facilitates the demonstration of knowledge in a manner that removes the boundaries of each discipline for application to problem as would be practised in the real world.

## IMPLICATIONS OF PERSPECTIVES OF STEM/STEAM IN LIGHT OF THE NSC

Since the NSC is based on Constructivism principles, STEM/STEAM as an approach and methodology, has to be established on post-positivistic thinking. From this position, STEM/STEAM influences the kind of practice that promotes collaboration, negotiation of meaning and openness to scrutiny.

The NSC developers selected a Constructivist approach that included the deliberation, designing and development stages of the curriculum process. Evidence of the influence of Constructivism can be seen the NSC Framework Document that conveys the following emphasis:

(i) The element of objectives is presented in two forms; firstly as Learning Objectives to focus attention on process and experience rather than product. Secondly as Learning Outcomes that serve as some of the outputs of the process. They include the basic understandings, skills and dispositions anticipated from learners' engagement in the planned experiences.

(ii) The element of content is treated as contexts for learners to think critically, solve problems creatively while developing their identity as Jamaicans. Content is not expected to be treated as disciplines to be mastered but as areas that contribute knowledge, skill sets and attitudes that form the composite of competencies to be acquired from their integration in the learning situations.

(iii) The element of learning experiences (method) is presented as a set of learning activities that serves as a source of problems to be addressed as a part of the learning process. These real-life activities provide the scope of knowledge, skills and required dispositions or character traits for learners to make sense of that aspect of life or the world that they represent. They are the threads that connect all the other elements of the curriculum and allow for the integration of STEM/STEAM in the following ways:

- Identification of activities that are presented as problems to be solved using the STEM/STEAM approach based on contextual factors that include the profile of the learner, the learning conditions and the anticipated impact.
- Integrating activities to form a real problem to be solved as a short, medium or long term project to which the project based learning would be applied.
- The examination of learning activities by learners and teachers as co-learners through multiplelenses using content of science, technology, mathematics and the humanities that they have already explored to engage in the problem identification and definition processes.
- Extending learning in the formal setting to the informal by connecting co-curricular initiatives that are STEM/STEAM based that learners are undertaking at the institutional level through clubs and societies, as whole school projects or in partner ship with external stakeholders.
- Using the learning activities to review STEM/STEAM initiatives that form a part of the informal curriculum to and for reflection on action.

- Using activities as springboards for reflecting on career or occupational interest in STEM/STEAM related areas.

(iv) The element of evaluation is communicated in two major ways; firstly as prior learning which serves diagnostic purpose and secondly as an on-going developmental process. This formative focus is indicated by the inclusion of explicitly stated assessment criteria that are to be used alongside the learning activities. The use of assessment criteria as counterparts of the learning activities also indicates that assessment is learner centred since it is serving developmental rather than promotional purpose and as a consequence, allows learners to self-correct as they use feedback to develop feed-forward capabilities. Evidence of learning, based on the learning outcomes, can be collected from various types of assessment methods that emphasize the learner centred constructivist orientation. This brings to the fore the need for serious consideration to be given to differentiation in assessment for fairness and credibility of claims about learners' capabilities and to inform decisions that will impact their educational journey.

In general, this integrated approach, which is the context of STEAM, is aimed at improving the quality of the educational experience for learners while influencing the achievement of the aims of education that relate to productivity and creativity as part of the profile of the Jamaican learner.

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**The 5Es Overview: "The 5E Learning Cycle"**

What is a 5E Learning Cycle?

This model describes an approach for facilitating learning that can be used for entire programmes, specific units and individual lessons. The NSC supports the 5E constructivist learning cycle, as it places emphasis on the processes that may be used to help students to be personally involved in the learning situation as they are guided to build their own understandings from experiences and new ideas.

