REPUBLIC OF TRINIDAD AND TOBAGO

MINISTRY OF EDUCATION

Secondary School Curriculum

INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

Curriculum Development Division

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Contents

A Message from the Director

The Curriculum Guides and Teachers Guides have been developed by educators and teachers. They are intended to facilitate the preparation of students to meet the rapidly changing demands of life in the 21st century, while ensuring that they acquire the core of general knowledge and experience essential for higher education. The revised curriculum represented is designed to guide the adoption of a more student-centred approach to instruction, and the provision of learning opportunities that are relevant and inclusive of varied learning needs and interests.

We have seen profound changes in the use of technology in education, the need for a greater focus on morals and values education and increased acquisition of life skills. There is no doubt that further shifts will take place in the coming years. The challenge for us as educators is to find ways to make our approach to teaching flexible, progressive, and responsive, so that we embrace change where it benefits learners. This entails becoming lifelong learners ourselves and creating environments that provide necessary community and stakeholder support and foster professional development.

The design of the revised curriculum documents was based on sound, contemporary educational theory, best practice, and system data. These documents will serve as foundational guides for the development of instructional programmes to be implemented at the Forms 1-3 levels.

The Curriculum Development Division is confident that the revised National Curriculum Guides and the Teachers Guides for Forms 1–3 will contribute significantly to enhanced teaching and learning experiences in our secondary schools. Accordingly, the curriculum is the main channel to educate and develop children towards being academically balanced, healthy and growing normally, well-adjusted socially and culturally, emotionally mature and happy and enabling them to achieve their full potential

John Roopchan
Director of Curriculum Development
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PROJECT LEADERSHIP

John Roopchan	Director- Curriculum Development Division
Farishazad Nagir	Project Lead- Secondary Curriculum Revision
Ingrid Khemchand	Project Advisor
Gaytree Siewah-Barkarr	Administrative Support Team
Gillian Pilgrim	Administrative Support Team
Tricia Gilkes	Administrative Support Team
Paul Massy	Administrative Support Team

CURRICULUM REVISION TEAM: INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

Sharon Moonan-Seepaul	Curriculum Coordinator, Project Lead
Gerald Phillip	Curriculum Officer, ICT
Wayne Wilson	Curriculum Officer, ICT

Part 1

The National Curriculum for Forms 1 - 3

National Curriculum Framework

Introduction

This curriculum framework is intended to outline the nature and purpose of the curriculum as well as the parameters for consistent curriculum implementation throughout secondary education in Trinidad and Tobago. The document sets out the principles that govern and guide teaching and learning. The term `curriculum' is used in this document to describe the sum total of the planned experiences which occur within that environment and was designed to foster children's learning and development. These include activities and events, with either direct or indirect impact upon the child.

A clear understanding of the nature, role and function of the national curriculum for Trinidad and Tobago is a critical part of the whole positive transformation of education to provide a seamless pathway for all students through the system of teaching and learning. For Trinidad and Tobago, the National Curriculum Framework becomes the basis for all education and curriculum decision-making, including the design, development and implementation strategies for a new system of teaching and learning covering those foundation years of education. The statement of outcomes for students are a key part of this education framework and forms the basis for all subsequent decisions about teaching and learning, content, pedagogy and assessment. These must work towards fulfilling the vision for successful students and future citizens of our nation.

In order to establish common ground and ensure that the curriculum can be implemented as designed, a set of foundational principles needs to be established. This National Curriculum Framework establishes a consistent foundation for learning that is undergirded by the Ministry of Education vision, mission and the five value outcomes for all children.

The National Curriculum must ensure that all curriculum activity, including implementation at the classroom level, functions within the guiding principles of education established by the Ministry of Education. The guiding principles of the Ministry of Education ***(Education Sector Strategic Plan 2011-2015 p.g. XI)*** were developed after extensive stakeholder dialogue and sound analysis of the current societal and national requirements.

For an effective and relevant twenty-first century process of teaching and learning, these guiding principles are an indicator that the Ministry of Education seeks to place education in Trinidad and Tobago alongside, if not ahead of international best practices. The Ministry of Education has established an ***Education Sector Strategic Plan 2011-2015*** to achieve the goals of quality, innovative, challenging, flexible education for all, and has begun an investment in human and material resources to achieve this outcome in a purposeful and timely fashion.

Foundation of the National Curriculum

Curriculum development is informed by the vision and mission of the Ministry of Education. The design of revised curriculum documents for implementation at the classroom level is therefore guided by the principles and policies of the Ministry of Education.

A forward-looking perspective on what all schools should be facilitating in terms of student achievement is guided by the national curriculum. There is equal clarity regarding a twenty-first century education system functioning to provide the highest standard of education. The regulatory and guiding principles for education provide the overarching national framework for education.

The Ministry of Education, ***Education Sector Strategic Plan: 2011-2015,*** and other policy documents, establish the design framework for all components of the new curriculum. Principal among these are the vision, mission and the five (5) value outcomes established at the national level for all students, which further guides the formulation of the desired and intended learning experiences for the classroom in the curriculum guide.

Vision of Ministry Of Education

The Ministry is leading a quality education system that responds to the diverse needs and requirements of 21st century learners, promotes inclusivity, seamlessness, equity and equality and contributes to human capital and sustainable development.

GORTT, Ministry of Education, Education Sector Strategic Plan: 2011-2015

The Mission statement is derived from the Vision of the Ministry Of Education. The Mission statement will guide the revision of the curriculum to meet the needs of the learners.

Mission of Ministry Of Education

To educate and develop children who are able to fulfil their full potential; healthy and growing normally; academically balanced; well-adjusted socially and culturally; and emotionally mature and happy.

GORTT, Ministry of Education, Education Sector Strategic Plan: 2011-2015

Value Outcomes

An internal analysis of the education system, together with research conducted in international forums, has shown that the curriculum is core to the development of innovative people. This curriculum is aimed at attaining the five value outcomes of the Ministry of Education that help to define standards of attainment for all secondary school students.

The Ministry of Education's overarching goal is to educate and develop children who are:

- Able to fulfil their full potential
- Academically balanced
- Healthy and growing normally
- Well-adjusted socially and culturally
- Emotionally mature and happy

Every core curriculum subject must facilitate the achievement of these value outcomes by all students. The core curriculum subjects, their content and the suggested teaching, learning, and assessment strategies are the means to fulfil the holistic development of the student.

It is expected that by the end of secondary school education, students will achieve all five value outcomes in order to make informed choices and contribute to the needs of society.

The five value outcomes are described more fully below.

A. Children who will achieve their full potential.

1. Function with a purpose based on love, value, family life, service and aesthetic expression.
2. Understand and participate constructively in their career and vocational pathway.
3. Able to cope with daily challenges, set healthy boundaries and make wise social choices.
4. Productive achievers, role models with good work ethics.
5. Will function at their best with a strong sense of commitment to their interests and activities.
6. Optimize their God-given talents to advantage.
7. Enterprising and responsible in risk taking.
8. Recover quickly from setbacks and disappointments.

9. Achieve economic well-being and make a positive contribution to society.

B. Children who are adequately prepared educationally to fulfill their potential.

1. Prepared to participate in society as appropriate to their age.
2. Academically balanced to be productive (combination of appropriate skills and competencies).
3. Skilled in critical and creative thinking, problem-solving, visioning, thinking outside the box and receptive to new ideas.
4. Skilled in the use of current technology and the Internet (cyber wellness).
5. Proficient in a second language.

C. Children who are adequately developed socially and culturally.

1. Productive and have good self-image.
2. Enquiring, confident and strong among their peers, and emotionally secure, open, honest and emphatic in relationships.
3. Competent to interact and communicate with others, within different social settings and environments.
4. Patriotic and courageous in civic affairs and proud to be identified as members of the national and Caribbean Community.
5. Historically aware, including knowledge of our people.
6. Capable of informed participation in the democratic and political process.
7. Capable of functioning with good character and values in their culture.
8. Respectful of the law, authority, the rights of others, creative imagination in its different forms and of the right to divergent views.
9. Developed with interpersonal and language skills.
10. Environmentally aware, protective of the physical environment and demonstrates an understanding of sustainable development.
11. Able to lead, have good governance skills, are competent to respond to the challenges of new roles in multiple contexts and are able to manage conflict.
12. Humanely aware of the less fortunate and the disadvantaged and committed to contributing to the welfare of our community and country.
13. Functioning with an honest sense of family and community.
14. Proficient in dealing with daily conditions.

15. Skilled in finding a safe place to think and grow.

16. Confident in themselves, self-motivated, enterprising and pursue self-education and lifelong self-development and able to work independently and with others.

17. Capable of finding assistance if they are abused or neglected.

18. Spiritually aware with the emotional and intellectual resources to pursue their spiritual growth.

19. Appreciative of the contribution of the arts to daily life, cultural identity and diversity, locally, regionally and internationally.

20. Able to express themselves through the arts.

D. Children who are healthy and growing normally.

1. Secure and safe in their home, school, and community.

2. Physically fit, mentally alert, well nourished, and psychologically sound.

3. Active in exercise, sports, games and recreation.

4. Capable of wholesome interaction with peers.

5. Morally prepared for a productive life.

6. Adequately developed neurologically to overcome learning, speaking, hearing, focusing, and memory or mobility challenges.

