



**REPUBLIC OF KENYA  
MINISTRY OF EDUCATION**

**JUNIOR SECONDARY SCHOOL CURRICULUM DESIGN**

**COMPUTER SCIENCE  
GRADE 7**

**FOR LEARNERS WITH PHYSICAL IMPAIRMENT**



**KENYA INSTITUTE OF CURRICULUM DEVELOPMENT**

**First Published in 2022**

All rights reserves. No part of this book may be reproduced, stored in a retrieval system or transcribed, in any form or by any means, electronic, mechanical, photocopy, recording or otherwise, without the prior written permission of the publisher.

ISBN: 978-9914-43-690-7

Published and printed by Kenya Institute of Curriculum Development

## **FOREWORD**

Curriculum is a tool which a country employs to empower its citizens. The Kenya Institute of Curriculum Development in meeting its core mandate ‘*to develop curriculum and curriculum support materials*’ has spearheaded curriculum reforms in the education sector. The reforms are based on rigorous research, monitoring and evaluation activities conducted on the 8-4-4 system of education to inform the Competency-Based Curriculum through a phase-in phase-out model. The reforms were informed by the Summative Evaluation Survey (2009), Needs Assessment Study (2016) and the Task Force Report on Re-alignment of Education Sector (2012), 21<sup>st</sup> century learning and approaches, the East Africa Protocol on harmonisation of education, among many others.

The curriculum reforms aim at meeting the needs of the Kenyan society by aligning the curriculum to the Constitution of Kenya 2010, the Kenya Vision 2030 and the East African Protocol, among other policy requirements as documented by the Sessional Paper No. 1 of 2019 on ‘Reforming Education and Training in Kenya for Sustainable Development’. The reforms adopted the Competency-Based Curriculum (CBC) to achieve development of requisite knowledge, skills, values and attitudes that will drive the country’s future generations as documented by the Basic Education Curriculum Framework (BECF). Towards achieving the mission of the Basic Education, the Ministry of Education has successfully and progressively rolled out curriculum implementation for Early Years Education, Grades 4 and 5. The roll out for Grade 6 and Junior Secondary (Grade 7-9) will subsequently follow.

It is my hope that the curriculum designs for learners with Physical Impairment in Grade 7 will guide the teachers, among other educational stakeholders, for progressive achievement of the curriculum vision which seeks to have engaged, empowered and ethical citizens.

**PROF. GEORGE A. O. MAGOHA, EGH**  
**CABINET SECRETARY**  
**MINISTRY OF EDUCATION**



## **PREFACE**

The Government of Kenya embarked on the national implementation of the Competency Based Curriculum in January, 2019 for Early Years Education (Pre-Primary 1 and 2, and Lower Primary Grade 1, 2 and 3). The implementation progressed to Upper Primary (Grade 4, 5 and 6) based on the reorganization of the Basic Education structure. Grade 7 curriculum furthers implementation of the Competency-Based Curriculum to Junior Secondary education level. This level marks the zenith of Middle School education whose main feature is to offer a broad opportunity for the learner to explore talents, interests and abilities before selection of pathways and tracks in Senior Secondary education level.

The Grade 7 curriculum designs for learners with Physical Impairment in the respective learning areas will enable the development of 21<sup>st</sup> Century competencies. Ultimately, this will lead to the realization of the vision and mission of the Competency-Based Curriculum as documented in the Basic Education Curriculum Framework (KICD, 2017).

It is my hope that all Government agencies among other stakeholders in education will use the designs to guide effective and efficient implementation of the learning activities as well as provide relevant feedback on various aspects of the curriculum. Successful implementation of the Grade 7 curriculum for learners with physical impairment will be a significant milestone towards realization of the curriculum mission ‘Nurturing Every Learner’s Potential’.

**JULIUS O. JWAN, PhD, CBS**  
**PRINCIPAL SECRETARY**  
**STATE DEPARTMENT FOR EARLY LEARNING AND BASIC EDUCATION**  
**MINISTRY OF EDUCATION**

## **ACKNOWLEDGEMENT**

The Kenya Institute of Curriculum Development (**KICD**) Act Number 4 of 2013 (**Revised 2019**) mandates the Institute to develop curricula and curriculum support materials for basic and tertiary education and training, below the university. The curriculum development process for any level involves thorough research, international benchmarking, and robust stakeholder engagement. Through this systematic and consultative process, KICD conceptualised the Competency Based Curriculum (**CBC**) as captured in the Basic Education Curriculum Framework (**BECF**). The CBC responds to the demands of the 21<sup>st</sup> Century and the aspirations captured in the Constitution of Kenya 2010, Kenya Vision 2030, East African Commission Protocol and the United Nations Sustainable Development Goals.