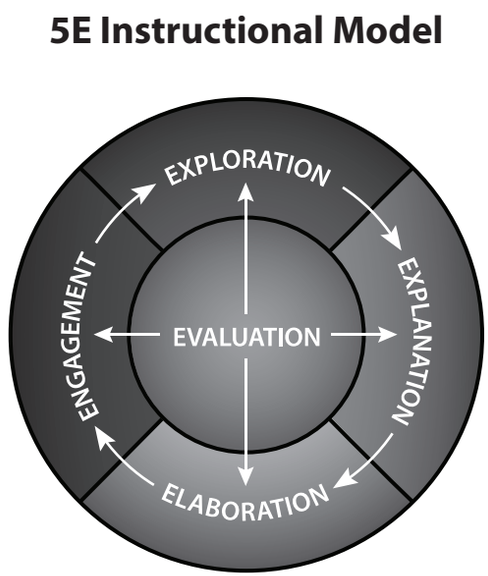


Figure 1. Illustrating one version of the 5E model that conveys the role of valuation as an interconnecting process that is at the core of the learning experience.


Figure 2, illustrating a cyclical perspective of the model with each process being given similar emphasis in contributing to the learning experience on a whole.

**EXPLANATION OF THE INSTRUCTIONAL MODEL**

What are the 5Es?
The 5Es represent five key interrelated processes that provide the kind of learning experiences for learners to experience the curriculum or planned learning episodes: Engage, Explore, Explain, Extend (or Elaborate), and **Evaluate**.

ENGAGE: The purpose of the ENGAGEMENT dimension is to help students to be ready intellectually, socially, emotionally etc. for the session. Attention is given to the students' interests and to getting them personally involved in the lesson, while pre-assessing prior understandings, attitudes and/or skills. During the experience, students first encounter and identify the instructional task and their roles and responsibilities. During the ENGAGEMENT activity, students make connections between past and present learning experiences, setting the organizational groundwork for upcoming activities. The engagement activity may be used to (a) help student unearth prior knowledge (b) arouse their curiosity (c) encourage students to ask questions as a sign that they have wonderments or are puzzled.

EXPLORE: The purpose of the EXPLORATION dimension is to get students involved in solving a real problem that is based on a selected context. EXPLORATION provides them with a chance to build their own understanding of the phenomenon being investigated and the attitude and skills involved for arriving at a workable solution. In exploring the students have the opportunity to get directly involved with the phenomenon and materials. As they work together in learning teams or independently, the need to share and communicate becomes necessary from the experiences. The teacher functions as a facilitator, providing materials, guarding against obstacles to learning and guiding the students to operate based on agreements. The students become inquirers and co-owners of the learning process. In exploring, they also ask questions, formulate hypothesis, search for answers or information/ data, reflect with others, test their own predictions and draw conclusions.

EXPLAIN: The purpose of the EXPLANATORY dimension is to provide students with an opportunity to assess their thinking and to use intellectual standards as critical thinkers to communicate their perspectives and/or the meaning of the experiences. They rely on communication tools and their skills as Language users to: (a) organize their thoughts so that they are clear, relevant, significant, fair, accurate etc. (b) validate or affirm others (c) self-motivate. Reflection also occurs during the process and may cause students to adjust their perspective or justify their claims and summarise the lessons being learned. Providing explanations contributes to vocabulary building and self-corrective actions to deal with misconceptions that they become aware of from feedback of their peers and/or their facilitator.

EXTEND: The purpose of this dimension is to allow students to use their new knowledge and continue to explore its significance and implications. Students work independently or with others to expand on the concepts and principles they have learned, make connections to other related concepts and principles within and/or across disciplines, and apply their understandings in new ways to unfamiliar situations.

EVALUATE: The purpose of the EVALUATION dimension is for both students and facilitator to determine progress being made or the extent to which learning has taken place based on the stated objectives or emergent objectives. EVALUATION is treated primarily as an on-going diagnostic and developmental process that allows the learner to become aware of gaps to be treated and progress made from their efforts to acquire the competencies that were the focus of the session. Examples of competencies include understanding of concepts, principles and processes and demonstrating various skills. Evaluation and assessment can occur at different points during the learning episode. Some of the tools that assist in this diagnostic and formative process include rubrics, teacher observation log, self-inventories, peer critique, student interviews, reflective presentations, displays/expositions,

portfolios, performances, project and problem-based learning products. Analysis of reflections, video recordings are useful in helping students to determine the depth of their thinking and understanding and the objectives they have or have not achieved.

**Who developed the 5E model?**

The Biological Science Curriculum Study (BSCS), a team led by Principal Investigator Roger Bybee, developed the instructional model for constructivism, called the “Five Es”.