E. Children who are emotionally developed, mature and happy.

1. Able to enjoy daily life, have fun and express happiness and positive emotions.

2. Participants in entertainment and celebration.

3. Established in their peer group, satisfied with their life and able to achieve meaning in their lives.

4. Mature and able to become full-fledged, productive and enterprising citizens.

*Further readings -GORTT, Ministry of Education, Education Sector Strategic Plan: 2011-*2015

Education Policies That Impact on the Curriculum

Several policies from the Ministry of Education were taken into account for the revision of the Lower Secondary School Curriculum. These include the Education Sector Strategic Plan 2011-2015, the ICT policy and National Schools Code of Conduct. Three policies that have direct impact on the development and implementation of the curriculum are discussed.

Education Sector Strategic Plan 2011-2015

The Education Sector Strategic Plan purports a vision for education premised on guiding principles which informed the curriculum design and development process. They will provide reference points to ensure that the desired attributes of education are achieved. The guiding principles, listed below, are important components in the revised curriculum.

Principle	***Elaboration***
Student Centered	The student is at the centre of everything we do.
Engaged Communities	We engage parents and families as the heart of students' lives and we support and acknowledge them as the primary guides and decision-makers for students. We engage members of local, regional and global communities as active contributors to student learning
Inclusive	We expect all students will learn in a welcoming environment regardless of place, culture, or learning needs.
Proactive	We plan for a desired future, preventing problems instead of reacting to them.
Shared	We acknowledge that education is everybody's business and therefore expect teachers, the school and education leaders to collaborate with other

Responsibility	government and community organizations to foster student learning
Innovative	We explore new learning opportunities through research, innovation and professional development to ensure continuous improvement of student learning.
Flexible	We enable meaningful and relevant learning through a range of opportunities appropriate to each student's development stage.
Equitable	We ensure that every student will have the benefit of high-quality learning opportunities.
Accountable	We explain to the citizens of Trinidad and Tobago the outcomes of our students and our use of funding.
Transformative Leadership	We believe that people with vision and passion can achieve great things. We therefore empower and inspire out staff and stakeholders to create positive and lasting changes in the education system.
Quality	We are committed to meeting our won quality standards that are driven by the requirements of our customers. Each of us takes charge to ensure that these standards are implemented in our individual areas of authority.
Teacher Empowerment	We create the environment for excellence in teaching practice that improves the learning of all students, deepens educators content knowledge, provides them with research-based instructional strategies to assist students in meeting rigorous academic standards, and prepares them to use various types of classroom assessments appropriately.

ICT in the Curriculum

The ICT Policy goals and objectives of the Ministry of Education are to:

i. Ensure all stakeholders possess the critical requisite skills and competencies to use ICT in the education system as a tool to enhance learning and teaching,

communication and research, and to generate innovative processes;

ii. Encourage innovative models of ICT use such as:
- teacher education;
- teaching;
- learning; and
- curriculum materials development

iii. Harmonize activities, approaches and standards in the use of ICT within the Education System

iv. Encourage critical and creative thinking, lifelong learning and social responsibility;

ICT in education in Trinidad and Tobago would create an educational system in which students leave schools as confident, creative and productive users of new technologies, including information and communication technologies, and understand the impact of those technologies on society.

The Ministry of Education's ICT in Education Policy (pp. 28–29) refers to Curriculum Content and Learning Resources as;

- Curriculum and content must increasingly maximize the use of ICT.
- ICT must be integrated into the development and delivery of the curriculum.
- The ICT curriculum needs to be reviewed frequently in order to maintain its relevance.
- ICT integration and ICT competency measures across the curriculum shall be driven through the development and delivery of an ICT-infused curriculum.

ICT in education would create an environment that encourages creativity, innovation, critical thinking and decision making.

Inclusive Education Policy

The Ministry of Education is committed to "support the delivery of inclusive education in all schools by providing support and services to all learners, and by taking appropriate steps to make education available, accessible, acceptable and adaptable to all learners." An inclusive

curriculum is acknowledged to be the most important factor in achieving inclusive education. In planning and teaching the school curriculum, teachers are therefore required to give due regard to the following principles:

i. The National Curriculum Guides set out what most students should be taught at lower secondary school but teachers should teach the required knowledge and skills in ways that suit students' interests and abilities. This means exercising flexibility and drawing from curricula for earlier or later class levels to provide learning opportunities that allow students to make progress and experience success. The degrees of differentiation exercised will depend on the levels of student attainment.

ii. Varied approaches to teaching, learning, and assessment should be planned to allow all students to participate fully and effectively. Account should be taken of diverse cultures, beliefs, strengths, and interests that exist in any classroom and that influence the way students learn.

Copies of these documents may be obtained from the Ministry offices or the website at http://moe.edu.tt/.

The Curriculum Development Process

The term 'curriculum' has several meanings, depending on the context and the perspective of curriculum theory that is applied to the definition. Most theories concur that there are four fundamental components within definitions of curriculum:

- Curriculum as the transmission of a body of knowledge.
- Curriculum as product - defined by the ends or achievements expected.
- Curriculum as process.
- Curriculum as praxis

This revised curriculum subscribes to an eclectic approach which is an amalgamation of the above definitions.

The foundation of the National Curriculum is also informed by a wealth of available curriculum theories and processes. The major forces that influence and shape the organization and content of the curriculum include:

1. Educational philosophy and understandings about the nature of knowledge
2. Society and culture
3. The learner and learning process
4. Learning theories
5. The nature and structure of subject matter to be learned

Thus, these areas represent the foundation on which the national curriculum is revised. These areas will inform educational goals with the aim of developing a coherent, culturally focused, and dynamically evolving curriculum.

This revised curriculum displays a learner-centred design with philosophical assumptions that are mainly constructivist. It seeks to educate and develop children who are able to fulfil their full potential; healthy and growing normally; academically balanced; well-adjusted socially and culturally; and emotionally mature and happy.

The curriculum process was developed through four stages:

Stage 1 of the curriculum development process consisted of consultations with stakeholders from a cross-section of the national community.

The Ministry of Education conducted one national consultation on the secondary education curriculum, along with 3 joint-district consultations and one in Tobago. Consultations were held with representatives from the various divisions of the Ministry of Education, Students, denominational and local school boards; members from the primary and secondary principals association, members of the business community, Unions, representatives from tertiary institutions, representatives from Non-Governmental Organizations (NGOs), parents, and special interest groups. These key stakeholders provided valuable information which helped to inform curriculum change to better prepare students to meet the needs of society.

Stage 2 of the process involved the analysis of findings from opinions, experts, relevant documents and best practices which informed the design of the revised curriculum to enable a set of desirable outcomes and essential competencies to be possessed by all students.

Data from different sources together with other policy documents were examined and a unanimous decision was taken for the following to be core:

English Language Arts, Mathematics, Science, Visual and Performing Arts (VAPA), Physical Education, Spanish and Health and Family Life Education (HFLE), Technology Education, Information and Communication Technology (ICT) and Social Sciences which comprise History, Geography, Social Studies, Religious Education.

In order to develop the student holistically, emphasis was also placed on ICT integration, Sexuality and Sexual Health Education, Health and Wellness, Literacy and Numeracy.

At **Stage 3**, subject experts produced the revised curriculum documents. For each subject, a Curriculum Guide and Teachers' Guide was developed. Teachers with specific subject or curriculum development skills from schools were also included in the creation of these curriculum documents. The outputs of this phase included learning outcomes specific to each subject that contribute to the fulfilment of the national outcomes; subject content; teaching,

learning and assessment strategies to support the outcomes. As part of the development process, the curriculum was validated by feedback solicited from Universities and other key stakeholders. Continued consultations with key stakeholders will provide feedback to inform curriculum evaluation and further validation.

These curriculum documents will provide learning opportunities, teaching and learning strategies, assessment strategies and instructional plans which will contribute to the full potential of the students.

Stage 4 involved the implementation of the revised curriculum. Implementation of the curriculum is a dynamic process, requiring collaboration of the curriculum coordinators / officers and teachers. In implementing, teachers are expected to use the formal curriculum, as described in the curriculum guides, to plan work and teach in a manner that accomplishes the outcomes described. Teachers are expected to translate those outcomes into units of study, determining the appropriate sequence and time allocation according to the learning needs of their students. Although the curriculum documents provide sample teaching and assessment strategies, it is also the role of the teacher to select and use sound teaching practices, continually assessing student learning and systematically providing feedback to curriculum teams for use in revising and improving the guides.

The revised curriculum documents will be implemented initially for Forms 1 then at the Form 2 level and finally at the Form 3 level. Curriculum officers responsible for specific subject areas will monitor and support teachers in the implementation of this curriculum through school visits.

A curriculum development system provides support for the tasks of curriculum implementation. The system advocated by the Ministry of Education involves stakeholders, specialist curriculum officers, principals, heads of departments, and teachers, each with specific roles and responsibilities. Some of these are outlined in the table below.

System Component	Members	Role
Strategic Executive Team (SET) of the Ministry of Education	Consultants, Advisors	• Advise on curriculum policy, goals, and standards.
Curriculum Development Division (Head Office and District-based)	Curriculum officers	• Plan and develop curriculum. • Provide leadership in identifying curriculum goals and determining the process for development of curriculum materials. • Lead writing teams (which include teachers). • Monitor implementation. • Provide teacher support. •Facilitate teacher professional development for curriculum implementation. • Advise on processes and materials for effective implementation and student assessment. • Evaluate curriculum.
School Curriculum Management Team	Principal/Vice Principal and Heads of Departments	• Make major decisions concerning the school curriculum, such as assigning resources. • Provide guidelines for Instructional Planning Teams.
Instructional Planning Teams/School	Teachers	• Cooperate on tasks necessary for effective implementation,

Instructional Committees		such as: yearly work plans, units of study, development of materials to individualize the curriculum, identification and development of learning materials, student assessment and evaluation.