The Kenya Institute of Curriculum Development has developed the adapted Grade 7 curriculum designs for learners with Physical Impairment taking cognisance of the tenets of the CBC, key among them being the need to ensure that learners are provided with learning experiences that call for higher order thinking, thereby ensuring they become engaged, empowered and ethical citizens as articulated in the BECF Vision. The Grade 7 designs for learners with Physical Impairment also provide opportunities for learners to develop the core competencies as well as engage in Community Service Learning. The designs present assessment rubric linked to sub strands in the individual subjects. Teachers are encouraged to use varied assessment tools when assessing learners.

KICD obtains its funding from the Government of Kenya to enable the achievement of its mandate and implementation of the Government and Sector, Ministry of Education (**MoE**) plans. The Institute also receives support from development partners targeting specific programmes. The Grade 7 curriculum designs have been developed with the support of the World Bank through the Kenya Secondary Education Quality Improvement Program (**SEQIP**) commissioned by the MoE. The Institute is grateful for the support accorded to the process by the Government of Kenya, through the MoE and the development partners for the policy, resource, and logistical support.

I acknowledge the KICD curriculum developers and other staff, teachers and all the educators who participated, as panelists, in the development of the designs. I also appreciate the contribution of the Semi-Autonomous Government Agencies (**SAGAs**) and representatives of various stakeholders for their various roles in the development of the Grade 7 curriculum designs.

My special thanks to the Cabinet Secretary, Ministry of Education; the Principal Secretary State Department of Early Learning and Basic Education; the Secretary, Teachers' Service Commission (**TSC**) and the Chief Executive Officer, Kenya National Examinations Council (**KNEC**) for their support in the process. Finally, I am grateful to the KICD Governing Council for their consistent guidance during the development of the curriculum designs. The Institute assures all curriculum implementers, parents, and other stakeholders that the designs will ensure effective implementation of the CBC at Grade 7.

**PROF. CHARLES O. ONG'ONDO, PhD, MBS**  
**DIRECTOR/CHIEF EXECUTIVE OFFICER**  
**KENYA INSTITUTE OF CURRICULUM DEVELOPMENT**



## TABLE OF CONTENTS

FOREWORD .....	i
PREFACE .....	ii
ACKNOWLEDGEMENT .....	iii
TIME ALLOCATION .....	v
NATIONAL GOALS OF EDUCATION .....	vi
LEARNING OUTCOMES FOR MIDDLE SCHOOL .....	viii
ESSENCE STATEMENT .....	viii
GENERAL SUBJECT OUTCOMES .....	viii
STRAND 1.0: FOUNDATION OF COMPUTER SCIENCE.....	1
STRAND 2.0: COMPUTER AND SOCIETY .....	48
STRAND 3.0: COMPUTER NETWORKS .....	64
STRAND 4.0: COMPUTER PROGRAMMING .....	76
COMMUNITY SERVICE LEARNING CLASS ACTIVITY .....	85



## TIME ALLOCATION

	<b>Subject</b>	<b>Number of Lessons Per Week (40 minutes per lesson)</b>
1.	English	5
2.	Kiswahili/KSL	4
3.	Mathematics	5
4.	Integrated Science	4
5.	Health Education	2
6.	Pre technical Studies	4
7.	Social Studies	3
8.	Religious Education (CRE/IRE/HRE)	3
9.	Business Studies	3
10.	Agriculture	3
11.	Life Skills Education	1
12.	Physical Education and Sports	2
13.	Optional Subject	3
14.	Optional Subject	3
	<b>Total</b>	<b>45</b>



## **NATIONAL GOALS OF EDUCATION**

Education in Kenya should:

**i) Foster nationalism and patriotism and promote national unity.**

Kenya's people belong to different communities, races and religions, but these differences need not divide them. They must be able to live and interact as Kenyans. It is a paramount duty of education to help young people acquire this sense of nationhood by removing conflicts and promoting positive attitudes of mutual respect which enable them to live together in harmony and foster patriotism in order to make a positive contribution to the life of the nation.