**The Link between the 5E model and Types of Learning Activities**

The five (5) types of Learning Activities purported by Yelon (1996) can be integrated with the 5E’s so as to enrich the teaching and learning process. He noted that every instructional plan should include the following learning activities

1. Motivation Activities: Intended to help learners to be ready for the session
2. Orientation Activities: Inform students of their roles and responsibilities based the purpose or objectives of a learning episode.
3. Information Activities: Allow students to manipulate current knowledge, access/retrieve and generate new ideas
4. Application Activities: Allow for the use of knowledge and skills in novel situations
5. Evaluation Activities: Allow for reflection, corrective actions and sourcing of evidence to confirm/refute claims about learning.

These activities can be planned to serve one of the purposes of each dimension of the 5E model. For example, ENGAGEMENT may be comprised a Motivation Activity and an Orientation Activity. EXPLORATION and EXPLANATION require an Information Activity, while EXTEND requires an Application Activity. EVALUATION requires the kind of activity that will contribute to the collection of data for assessing and arriving at a conclusion about performance based on stated or expected purpose for which learning is being facilitated.

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**Subject: Information Technology**

**Grade: 7**

**Duration: 60 minutes**

**Resources: electronic devices, online dictionary, pictures – of computer, computer system, components, video on "what is a computer", textbook**

**Topic: Introduction to Computer**

**Objectives**

By the end of the lesson students should be able to:

1. Define correctly the terms data, information, computer, computer system
2. Identify two main components of a computer system
3. Describe the connection among the hardware components of a computer system

**Key Skills**

Discuss, analyze, identify

**Key Vocabulary**

Computer, computer system, components, data and information

**Content Outline** [*Brief notes on main points/concepts*]

A computer is an electronic machine operating under the control of instructions stored in its own memory, which can accept data (**input**), manipulate the data according to specific rules (process) produce results (**output**), and store the result for future use (**storage**).

***Data*** - A collection of raw unprocessed, facts, figures and symbols.

***Information*** – This is data that is organized, meaningful and useful.

***User*** - Someone who communicates with a computer or uses the information it generates.

***Hardware*** - Hardware is the electric, electronic and mechanical equipment that makes up a computer.

***Software*** - This is a series of instructions that tell the hardware how to perform tasks.

**Prior Learning**

Check that students students have already been exposed to computers.

**Differentiation Strategies**

In groups students will:

1. Observe a computer and highlight two characteristics about the devices which make up the computer.
2. Draw label and colour a computer system
3. Research information on what is a computer system; compose a poem/song explaining their findings.
4. Use available materials/trashables to create a computer system model

**Teaching Procedure/Activities**

**ENGAGE**

*How can I get students interested in this?*

- Examine a series of pictures which depicts computers and computer systems or view a video depicting “computer basics”. Based on their examinations, students will answer the following:
    1. Name an electronic device viewed in the video or on picture
    2. Give one example of a computer device
    3. State the main function of a computer system

**EXPLORE**

*What tasks/questions can I offer to help students puzzle through this?*

- Conduct a mini research on the technical terms (jargon)/key concepts using available electronic devices or textbooks, para phrase the definition that has been discovered.
- Draw and label a sketch of a basic computer system. Create a diagram illustrating the connection among hardware, software, input, output, communication, process and storage. Given a list of words which represent data, create a meaningful sentence to represent information.

**EXPLAIN**

How can I help students make sense of their observations? Class presentation and discussions.

- In groups create a simple multimedia presentation, to share information which details definition of the terms 'computer', 'computer system', 'data' and 'information'
- Use various examples from their experiences to state the major components of a computer system and the difference between computer and computer system.

**ELABORATE**

*How can my students apply their new knowledge to other situations?* Application of what was learned.

- In groups, create concept maps which identify hardware components of a computer and their functions or view a video on the hardware components of a computer and their functions; in the school environment such as the computer lab identify the components and classify each component according to its role in the computer system - input, output, storage and communication
- Use available materials/trashables to create a computer system model and discuss each component

**EVALUATE**

*How can I help my students self-evaluate and reflect on the teaching and learning, and how can I evaluate the students learning of concepts and skills.* Assessment

- Create a Glossary of the following terms: computer, computer system, hardware and software, data and information.
- Complete a crossword puzzle, which provides clues related to the components of a computer system and the differences between data and information.

## EVALUATION OF SESSION