At the school level, the curriculum refers to all the learning and other experiences that the school plans for its students. It includes the formal or written curriculum, as well as the informal curriculum, which is comprised of other developmental opportunities provided by the school, such as those offered by student clubs, societies and committees, and sporting organizations (e.g. cricket team, debating society, Guides, Cadets).

The School Curriculum Management team develops a School Curriculum that must be in alignment with the National Curriculum. The School Curriculum Management team usually consists of the Principal and/or Vice Principal and Heads of Department. The duties of the School Curriculum Management team include the development of school culture, goals, vision, and curriculum in alignment with the national curriculum and culture. It also provides support for curriculum work and performs evaluation functions.

In providing support for curriculum work, the Management team may, for instance:

- encourage teachers to identify challenges and try new ideas;
- develop timetables to allow for development of curriculum materials, for example,

year plans, units, instructional materials;

- ensure availability of learning materials;
- provide instructional leadership;
- ensure that appropriate strategies are formulated to promote student success.

- monitors the curriculum (using, for example, observation, test scores, student books, formal and informal discussions with different stakeholders);
- assesses the hidden curriculum (including discipline policies, fund allocation, physical environment);
- evaluates the school programme of studies.

The roles of instructional teams are described below:

- Develop/Revise/Evaluate work programmes
- Determine resource needs
- Identify/Develop instructional materials
- Conduct classroom action research
- Integrate and align curriculum
- Identify and develop appropriate assessment practices
- Develop reporting instruments and procedures (student and teacher performance)
- Keep records

The roles of teachers are described below:

- Develop/Revise instructional programme
- Individualize curriculum to suit students' needs and interests
- Develop/Evaluate/Revise unit plans
- Develop/Select appropriate learning materials
- Select appropriate teaching strategies to facilitate student success
- Integrate the curriculum as far as possible, and where appropriate
- Select appropriate assessment strategies
- Monitor/Assess student learning and keep records
- Evaluate student performance
- Evaluate classroom programmes
- Conduct action research
- Collaborate with colleagues

The revised lower secondary curriculum for Trinidad and Tobago provides every opportunity for the child to learn, master new important skills and develop attributes and values that are critical to their role as emerging productive, caring and responsible citizens.

The Core Curriculum Subjects

The core curriculum subjects are those for which every student is required to demonstrate achievement of the stated outcomes in Forms 1–3.

A minimum time allocation is recommended for each core subject. The principal, as instructional leader of the school, will make the final decision as to time allocation, according to the needs of the students and the resources available at any given time.

The subjects and the recommended time allocations are as follows:

The number of periods per subject is based on:

- A 5 day cycle
- 7 periods per day
- Approximately 40 minutes per period

SUBJECT	**NUMBER OF PERIODS PER WEEK**
English Language Arts (ELA)	6
Mathematics	5
Spanish	3
Science	4
Physical Education	3
Technology Education	3
Visual and Performing Arts (VAPA)	4
Information and Communication Technology (ICT)	1
Health and Family Life Education (HFLE)	2
Social Sciences (History, Geography, Religious Education, Social Studies)	4

FRAMEWORK FOR AREAS OF STUDY IN SOCIAL SCIENCES

- Social Sciences comprise of the following subjects: Social Studies, History, Geography and Religious Education.
- Four periods are dedicated to Social Sciences.
- Two periods will be dedicated for Social Studies from Forms 1-3 all terms.
- Two periods each will be dedicated to History, Geography and Religious Education according the table below.

	TERM 1	**TERM 2**	**TERM 3**
FORM 1	• SOCIAL STUDIES • HISTORY	• SOCIAL STUDIES • RELIGIOUS EDUCATION	• SOCIAL STUDIES • GEOGRAPHY
FORM 2	• SOCIAL STUDIES • GEOGRAPHY	• SOCIAL STUDIES • HISTORY	• SOCIAL STUDIES • RELIGIOUS EDUCATION
FORM 3	• SOCIAL STUDIES • RELIGIOUS EDUCATION	• SOCIAL STUDIES • GEOGRAPHY	• SOCIAL STUDIES • HISTORY

At the end of Form 3, students will be assessed for the National Certificate of Secondary Education (NCSE), Level I.

Information and Communication Technology (ICT) Infusion into the Curriculum

Information and Communication Technology (ICT) infused in the curriculum is intended to ultimately transform teaching and learning to meet the needs of twenty-first century learners and better prepare them to be global citizens. The use of ICT integration initiatives should support the development of critical skills such as knowledge construction, problem-solving, critical thinking, collaboration, communication, innovation, inquiry, digital literacy and entrepreneurship.

ICT covers all the technologies used for the handling and communication of information. These technologies include:

- Computers/laptops
- Storage devices (e.g. flash drives, CDs)
- Mobile devices/handheld devices
- Satellite communication
- Audio & Audio visual systems
- Cloud computing
- Email/messaging

In addition to the above named technologies, there is a generation of Web 2.0 tools that facilitate a more engaging and interactive learning experience in the classroom. The following is a small sample that may be useful to teachers and students:

- Social networking sites (including educational social networking platforms like Edmodo)
- Blogs, wikis, forums
- Photo and Video sharing tools (e.g. Flickr, Instagram, Youtube)
- Cloud storage (e.g. Skydrive, Dropbox, Deego)
- Digital Story telling tools (e.g. Story Maker)
- Social bookmarking and annotation tools (e.g. Diigo)
- Inspirational tools and lessons (e.g. TED Talks/Ed)

- Screen casting/screen capture tools (e.g. Jing)
- Word cloud generators (e.g. Wordle)

The process of integrating ICT into the curriculum requires that administrators and teachers find ways to incorporate ICTs into teaching and learning to maximize educational outcomes, making learning relevant and meaningful. This integration can only be successful if it is carefully planned, managed, monitored, evaluated. Additionally, appropriate measures should be devised to provide support wherever needed according to the context of the school environment.

It is hoped that educators continue to be creative and resourceful, making full use of the resources that are available to them as they plan instruction.

Literacy across the Curriculum

Literacy is about more than reading and writing – it is about how we communicate in society. It is about social practices and relationships, about knowledge, language and culture. Literacy … finds its place in our lives alongside other ways of communicating. Indeed, literacy itself takes many forms: on paper, on the computer screen, on TV, on posters and signs. Those who use literacy take it for granted – but those who cannot use it are excluded from much communication in today's world. Indeed, it is the excluded who can best appreciate the notion of "literacy as freedom". (UNESCO, Statement for the United Nations Literacy Decade, 2003–2012)

The revised lower secondary curriculum addresses the literacy needs of all learners as they interact with a variety of texts across the different subject disciplines. Research indicates that students who struggle have significant difficulty navigating mathematics, science and social sciences texts in which the language is expository, dense and full of difficult vocabulary (Allen 2000). This underscores the need for all teachers to support students' literacy development since literacy skills are needed if students are to access the entire curriculum.

Teachers of English address students' literacy by teaching the skills of listening, speaking, reading and writing in an explicit and systematic manner. The goal of literacy instruction is to improve learning by building students' comprehension and communication skills. **Teachers of other content areas** have the responsibility of extending students' literacy instruction by teaching the subject-specific literacy of their respective subject areas. Literacy is embedded in every subject so teachers must create literacy-rich activities for students that will strengthen and support subject-specific learning.

The table below illustrates generic literacy activities that content area teachers and students can engage in to build the core skills of listening, speaking, reading, writing and representing as the curriculum is enacted in all subjects.

Table 1: BUILDING LITERACY SKILLS ACROSS ALL SUBJECT AREAS

LITERACY SKILLS	STUDENT ACTIVITY IN ALL SUBJECTS	TEACHER SUPPORT
• Listening and Speaking	Engage in collaborative discussions	Set ground rules for discussions

• Aesthetic Listening • Efferent Listening • Critical Listening	Make oral presentations that include use of ICTs Express ideas, perceptions and feelings about what is being learnt Listen to videos, film clips, audio tapes, DVDs, CDs Engage in discussions related to their learning and to their multicultural environment Engage in critical listening to process information and solve problems Engage in critical reflection on ethical issues related to subject	Listen attentively Facilitate discussions and explanations Source audio texts of related content for discussion Help students interpret and analyse what they listen to Develop students' presentation skills
Reading • Textbooks • E-books • Reports • Interviews • Surveys • Newspapers • Magazines • Multi-media texts	Engage in individual, peer and group reading Extract details relevant to learning Make inter-textual references Access and read e-books and online information Critically reflect on and interpret ideas presented in multi-media texts Identify problems and discuss solutions Read for information and enjoyment	Model reading of subject content to students Model the Think Aloud strategy Engage students in reading as a process Explain technical terminology and subject-specific vocabulary Indicate features of text and internal organization in subject-specific materials Provide graphic organisers/ concept map templates for student use Help students interpret, analyse and evaluate subject-specific content Help students connect subject content to the world beyond

		the classroom
Writing ▪ Expository ▪ Persuasive ▪ Technical ▪ Reflective	Use graphic organisers to plan and record ideas Engage in individual and shared writing Create descriptions, songs, raps, narrations, explanations Create comics and story boards Engage in reflective thinking when writing Use ICTs to produce and publish pieces	Infuse technology when modelling writing of subject content Explore subject-specific vocabulary and language use Explain internal organization of subject-specific texts Provide graphic organizers/ concept map templates Create blogs for collaboration Encourage emailing of student responses Help students interpret, analyse and evaluate what they write
Representing	Present work learnt through role play, movement, monologues, tables, graphs, maps, songs, posters, diagrams, letters, brochures, written paragraphs, essays, reports, cartoons, comics, models, digital presentations	Encourage a range of presentation types/modes Infuse ICTs when teaching subject content Encourage use of ICTs in students' presentations

Failure to acquire literacy skills for learning across subject disciplines is a major risk which the revised curriculum seeks to address. Literacy lies at the heart of student understanding and achievement. For the curriculum to be enacted in a meaningful manner that benefits all students, effective subject-specific literacy teaching is critical. Each content area requires skills for effective reading and studying of text materials.To support literacy development, content area teachers must know how to teach the skills so that students can bridge existing gaps. Literacy skills are essential for good communication, critical thinking and problem-solving at school and for success in life beyond school.