**ii) Promote the social, economic, technological and industrial needs for national development.**

Education should prepare the youth of the country to play an effective and productive role in the life of the nation.

**a) Social Needs**

Education in Kenya must prepare children for changes in attitudes and relationships which are necessary for the smooth progress of a rapidly developing modern economy. There is bound to be a silent social revolution following in the wake of rapid modernization. Education should assist our youth to adapt to this change.

**b) Economic Needs**

Education in Kenya should produce citizens with the skills, knowledge, expertise and personal qualities that are required to support a growing economy. Kenya is building up a modern and independent economy which is in need of an adequate and relevant domestic workforce.

**c) Technological and Industrial Needs**

Education in Kenya should provide learners with the necessary skills and attitudes for industrial development. Kenya recognizes the rapid industrial and technological changes taking place, especially in the developed world. We can only be part of this development if our education system is deliberately focused on the knowledge, skills and attitudes that will prepare our young people for these changing global trends.

**iii) Promote individual development and self-fulfillment**

Education should provide opportunities for the fullest development of individual talents and personality. It should help children to develop their potential interests and abilities. A vital aspect of individual development is the building of character.

**iv) Promote sound moral and religious values**

Education should provide for the development of knowledge, skills and attitudes that will enhance the acquisition of sound moral values and help children to grow up into self-disciplined, self-reliant and integrated citizens.





v) **Promote social equality and responsibility**

Education should promote social equality and foster a sense of social responsibility within an education system which provides equal educational opportunities for all. It should give all children varied and challenging opportunities for collective activities and corporate social service irrespective of gender, ability or geographical environment.

vi) **Promote respect for and development of Kenya's rich and varied cultures**

Education should instil in the youth of Kenya an understanding of past and present cultures and their valid place in contemporary society. Children should be able to blend the best of traditional values with the changing requirements that must follow rapid development in order to build a stable and modern society.

vii) **Promote international consciousness and foster positive attitudes towards other nations**

Kenya is part of the international community. It is part of the complicated and interdependent network of peoples and nations. Education should therefore lead the youth of the country to accept membership of this international community with all the obligations and responsibilities, rights and benefits that this membership entails.

viii) **Promote positive attitudes towards good health and environmental protection**

Education should inculcate in young people the value of good health in order for them to avoid indulging in activities that will lead to physical or mental ill health. It should foster positive attitudes towards environmental development and conservation. It should lead the youth of Kenya to appreciate the need for a healthy environment.



## **LEARNING OUTCOMES FOR MIDDLE SCHOOL**

By the end of Middle School, the learner should be able to:

1. apply literacy, numeracy and logical thinking skills for appropriate self-expression;
2. communicate effectively, verbally and non-verbally, in diverse contexts;
3. demonstrate social skills, spiritual and moral values for peaceful co-existence;
4. explore, manipulate, manage and conserve the environment effectively for learning and sustainable development;
5. practise relevant hygiene, sanitation and nutrition skills to promote health;
6. demonstrate ethical behaviour and exhibit good citizenship as a civic responsibility;
7. appreciate the country's rich and diverse cultural heritage for harmonious co-existence;
8. manage pertinent and contemporary issues in society effectively;
9. apply digital literacy skills for communication and learning.

## **ESSENCE STATEMENT**

Computer science is the study of computers and algorithmic processes, including their principles, hardware and software designs, applications and their impact on society. This discipline is deeply concerned with how computer systems work, and how they are designed and programmed. Computer science as a subject will equip learners with Physical Impairment with knowledge, skills, attitudes, values and 21<sup>st</sup> century skills that are necessary in the attainment of Vision 2030. The curriculum will focus on developing computing skills as well as preparing future experts, engineers and specialists in computer related fields by equipping them with relevant and modern computing competencies through up-to-date technologies and learning experiences. The learning experiences will involve active learner participation conducted through practical and experiential learning activities to develop applicable competencies in computational thinking. The acquired knowledge, skills and attitudes will form a strong foundation for development of computational thinking competencies for learners with Physical Impairment who wish to specialize in STEM pathway. The curriculum for computer science responds to the demands of the 21st Century and the aspirations captured in the Constitution of Kenya 2010, Kenya Vision 2030 and National ICT policy of Kenya 2016 (revised 2020).