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PART 2:

The Information and Communication Technology Curriculum

Introduction

The term Information and Communication Technology (ICT) refers to forms of technology that allows information to be gathered, digitally processed and communicated. Essentially, ICT incorporates a diverse set of technological tools and resources used to communicate and to create, store, analyze, evaluate, disseminate and manage information. Some of these technologies include computers, the Internet, digital media and broadcasting technologies such as radio, television, video and telephony, and the protocols and services associated with these technologies, including electronic mail, text messaging and webcasts. According to the UNESCO ICT Competency Framework for Teachers, teachers need to infuse ICT into teaching and learning experiences to help students become collaborative, problem-solving, self-directed learners.

The importance of Information and Communication Technology (ICT) in the school curriculum has been given top priority by the Government through the eConnect and Learn (eCAL) Laptop Initiative. During the period 2010 – 2013, 68,850 laptops have been distributed to four cohorts of students entering Form 1. The initiative also distributed 3,300 laptops to schools for use by teachers. Moreover, the Ministry of Education has increased school infrastructure to support the integration of ICT in teaching and learning.

Information Technology was first introduced to the National Secondary curriculum as a component of the Technology Education Syllabus. Changes in global educational trends however, makes it imperative that ICT be given greater focus in the curriculum to provide students with the 21st Century skills and competencies needed to function in a world that's globally competitive and technological-driven. After consultation with parents, teachers, and other stakeholders, it was decided that ICT be included as a separate subject in the core lower secondary curriculum.

Subject Philosophy

This ICT curriculum will promote and encourage a more seamless approach to the ways ICT impact student lives. It embraces 21st century skills such as communication and collaboration, problem-solving and decision-making, creative and critical thinking. The curriculum is underpinned by constructivist theories of learning, preferring learner-centered approaches rather than memorization and rote regurgitation. The curriculum is anchored on the pillars of active learning, collaborative and project-based learning. Active learning provides a forum for enquiry and analysis, facilitating learners to learn as they actively participate in the process of knowledge construction. Real-life problems are presented, resulting in less abstraction, with greater emphasis on life situations. Collaborative learning encourages interaction and cooperation among teachers and students. Project-based learning is underpinned by pedagogy that supports long-term student centered activities and the development of skills necessary for surviving in the 21st Century.

The curriculum will emphasize the use of various tools for problem-solving, rather than on the unique features of the tools. This will enable students to adapt to the inevitable advent of new technology changes in the digital world rather than merely being versed in the mastery of application-specific tools. Students will learn how to handle real-life situations at any age using the computer and appropriate resources to develop life skills such as brainstorming, critical thinking, decision-making and problem-solving. With the increased access to technology and information, students will learn how to process, analyse, and evaluate information, and use information in their learning, making them digitally literate and empowered within a technologically sophisticated knowledge-based society.

Rationale for teaching Information and Communication Technology (ICT)

Technological advancements, driven by society's insatiable appetite for information, have become pervasive among people of all ages, but more significantly among the youth. It is therefore imperative that students be taught how to use ICT effectively, efficiently and in ethical ways in a safe environment. The lower secondary school ICT curriculum is intended to support all the other subject areas. There is also universal recognition of the need to introduce and sustain the delivery of ICT in the curriculum in this present age where the need for digital literacy is critical.

The infusion of ICT into the teaching and learning environment can only be successful if it is carefully planned, managed, supported and monitored. Instruction and assessments have to be carefully planned around available classroom environments and teachers' varying abilities to integrate ICT in teaching and learning and assessment strategies. ICT empowers teachers to exercise pedagogical flexibility and provide differentiated instruction while engaging the multiple intelligences of their students. This curriculum will support the infusion of ICT across various subject areas as it provides a sound medium for transforming teaching and learning to all students, including the exceptional learners.

Digital natives are growing up in an era when ICT is a ubiquitous part of the social and cultural fabric of learning, recreation, communication and social interaction. Functional ICT competencies are essential for students to be able to access, interpret and apply information which is a necessity for national development and the creation of human capital in any country. The lower secondary school ICT curriculum therefore will provide training in the use of computer-based technologies to solve problems using digital tools. It will provide the opportunity for students, through project work and active participation, to develop skills in problem-solving, collaboration, decision making, inquiry and critical thinking. Students will also learn how to integrate various technologies and the safe use of the internet. By understanding and applying the tools and competencies that ICT provide, students will be better able to solve problems and work more efficiently. Ultimately, the competencies acquired will empower students to apply these skills to all other subject disciplines in the curriculum.

Only a small percentage of students in secondary schools attempt Caribbean Secondary Education Certificate (CSEC) Information Technology (IT) at Forms Four and Five. The number of students who leave the secondary school system without gaining essential ICT skills exposes a dire need to ensure that this curriculum facilitates the delivery of a dedicated course of instruction in ICT to all students at the lower secondary level. Some secondary schools have already developed their own ICT program of study for delivery at Forms 1 to 3. However, there is wide disparity in the range of topics addressed. This further highlights the urgent need to define a national curriculum in ICT that addresses the desired knowledge, skills and attitudes that should be delivered to all students in secondary schools.

Goals

The ICT curriculum seeks to

- develop computational thinking skills in students to assist them in being able to cope with daily challenges
- expose students to ICT health and safety standards empowering them set healthy boundaries and make wise choices when using technology.
- develop confident, self-motivated, enterprising, self-directed lifelong learners, able to work independently and with others.
- Expose students to various careers in computing and ICT, assisting them to make informed career choices, while allowing them to understand and participate constructively in their career and vocational pathway.
- Provide student with knowledge of appropriate etiquette and 'netiquette' when using the technology, especially the Internet and social media.
- engage students in activities so as to inculcate a sense of value for their own work and respect and regard for the work of others.
- promote awareness of fundamentals in ICT so that they can become more skilled in the use of current technology and the Internet especially the critical issue of cyber wellness
- provide students with the necessary competencies to compete in a globally competitive digital age

General Learning Outcomes

At the end of this curriculum students will be able to:

- demonstrate an understanding of fundamental computer operations and concepts apply their knowledge of careers in computing;
- use productivity tools and other software applications for data collection and analysis, problem solving and to accomplish various tasks efficiently
- communicate through interactive and multimodal means
- practice the concepts of ergonomics for personal safety and wellness
- advocate and observe health and safety standards when using technology
- cultivate positive, healthy and responsible attitudes towards the use of ICT
- use digital tools for collaboration, peer-tutoring and problem-solving.
- demonstrate digital-age literacy skills by locating, collecting, analyzing, evaluating and communicating information electronically.
- Demonstrate ethical and responsible behavior when using the Internet and social media.
- Show respect for the work of others by practicing legal and ethical use of information.
- explore programming concepts to develop computational thinking skills
- design solutions for simple real-world problems using digital technologies

PART 3: Curriculum Content

This curriculum consists of six (6) modules to be completed over three (3) years.

The curriculum is spiral so some modules will be expanded over the three years.

Module 1	:	Health and Safety
Module 2	:	Computer Fundamentals and Careers in ICT
Module 3	:	Software applications (Word Processing, Spreadsheets, Presentation, Drawing and Video Creation)
Module 4	:	Internet and Web 2.0 tools
Module 5	:	Programming Concepts and Computational Thinking
Module 6	:	Ethics in Technology

Framework for Information and Communication Technology Curriculum

FORM 1		
Term 1	**Term 2**	**Term 3**
Health and safety Ergonomics, Health Hazards **Computer Fundamentals and Careers in ICT** Definitions of Information Technology (IT), Information and Communication Technology (ICT) and Computer Science; Components of a computer system, Functions of computers, Computer care, Types of computers Types of Software. Keyboarding **Word Processing** Creation of a simple document, Basic file operations, Common formatting tools and editing features. **Ethics in Technology** Netiquette **Internet and Web 2.0 tools** Introduction to the Internet, Internet browsing, Search Engines, Hyperlinks, Internet Information Sources, World Wide Web **Presentation** Creation of a simple presentation, Manipulating a presentation, Saving/Printing a presentation.	**Computer fundamentals and Careers in ICT** File Maintenance, Computer maintenance, Saving/Protecting data, File backups and cloud computing **Word Processing** Page formatting, Tables, Inserting and editing images, **Ethics in Technology** Data Protection and Physical and Software Security issues **Presentation** Creation of a simple slideshow, formatting, Working with images	**Drawing** Creation of a digital drawing, Save/Print drawing, Open/Close drawing file, Manipulate drawing, Formatting **Ethics in Technology** Plagiarism, Copyright, Freeware, Shareware, Piracy **Health and safety** Safety precautions, Green Computing, Disposal of equipment **Presentation** Animation, Working with Graphics **Programming Concepts and Computational Thinking** Information gathering, Brainstorming, Decision Making, Information Evaluation

FORM 2		
Term 1	**Term 2**	**Term 3**
Word Processing Table of Contents, Templates, Images, Review document **Video Creation** Source files, Videos, Storyboards **Internet and Web 2.0 Tools** Representation and Evaluation of information, Copyright, Plagiarism **Computational Thinking** Representation, Organization and Analysis of information **Presentation** Multimedia, Hyperlinks	**Spreadsheet** Creation of a spreadsheet, Save/Print, Open/Close a spreadsheet, Manipulate rows/columns, Arithmetic Operations, Formula, Formatting, Managing worksheets, Graphs **Video Creation** Video clips, Sound, Editing videos Titles, Sub-titles, Credits **Internet and Web 2.0 tools** Ways of Communication, Digital footprint, SMS texting, Instant Messaging, Email, Blogs	**Spreadsheet** Cell referencing, Relative and absolute cell addressing, Cell alignment, Borders Creating and labelling Graphs/ Charts **Internet and Web 2.0 Tools** VoIP, Sky Drives, Collaboration Tools, **Programming Concepts and Computational Thinking** Representation and Analysis of information, Organisation of information Problem Solving-Problem definition, analysis and design of solution to real-world problems.

FORM 3		
Term 1	**Term 2**	**Term 3**
Internet and Web 2.0 tools Virus, Spam and other malware, Computer crimes including identity theft **Programming Concepts and Computational Thinking** Algorithm Development - Narrative, Flowcharts	**Computer fundamentals and Careers in ICT** Hardware Specifications, **Programming Concepts and Computational Thinking** Implementation and Evaluation of Solutions	**Computer fundamentals and Careers in ICT** Careers in ICT **Programmimg Concepts and Computational Thinking** Solution Implementation

Curriculum Content

FORM 1			
SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
MODULE 1 : Health and Safety			
1.1 Demonstrate correct body posture when using computers.	Ergonomics (body posture);	***Presentation*** Teacher provides images of health hazards and effects and shows picture of correct body posture to take at a computer work station and allow students to help each other to model picture.	***Peer assessment*** Students work in pairs and take turns to model correct body posture by sticking pictures to create or demonstrate correct body posture and workstation layout and use a peer-assessment rubric.
1.2 Identify possible health hazards associated with long-term exposure to ICT tool. 1.3 State safety precautions for the use of ICT tools. 1.4 Explain health and safety risks and precautions for an ICT environment.	Possible health hazards associated with long-term exposure to ICT tools (vision, back- ache, wrist pain, carpel tunnel syndrome, repetitive strain injury, computer addiction, radiation from mobile phone which can cause cancer, hearing loss form loud ringing tones)	***Brainstorming/Discussion*** Students engage in brainstorming (use Think-pair-share) to determine possible health hazards associated with long-term exposure to the use of ICT tools and then discuss the risks and precautions that can be taken.	***Group Presentation*** Students create a five (5) slide presentation showing the health and safety risks and precautions to take when using ICT and make presentation to class. A presentation rubric is used to assess performance.

FORM 1			
SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
1.5 Demonstrate health and safety practices while using ICT tools (computers, mobile phones).	Safe practices while using ICT tools	Students view a video on health and safety practices while using ICT tools Students work in groups to brainstorm a list of safe practices when using ICT tools.	Students' proper handling of ICT tools is observed using a checklist
MODULE 2: Computer Fundamentals and Careers in ICT			
2.1 Explain the difference between Information Technology (IT), Information and Computer Technology (ICT) and Computer Science	Definitions of terms – Information Technology (IT), Information and Communication Technology (ICT) and Computer Science	***Research*** Students research terms and discuss orally in class. Students work in groups to put together a definition for one of terms from phrases given by the teacher	***Questioning*** Students respond to prompts to define stated terms orally and in writing and graded accordingly.
2.2 Explain the components of a basic computer system	• Input • Output Processing • Storage	***Presentation/Demonstration*** Students discuss the importance of various components of a computer system and their interconnection using diagrams and other visuals to show how components are connected to one another and the effects if one is missing or omitted.	***Drawing*** A drawing checklist is used to assess students' drawings and labelling of a typical computer system.

FORM 1			
SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
2.3 Discuss the reasons why computers are so useful and important in the world today	• Speed • Reliability • Accuracy • Consistency • Storage Capacity	***Visual Presentation/Discussion*** Teacher shows video of how computers are being used today. Students work in groups to identify how computers are used in their lives.	***Brainstorming*** Students work in groups to research and brainstorm reasons for the computer's usefulness and importance in today's society and makes oral presentation. A presentation rubric is used to assess the performance and content.
2.4 State methods of caring for computers	• Adverse temperatures • Dust • Water • Magnetic fields • Shutting down • Unplugging when not in use • Defragmentation.	***Discussion/Research/Demonstration*** Students can research and present methods of caring for their computer. Students simulate adverse conditions, magnetic fields. Teacher and students discuss the effects of water and the corrosive effects of dust. Teacher demonstrates the steps of defragmentation Working in groups students create a chart of the DO's and Don'ts of caring for a computer.	***Chart of Do's and Don'ts*** Use a checklist to assess students' statements of do's and don'ts of caring for a computer.

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SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
		Students explain how to defrag their computers.	
2.5 Compare various types of computers	• Supercomputers • Mainframes • Servers • Personal computers • Mobile computers • Mobile devices • Embedded systems • Size • Processing speeds • Storage capability • Use	***Discussion*** Students explore different types of computer systems and comparisons made according to specifications, type and function	***Model*** A modelling rubric is used to assess students' models of different computer systems.
2.6 Distinguish among types of software	• Definition of software • Features of Operating system vs application software • Examples of each type.	***Discussion/Research.*** Teacher explains the difference in function. Students discuss types of software types found on their computers.	***Mix and match*** Students categorise software tools from a list given by the teacher.
2.7 Practise keyboarding	Qwerty keyboard as input device. eg. Mavis Beacon Teaches Typing application software.	***Guided Discovery*** Teachers guide students on the use of a typing application, e.g. 'Mavis Beacon Teaches Typing'	***Typing Assignments*** Students aim to reach expected standards of speed and accuracy and evaluates their competency at various times using checklists.

FORM 1			
SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
2.8 Demonstrate file management operations	• Creation of folders and sub-folders • Deletion of folders • Restoration of folders • Placing files into specific folders.	***Demonstration/Discussion***. Students discuss the need for proper file management. Teacher demonstrates the creation of a folder and sub-folder. Teacher supervises students practice Students create folders and sub-folders to store their school work according to their subjects. Students create a main folder named Form 1 subjects, then sub-folders for each subject they are doing. For example, Math, Physics etc. Create two sub folders in each sub-folder. For example in the Math folder create a folder named Assignments and another folder named Class notes.	***Performance Task*** Students are graded against a competency checklist for creation of folders/sub-folders.
2.9 Perform computer maintenance	• Formatting • Virus program updates • Back-up	***Demonstration*** Teacher demonstrates maintenance procedures	***Demonstration*** Students demonstrate expected maintenance skills to the class and evaluated using

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SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
2.9 Perform computer maintenance	• Defragmentation of hard drive • Formatting • Virus program updates • Back-up • Defragmentation of hard drive	***Discussion*** Teacher solicits students' responses on their perceptions on stated maintenance issues. Teacher engages class in discussion and makes practical demonstrations of maintenance tasks.	competency checklist. ***Demonstration*** Students demonstrate expected maintenance skills to the class and evaluated using competency checklist.
2.10 Select appropriate media to backup and store data	• Importance of secondary storage • Definition of the term backup • Reasons for backups • Storage media (CD, DVD, Blu-Ray Disk, external hard disk, USB, flash memory) • Cloud storage.	***Discussion*** Teacher conducts class discussion on the need for secondary storage; describe the comparative advantages and disadvantages of using different backing storage; provide examples of secondary storage devices; need for backing up data.	***Oral Questioning*** Students answer questions orally on the importance of secondary storage and making backups. Students in groups construct a chart to show the various storage devices and select appropriate media for backing up data. Students evaluated using checklists.
MODULE 3: Software Applications			
Word Processing 3.1 Use a word processor to create a simple	• Creation of document • Save	***Guided Instruction/Discussion*** Using guided instruction and discussion, students type a simple report of their choice. For example, students can be given a sample report	***Work Processing Practical*** A checklist of competencies in word-processing is used to measure students gain in each

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SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
document 3.2 Save a document 3.3 Open a document 3.4 Close a document 3.5 Print/Print Preview report	• Open/Close Preview/Print	of a school incident, an inter-class sport competition. Students save and print preview their report while following the instructions by the teacher. Teacher allows one student to demonstrate how to print their report while guiding the process.	of the specific objectives over the period of the module.
3.6 Select blocks of text. 3.7 Manipulate text 3.8 Apply appropriate formatting (text, line, page) 3.9 Use features on the tool bar	• Block/Cut/Copy/Paste text • Undo/Redo changes • Deletions/Insertions (character, words, lines, sentences, paragraphs) • Text formatting (font type, font size, font colour, bold, italics, underline, superscript, subscript, alignment) • Line justification (left, right, centre, full) • Line spacing • Word wrap; Bullets • Spell Check	***Guided Instruction*** Students format and edit their previously saved report incorporating at least five (5) of the formatting features. Students apply review tool to check for spelling and grammar errors	***Work Processing Practical*** A checklist of competencies in word processing is used to measure students gain in each of the specific objectives over the period of the module.