## **GENERAL SUBJECT OUTCOMES**

By the end of Junior Secondary School, the learner should be able to:

- a) Apply computer fundamental knowledge and skills in everyday life;
- b) Demonstrate ethical behaviour, security and safety when using computers;
- c) Acquire foundational knowledge and skills in computer networks and programming;
- d) Exhibit competency in the use of computers to adapt to fast-changing technological world;
- e) Appreciate the use of computers in managing pertinent and contemporary issues in society;
- f) Promote an inquiry-based learning that provokes interest for further education and training in computing disciplines.



## STRAND 1.0: FOUNDATION OF COMPUTER SCIENCE

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
<b>1.0 Foundation of Computer Science</b>	<b>1.1 Computer Concepts (3 Lessons)</b>	<p><b>By the end of the sub strand, the learner should be able to:</b></p> <ol style="list-style-type: none"> <li>explain the characteristics of a computer for awareness</li> <li>use computers to perform daily life activities</li> <li>outline the stages of processing cycle in a computer</li> <li>explore the advantages and disadvantages of using computers in data processing</li> <li>appreciate analysing the application areas of computers.</li> </ol>	<p><b>Individually or in purposive pairs/groups the learners are guided to:</b></p> <ul style="list-style-type: none"> <li>Use digital devices to search for and present the definition of the terms; computer, data and information. <i>Learners with manipulation difficulties such as fine motor skills could use universal cuffs, head/mouth pointers, adapted digital devices with accessibility features such as expanded keyboards with sticky keys, key guards, embedded trackball and touchpads, head operated optical/ergonomic mouse to search for definition of terms. Learners with speech difficulties could use residual speech, point/write/type/stamp using assistive technology such as adapted computer, multipurpose stamps, text-to-speech software or be lip read by peers/learner support assistant/teacher as they present the definition of terms. Learners on positioning devices should be preferentially and appropriately positioned to avoid development of secondary conditions such as contractures. Tables/working tops/ surfaces should be lowered for learners with short stature. Appropriately adjust glare on the screens of digital devices for learners with epilepsy and those who may experience difficulties in vision. (Apply these adaptations in all the subsequent learning experiences</i></li> </ul>	<ol style="list-style-type: none"> <li>Why do computers have different features?</li> <li>How do you use computer in real life situation?</li> </ol>



			<p><i>which involve manipulation, speech, positioning and use of ICT devices).</i></p> <ul style="list-style-type: none"> <li>• Take turns to list examples of computers (Notebook, desktop, laptop, tablet, PDA (Personal digital assistant), server, iPad, MacBook, smartphone, smart watch, workstation). <i>Learners with manipulation difficulties could use alternative functional parts of the body like the legs, assistive technology such as universal cuffs, wrist/arm braces or weighted pencils/pens or pencil/pen with grips or be assisted by peer/learner support assistant/teacher to draw and label the computer processing cycle. (Apply this adaptation in all the subsequent learning experiences which involve manipulation).</i></li> <li>• In turns discuss the characteristics of a computer.</li> <li>• Watch a video clip that shows the functions of a computer.</li> <li>• Use computing device to perform arithmetic operations such as addition of numbers, search for information on business ideas, draw diagrams, listen to music.</li> <li>• Draw and label the computer processing cycle.</li> <li>• Display an illustration that demonstrates a general model of a computer.</li> <li>• Discuss the advantages and disadvantages of using computers in data processing.</li> <li>• Share experiences on the application of</li> </ul>	
--	--	--	--	--