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	• Grammar check • Page Formatting (margins, orientation, numbering, size, page/section breaks)		
3.10 Create a table within a document 3.11 Insert an image	• Tables (inserting/ deleting rows and columns) • Images (eg. Smart Art, Clip Art)	***Demonstration/Visual Presentation*** Teacher demonstrates/shows video how to create a table and insert image/graphic in a document. ***Group Work*** Students work in groups to insert an image of an input/output/storage device in a document and to create a table to list the advantages, disadvantages and applications of the device.	***Work Processing Practical*** A checklist of competencies in word processing is used to measure students gain in each of the specific objectives over the period of the module.
Presentation 3.12 Create a simple presentation. 3.13 Save a presentation 3.14 Use formatting and editing tools on slides.	Creation of a simple presentation • Save/Open/Close/Preview/ Print a presentation • Format and edit slides (font size, font style, font colour, bullets)	***Guided Instruction/ Discussion*** Assign students to groups to work on a project to develop a presentation with five (5) slides using presentation software such as Microsoft Power Point. Students choose from a list of topics	***Presentation Portfolio*** Students work in groups using resources including rubric to create presentation and present to class. A portfolio of no more than 5 slides is presented at the end of the module and graded against the presentation rubric.

FORM 1			
SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
3.15 Select and apply appropriate designs 3.16 Manipulate slides in a presentation. 3.17 Print/Print Preview a presentation 3.18 Create and demonstrate a slideshow presentation.	• Manipulate slides (insert, delete, re-order); Design; Slide Show.	and are given a list of resources.eg. page references in available textbooks, links to relevant websites and to YouTube videos. Teacher monitors student work providing guidance where necessary. Teacher guides students how to print preview/print presentation.	
3.19 Apply animation effects to slides insert graphics 3.20 Manipulate graphics	Images; Animation	***Visual Presentation/ Demonstration*** Teacher uses a presentation incorporating animation and graphics and demonstrates to class the process involved. Students open a saved presentation and enhance it by using animation and graphics and presents to class for feedback.	***Presentation/Demonstration*** A presentation rubric is used to mark the presentation/ demonstration
Drawing 3.21 Experiment with drawing tools	• Creation of a simple digital drawing; Save an image ((jpeg, bmp)	***Guided Discovery*** Students in groups will be given a simple drawing to complete using drawing tool (eg. Microsoft Paint)	***Performance Task*** Students are graded on their completed drawing.

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SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
3.22 Draw simple pictures 3.23 Add images 3.24 Format images 3.25 Add text to an image 3.26 Format an image	• Images (shapes) • Format an image (colour, brush, fill, stamps, crop, size, background colour, image resolution, pixel) • Print/Preview/Open/Close	Students discuss and demonstrate the elements of the package they used to create the drawing. Students complete a drawing given eg. a model house or comic strip related to one of the class topics taught previously and showcase to class.	
MODULE 4: Internet and Web 2.0 tools			
4.1 Describe features of the Internet	Features of the Internet; URL and web addresses; hyperlinks; web browsers; Browsing the Internet	***Demonstration/Discussion*** Teacher leads class in online demonstrations incorporating student participation while browsing the Internet Students demonstrate browsing the Internet.	***Questioning*** Students are questioned orally the teacher and marked on their responses.
4.2 Use search engines to find required information	• Definition of search engine • Functions of a search engine • Search/find information • Popular search engines	***Demonstration/Simulation*** Teacher demonstrates use of search and search criteria using search engines. Students explore the use of several search engines. Students use criteria to find specific information on a topic using the	***Checklist or rubric*** A checklist to used to determine students' competencies

FORM 1			
SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
		features of search engines	
4.3 Evaluate information obtained from the Internet	• Credibility of sources • Relevance • Timeliness • Reliability, Accuracy	***Guided Discovery*** Teacher discusses criteria for evaluation with students then supplies students with links to web sites to evaluate these sites for relevance, timeliness, reliability and accuracy. Students use a web quest provided by teacher and working in groups find and evaluate the web sites listed	***Group Work*** Journal entry (colour-coded based on Relevance; Timeliness; Reliability, Accuracy)
MODULE 5: Computational Thinking			
5.1 Write step by step instructions for a simple activity. 5.2 Apply step by step instructions for a simple activity. 5.3 Outline the main steps of a simple activity.	• Information gathering • Brainstorming • Identification of resources • Evaluation of pros and cons of multiple solutions • Determining most feasible solution.	***Role Play/Discussion*** Teacher elicits from class steps involved in a simple activity. Students work in pairs, one to write and give instructions to complete a simple activity (e.g. step by step direction to create a paper item) and one to follow these instructions. Students then evaluate the steps and outline the main steps to completing the activity.	***Peer Assignment*** Students use a peer feedback form to evaluate each other's performance.

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		Students work in pairs. Each person writes instructions on how to solve a problem or perform a task such as baking/cooking a dish or playing a game and exchange with the other to follow.	
5.4 Open/Close Scratch application 5.5 Identify sections of the Scratch interface 5.6 Select appropriate tools on the Scratch application interface. 5.7 Use Scratch application to create shapes 5.8 Format and edit shapes	Scratch application (offline and online version - http://scratch.mit.edu/); Main sections of the Scratch interface (script pane, custom pane, sound pane , stage, block palette, script area); Block (pen and move)	***Discussion/Demonstration*** Teacher discusses the main sections of the Scratch interface then demonstrates while students follow how to drag and drops command blocks and create a script to cause the image to make a square. Students follow steps as teacher demonstrates. Students then create a three-letter word of their choice using the command blocks to create a script.	***Demonstration*** Students demonstrate skills and a Skills demonstration rubric is used to evaluate students
MODULE 6 : Ethics in Technology			
6.1 Demonstrate proper netiquette when using the Internet.	• Proper netiquette (language, tone, use of capitals)	***Jigsaw Strategy*** Students work in groups of 6 and then rearranged in 3 sub-groups of 2. Each	***Presentation*** A presentation rubric is used to grade the presentation.

FORM 1			
SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
6.2 Explain security issues related to social media and internet usage	• Protection of digital footprint • Profiles settings (use, security) • Passwords (strong passwords / frequency to change) • Posting your location • Identify theft • Email scams • Online socialising	sub-group is given a different link to a video to discuss and then regroup as a class for discussion of video with the whole class. ***Oral Presentation*** Students work in groups to create a presentation with rules and regulations for using the Internet and present to class.	
6.3 Explain cyberbullying 6.4 Point out forms of cyberbullying tactics 6.5 Describe ways to prevent cyberbullying 6.6 Relate ways to deal with cyberbullying	• Meaning of Cyberbullying • Impact on students • Forms of cyberbullying (postings, texting, emails containing inappropriate material and abusive comments about an individual's status, physical characteristics, race, religion or sexual orientation) harassment, threats • Advice to victims of cyberbullying (make a report)	***Guided Learning*** Using guided instruction and discussion, students are shown examples of some forms of cyberbullying and the negative consequences. Resources are provided on how to prevent/deal with cyberbullying which they are then required to work in groups to add as many other examples they can think of giving advice for preventative measures/ ways a victim can deal with each one.	***Poster*** Students work in groups to create a brochure/poster on cyberbullying tactics and ways to deal with them. A rubric is used to grade brochure/poster
6.7 Distinguish between	Types of software (freeware,	***Jigsaw strategy***	***Report***

FORM 1			
SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
types of software licenses. 6.8 Describe legal and ethical issues in relation to ICT usage.	shareware, trial ware, commercial software)	Students work in groups to determine and discuss the software license for a piece of software. Students are then rearranged in 5 sub-groups of 2 students to discuss their findings.	Students work in groups to research a piece of software and to write a report on the type of license it has justifying answer. Students present orally on findings. A presentation rubric is used to assess the presentation.
6.9 Explain the meaning of the term copyright 6.10 Explain the consequences of violation of copyright laws. 6.11 Differentiate between plagiarism, copyright, piracy and hacking	• Plagiarism • Copyright, Copyright laws and violation • Piracy • Hacking	***Discussion*** Teacher explains the meaning of the terms and provides some actual examples of consequences for infringements (e.g. from various University policies, local and international news reports) ***Performance Task/ Mind Mapping*** Students complete a work sheet to match terms with their meanings and then to categorise examples given under the appropriate headings.	***Pen and Paper test*** Students complete a pen and paper test.

FORM 2			
SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
MODULE 3: Software Applications			
Word Processing 3.27 Apply template designs to documents 3.28 Manipulate images	• Templates • Insert/Delete Images (eg. Clip Art, Smart Art, Word Art)	***Project-Based Learning/ Demonstration*** Teacher assign students to groups of three (3) or four (4) at to create a use one of the templates and create a document, e.g. a brochure, on any topic of concern to them that they will like to share with other students in the school. Teacher shows students where to find templates in word processor and directs students to a You tube video on how to manipulate images. ***Class Project*** Students work in groups to create document, eg. brochure inserting at least one (1) image and shares brochure with another group to peer review.	***Word Processing Practical*** A ***w***ord processing checklist to include skills needed to do a brochure
3.29 Use the appropriate feature to create a table of contents 3.30 Update a Table of Contents	• Table of Contents (create, update)	***Demonstration*** Teacher uses a saved document and demonstrates how to create a table of contents and review documents using the track changes and comments features.	***Word Processing Practical*** Word processing checklist to include skills needed to do a table of contents

FORM 2			
SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
3.31 Review a document and add/delete comments and track the changes made. 3.32 Accept/Reject changes	• Review documents – add/delete Comments, Track Changes, Accept/Reject Changes	***Individual Work*** Students open a saved Word document and create a Table of Comments, conduct a peer review of another student's document using track changes and comments and peer review. Students will then accept or reject the changes and update the Table of Contents	
Spreadsheets 3.33 Create a worksheet 3.34 Save a spreadsheet 3.35 Edit cell contents 3.36 Open/Close a spreadsheet 3.37 Print Preview/ Print a spreadsheet 3.38 Manipulate rows and columns 3.39 Apply formulas and functions 3.40 Perform a sort	• Creation of a worksheet • Save/Print/Print Preview/Open/Close a spreadsheet • Edit contents in a worksheet (cell, range) • Insertions/Deletions of rows/columns • Row height and Column Width • Arithmetic operations • Formulae (Sum, Average, Min, Max) • Copy/Cut and paste formulas/cell contents • Relative and Absolute cell references • Numeric data format (number, currency,	***Guided Learning/Problem-based*** Teacher demonstrates and discusses the uses of spreadsheets and makes connections to real-life situations. Students work in pairs to solve a given problem. Teacher guides students to resources (links to online resources, textbook references) that can be helpful in developing content skills. Students work in groups and using resources develop a solution for a given case scenario. Teacher gives feedback on students' solutions at different phases.	***Spreadsheet practical*** A Spreadsheet skills checklist used to check for competence

FORM 2			
SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
operation using one criteria 3.41 Insert a border 3.42 Solve contextual problems using tabular representation	percentage, date) • Text formatting (bold, italics etc.) • Alignment (text, cell) • Borders		
3.43 Demonstrate data visually by creating appropriate charts using spreadsheet data 3.44 Label charts	Graphs/Charts (chart title, labels of x and y axis)	***Demonstration*** Teacher demonstrates how to create and format chart and then calls some students to demonstrate process. Teacher supervises student practice ***Practical*** Students open a saved spreadsheet and from the data entered, students create a graph to make a comparison.	***Spreadsheet Practical*** A checklist used to check for competence
Video Creation 3.45 Create a source file 3.46 Using various devices import a video 3.47 Create a storyboard 3.48 Add/Delete video clips and sound 3.49 Edit a video	• Creation of a source files using camera, camera phone, video camera, camcorder • Import video • Storyboards • Video clips and sound (adding/deleting) • Videos Editing	***Guided Instruction/ Visual Presentation*** Teacher shows videos on ways to create a video and a storyboard and to add titles/subtitles/credits. Teacher gives students continuous access to this video together with a hard copy of the summary of the steps involved.	***Project based Group work*** Students work in groups to create their own video using instructions and a group project. Rubric is provided by the teacher and students are marked with rubric.

FORM 2			
SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
3.50 Add titles, Subtitles and Credits	• Titles, sub-titles and credits.		
MODULE 4 : Internet and Web 2.0 tools			
4.4 Examine areas of inappropriate use of information	The nature and possible legal and ethical consequences of copyright infringement and plagiarism of information.	***Discussion*** Teacher provides resource material on legal and ethical consequences of copyright infringement and then engages students in discussion on ownership of material, and solicits their views on copying information from various sources. Teacher links the discussion to copyrighted material and plagiarism of content from the Internet, especially in the context of their school research and assignments. ***Group Work*** Class divided into two groups debates on the topic of plagiarism and copyright laws while teacher moderates.	***Questioning***. Oral Questioning and prompts in class. Anecdotal checklist
4.5 Discuss features of SMS texting and instant messaging technologies	• SMS and IM as social media • Merits and demerits of SMS texting and instant messaging.	***Brainstorming*** Teacher engages students in brainstorming to identify alternative ways to use SMS and IM. Students share their views on the various ways SMS and IM can be used positively in collaboration on school assignments and projects.	***Questioning*** Anecdotal checklist

FORM 2			
SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
4.6 Setup and use electronic mail	• Use of e-mail • e-mail addressing • Setting up an e-mail account • Creating a secure password • Forward, Reply, Copy, Attachments	***Demonstration*** Teacher directs students through the process of setting up an e-mail account, discussing each step while placing emphasis on security. Teacher guides students to create and send mail, add an attachment and forward mail. Students send mail with attachment to their peers in class and copy it to teacher	***Performance Checklist*** A checklist is used to determine what students are competent in doing.
4.7 Assess the use of web logs (blogs)	• Definition of blog • Uses (personal web page, online diary) • Comments • The use of blogs in education and in socializing.	***Guided Instruction*** Teacher accesses a previously created blog and invites students to access the blog and make comments by critiquing the process of blogging. Students post their critique on the use of blogs in the teacher's blog.	***Blog*** A blog rubric testing students' competence to perform tasks.
4.8 Evaluate communication via VoIP	• Benefits of using VoIP • Applications that support VoIP eg. Skype, Magic Jack phone service, Tango, Viber	***Discussion/Demonstration*** Teacher solicits from students their thoughts on how applications like Skype, Viber and Tango operate and then introduces the concept of VoIP in relation to Internet and Wi-Fi. Teacher guides students in using VoIP in applications to communicate. ***Oral/Visual Presentation*** Students work in groups and make	***Presentation*** Students are graded using a presentation checklist.

FORM 2			
SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
		group presentations on VoIP	
4.9 Collaborate using Internet-based tools.	• Wikis • Community of users • Adding/Editing content • Site for shared working • Google drive as a collaborative forum.	***Discussion*** Teacher introduces students to wikis, using Wikipedia and discusses the concept of allowing people to add, modify, or delete content in collaboration with others. Students work collaboratively on a document on Google Drive. ***Practical Group Work*** Students work as a class to complete a document on Google Drive and input/make edits to it. (eg. Rules for using mobile devices at school)	***Group Project*** Students are graded using a collaboration rubric.
MODULE 5 : Computational Thinking			
5.9 Solve problems using logical thinking	Plans to achieve goals (asking What", "When" and "Why") Identification of a goal Possible ways of achieving goals using the information available Conditions	***Practical*** Teacher introduces logical games and identifies the goals, available information and the conditions for each game (eg. Missionaries & Cannibals - one such simulation available at: http://www.learn4good.com/games/puzzle/boat.htm; 2048 available at: http://2048game.com/; Sudoku available at http://www.soduko-online.com/) ***Practical/Performance Task*** Students play each game and list the steps used to win	***Performance Task*** Students are scored on their performance in each game.

FORM 2			
SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
5.10 Use computational thinking skills to solve simple problems	• Decomposition • Patterns • Abstractions • Algorithms (narrative)	***Discussion*** Teacher discusses methods of computational thinking that can be used to solve problems such as mathematical problems, provides basic examples of each method and introduces students to websites like http://games.thinkingmyself.com/ ***Performance tasks*** Students complete logical reasoning worksheet (eg. http://in.edugain.com/sampleWorksheet/Grade4/Logical-Reasoning/Printed Students complete online worksheets/ puzzles (eg. http://www.puzzles.com/projects/LogicProblems.html	***Puzzles and Worksheets*** Students are given puzzle and worksheets to complete and graded on the percentage of completion and accuracy**.**
5.11 Develop a program to draw a selected image.	• Open Scratch (or other application) or use the online version: http://scratch.mit.edu/ • Paint new sprite (brush, shape, colours • Duplicate • Control blocks (Start, Wait) Looks blocks • Switch costume • Sound blocks • Multiple Sprites (coordinate actions)	***Demonstration*** Teacher presents some images that can be drawn using step by step (eg. images from Art, Joker, House, Elephant, Butterfly). Teacher demonstrates the drawing of an image step by step using Scratch. Students work in groups of four and each group select an image to draw using Scratch. ***Group Work*** Students work in groups to produce an image chosen from a list provided by the teacher.	***Performance Task*** Students are graded using a checklist to check for instructions to produce an image**.**

FORM 2			
SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
	• Control blocks • Animation		
5.12 List the main steps in an activity for a program.	• Event block (start) • Activities involving two (2) persons	***Discussion/Guided instruction*** Teacher solicits examples of some simple activities that may involve two people from students (eg. helping someone cross the street, cooking a dish with someone). Using directed questions the class discusses the main steps of some of the activities mentioned. ***Performance Task*** Students work in groups to develop list of steps for a selected activity including what each background will be, when the costume will change and what each sprite will say.	***Performance Task*** Students are scored using a rubric to determine if all the steps are listed; if the steps are finite or could be broken down further.
5.13 Demonstrate an activity in a program.	Sprites (speech, background, switching costumes, names)	***Demonstration*** Teacher demonstrates how to change the name of sprites and backgrounds by using the current sprite information. Students draw their own sprites and backgrounds and teacher provides support as needed. ***Practical*** Students work in groups to develop a Scratch application that demonstrates the step by step solution to a selected activity using a saved list.	***App Development*** Teachers used a Scratch Game Rubric to grade students

FORM 3			
SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
MODULE 2: Computer Fundamentals and Careers in ICT			
2.11 Evaluate the specifications of a computer	• Hardware specifications - Processor type, Processor speed • Capacity of RAM • Capacity of hard disk • USB, HDMI ports • Screen Size • Screen Resolution • IDE and SATA interfaces	***Discussion*** Teacher distributes brochures from computer retail stores detailing specifications on computer systems offered for sale and discusses specifications with students while demonstrating parts on a real computer. ***Group Work/Oral Presentation*** Students work in pairs to determine which of two computer systems given is better for a university student given the specifications of each; students justify reasons for choice and make presentation to class.	***Presentation*** Students are marked on the content and their presentation skills using a rubric.
2.12 Identify various	Careers in ICT (software	***Research/Discussion/***	***Presentation and Essay***

FORM 2			
SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
careers in ICT	engineer, programmer, computer technician, web designer etc.)	***Presentation*** Teacher gives students prior assignment to research careers in ICT. Students make presentations on various careers. Teacher moderates discussion and presentations. ***Performance Task*** Students write on an ICT career they would like to pursue, giving reasons for their choice**.**	Students are graded using a research, presentation and essay rubric
MODULE 4 : Internet and Web 2.0 Tools			
4.10 Identify threats to computer data and security	Viruses, malware, spam, anti-virus, firewall	***Research*** Students research the incidence and effects of viruses and malware and ways to protect computers form them. ***Oral/Visual Presentation*** Groups make presentations to class on assigned topics.	***Oral/Visual presentation*** A presentation rubric used to grade the presentation
4.11 Assess various levels of computer crime	Identity theft, credit card fraud, phishing, hacking	***Guided Discovery/Webquest*** Students work on group projects to research topics and present to class. Teacher makes presentation on the prevalence and consequences of computer crime	***Dramatization*** Students personify identity theft, credit card fraud, phishing and dramatize their actions to show the resultant effects on victims. A rubric is

FORM 2			
SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
		locally and internationally. ***Dramatization*** Students personify identity theft, credit card fraud, phishing and dramatize their actions to show the resultant effects on victims.	used to mark the dramatization.
MODULE 5 : Computational Thinking			
5.14 Develop a narrative solution to a given task	• Division of tasks into subtasks • Steps to perform a task	***Brainstorming*** Students brainstorm the rules of a board game (e.g. Snakes and Ladders)	***Performance Task*** Students write a list of steps of the rules of a selected game
5.15 Identify flowchart symbols.	Concept of a flowchart; Flowchart symbols (input/output, decision, processing, start/ stop, arrows)	***Inquiry/Discussion*** Teacher draws shape and asks students to identify the shape - ellipse, parallelogram, rectangle, diamond. Teacher describes a flowchart and the function of each shape. ***Individual Work*** Students are given random shapes to name their functions and vice versa.	***Written Test*** A checklist is used to check for correct shapes and their functions

FORM 2			
SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
5.16 Use flowchart symbols appropriately to represent an algorithm using a sequential construct.	Program Construct (sequential)	***Guided Discovery*** Students are given an algorithm and asked to use the symbols and place the steps in them. Teacher then gives feedback and shows students how to join the boxes together to represent the algorithm	***Performance Task*** Students construct a flowchart for a list of steps given to solve a problem.
5.17 Use flowchart symbols appropriately to represent an algorithm using a selection construct.	Program Construct (selection)	***Guided Discovery*** Students are given an algorithm involving a decision and asked to use the symbols and place the steps in them. Teacher then gives feedback and shows students how to join the boxes together to represent the algorithm. Teacher then allows students to connect the boxes and give feedback.	***Performance Task*** Students represent the rules of the snake and ladders game using a flowchart.
5.18 Use flowchart symbols appropriately to represent an algorithm using a looping/repetition	Program Construct (looping/repetition)	***Guided Discovery/Presentation*** Students are paired of and given an algorithm incorporating a loop and asked to use the symbols and place the steps in them. Students present	***Performance Task*** Student represent a solution for multiplication tables (multiplying numbers by 1 – 12) using a flowchart.

FORM 2			
SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
construct.		their solution obtaining feedback from other students and teacher.	
5.19 Manipulate sprites using Scratch application	Scratch instructions - Changing colour, moving a sprite to music, moving a sprite with the keyboard, talking sprites, moving to or gliding to a x / y coordinate,- sprite following the mouse, distraught images, animating a sprite, animate the movement of a sprite, using loops, creating interactive sprites, using variables, using If	***Guided Discovery*** Teacher provides graded worksheets / cards that show the Scratch instructions to complete each task. Eg. a card like the one can found at this link: http://cdn.scratch.mit.edu/scratchr2/static/__df70d52348f812d8e827dcab75de8302__//pdfs/help/Scratch2Cards_Jan2013.pdf Students grouped in pairs work through all of the cards and ask other groups for assistance if needed before asking teacher. ***Group work/Peer Review*** Students work in pairs to complete twelve (12) work cards, moving from card one to card twelve. Groups exchange solutions and conduct peer review.	***Peer review*** A checklist is used by peers to evaluate the work cards assignment.
5.20 Develop simple animated games that coordinates the action of	• Coordinates of the Scratch stage • Loops forever- without	***Guided Instruction/Demonstration*** Teacher asks students for ideas of a	***App Development*** A rubric is used to mark game app students create

FORM 2			
SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
various sprites using Scratch	conditions • Broadcast • Send and Receive • Motion block • Go to an X and Y location • Points in the direction • Looks block (say)	simple game that two people can play. Eg. Catch. Teacher demonstrates how the forever and broadcast blocks work and explains how they can be used to coordinate the action of various sprites. Students use directed questions to get the list of steps needed for the simple animated game. Eg. A football passing game. ***Individual Work*** Students write an animated game incorporating sprites communicating with each other.	
5.21 Develop a scratch program that accepts input from the keyboard	• Sensing block (ask, touching) • Help features • Data block (create a variable) Definition of a variable • Variable types (number, string) • Assigning values to variables (set) • Event block • Operator block (join words)	***Discussion/Guided Instruction*** Teacher discusses each block and provides examples of each. Teacher describes a programming challenge eg. to develop a space application that would help students estimate angles. When started it will set the score to 0 and randomly move a planet to different parts of the stage. Students input directions to	***Challenge*** A rubric is used to grade solution to challenge.

FORM 2			
SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
	• Mathematical, Relational and Logic Operators (->, <, =,-,+, and, or, not) • Control block (if, if..then.. else, repeat..until)	move a spaceship in that direction and if the space ship touches the planet the score increases by one, else, the ship is lost in space and game is over. Students use template given by teacher to develop program. ***Project-based/ Visual Presentation*** Students work in groups of three (3) or four (4) to complete challenge given by the teacher and then present solution to the class.	
5.22 Develop interactive games using Scratch	• Sensing block (timer, reset, touching colours) • Sounds	***Brainstorming*** Students brainstorm on how a keyboard can be used to control games, eg.an interactive game like car racing that is controlled by the user by press keys on the keyboard for it to turn, move forward, bring the cars on track when they run off, to go back to the start and to give the time it took at the end of the game.	***App Development*** A rubric is used to grade game app submitted by groups.

FORM 2			
SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
		Students are given an assignment to develop a game using Scratch ***Project-based*** Students work in groups to develop an interactive game like car racing.	
5.23 Interpret simple Scratch application to determine what it does	Programming Concepts Sequence, Looping, Conditions, Variables, Event handling, Parallel execution, Coordination, Random number, Arithmetic, relational and logic operators; Test	***Guided Discovery/Discussion*** Students evaluate various programs from worksheet given by the teacher and determine the programming concepts, their appropriateness and function of the programs. Students discuss their findings with each other. ***Group Work*** Students work in groups of four (4) to evaluate programs and check for their accuracy by running them. Students produce a type-written report on their findings.	***Program Test/ Report*** A checklist is used to evaluate students' competencies. A rubric is used to grade report submitted
5.24 Debug a program done using Scratch	Debugging a program	***Discussion/Guided Discovery*** Teacher uses students' evaluation reports and discusses with students possible reasons for some programs not running/producing output.	***Practical*** A checklist to check to for all corrections in program

FORM 2			
SPECIFIC OBJECTIVES	**CONTENT**	**SUGGESTED TEACHING AND LEARNING ACTIVITIES**	**SUGGESTED ASSESSMENT STRATEGIES**
		Students work in groups to use information and debug one program, teacher gives feedback as necessary. ***Practical*** Students work in groups of four (4) to debug a set of programs.	

Conclusion

It is strongly recommended that in the implementation of this curriculum, teachers adopt a task-oriented approach where students are given problems to solve that allows them to make connections to the real-world and requires them to use ICT tools in the process.

Practical examples of those tasks are suggested in the Teachers Guide. This will enable students to practice what they have learned in a meaningful way. The suggestions provide opportunities for students to explore and discover in a digital environment, assisting them to develop the necessary competencies to successfully and effectively use ICT in their learning. A copy of the Teachers Guide can be found online at *<insert link>*. This will allow for easy updates. Teachers can download a hard copy at any time if so desired.