			computers in various areas (Education, Business, Banking, Military, Communication, Government, Home, Insurance, Marketing, Healthcare, Engineering Design, manufacturing).	
<b>Core competencies to be developed:</b> <ul style="list-style-type: none"> <li>• Communication and collaboration as the learners develops speaking skills when using appropriate language to clearly and effectively share experiences on the applications of computers in various areas.</li> <li>• Digital literacy as the learners interacts with technology when searching for and presenting the definition of the terms computer, data, processing and information.</li> </ul>				
<b>Pertinent and Contemporary Issues (PCIs):</b> <ul style="list-style-type: none"> <li>• Mentorship and peer education as the learners use computing devices to perform arithmetic operations such as addition of numbers.</li> </ul>			<b>Values:</b> <ul style="list-style-type: none"> <li>• Unity as the learners discuss the advantages and disadvantages of a computer.</li> <li>• Responsibility when drawing and labelling the computer processing cycle.</li> </ul>	
<b>Link to other Subjects:</b> <ul style="list-style-type: none"> <li>• English when learners use appropriate language to clearly and effectively share experiences on the use of computers in real life situation.</li> <li>• Mathematics when using a computing device to perform arithmetic operations such as addition of numbers.</li> </ul>				
<b>Non formal Activities to support Learning:</b> <ul style="list-style-type: none"> <li>• Assist members in the family to use computers in various areas such as (Education, Business, Banking, Government, Home, Marketing, Healthcare, Engineering Design, manufacturing).</li> </ul>			<b>Suggested Modes of Assessment:</b> <ul style="list-style-type: none"> <li>• Projects, oral questions, aural questions, written tests, observation, interviews, practical assignments</li> </ul>	
<b>Suggested Learning Resources:</b> <ul style="list-style-type: none"> <li>• Digital devices, reference materials, computer hardware, manila papers, Internet, video, audio clips, models, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces, weighted pens/pencils, slanting/adjustable tables</i></li> <li>• <b>Other related service providers:</b> <i>physiotherapists, occupational therapists, nurses, doctors, learner support assistant</i></li> </ul>				



<b>Suggested Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Explaining the characteristics of a computer for awareness.	Illustrates the characteristics of a computer for awareness.	Explains the characteristics of a computer for awareness.	Relates the characteristics of a computer for awareness.	Recalls the characteristics of a computer for awareness.
Using computers to perform daily life activities.	Examines the use of computers to perform daily life activities.	Uses computers to perform daily life activities.	Describes the use of computers in performing daily life activities.	Lists the uses of computers in performing daily life activities.
Outlining the stages of processing cycle in a computer.	Describes the stages of processing cycle in a computer.	Outlines the stages of processing cycle in a computer.	Lists the stages of processing cycle in a computer.	Recalls correctly the stages of processing cycle in a computer.
Exploring the advantages and disadvantages of a computer.	Evaluates the advantages and disadvantages of a computer.	Explores the advantages and disadvantages of a computer.	Discusses advantages and disadvantages of a computer.	Lists the advantages and disadvantages of a computer.
Analysing the application areas of computers.	Interlinks the application areas of computers.	Analyses the application areas of computers.	Explains application areas of computers.	Recognises application areas of computers.

<b>Strand</b>	<b>Sub Strand</b>	<b>Specific Learning Outcomes</b>	<b>Suggested Learning Experiences</b>	<b>Key Inquiry Questions</b>
<b>1.0 Foundation of Computer Science</b>	<b>1.2 Evolution of Computers  (3 lessons)</b>	<b>By the end of the sub strand, the learner should be able to:</b> a) identify evolution stages of computers from first mechanical device to modern electronic digital devices b) explain the tasks performed by computers at different evolution stages c) distinguish between the difference engine and the	<b>Individually or in purposive pairs/groups the learners are guided to:</b> <ul style="list-style-type: none"> <li>Watch a video clip and learn about evolution stages of computers from abacus, mechanical devices electromechanical devices to modern digital computers. <i>Learners with manipulation difficulties could use adapted digital devices with filter keys, key guards, larger mouse, head control input devices such as head wand to play the video. Learners on positioning</i></li> </ul>	<ol style="list-style-type: none"> <li>How did the analytical engine play a role in development of computers?</li> <li>How do you use computers that existed at different evolution stages?</li> </ol>



		<p>analytical engine in relation to computer development</p> <p>d) use computer that existed at different evolution stages to perform tasks</p> <p>e) examine the sustained development of computers in respect to contemporary technology</p> <p>f) appreciate the evolution of computers from first mechanical device to modern electronic digital devices.</p>	<p><i>devices should be preferentially and appropriately positioned to avoid development of secondary conditions such as contractures. Tables/working tops /surfaces should be lowered for learners with short stature. Adjust glare on the screens of digital devices for learners with epilepsy and those who may experience difficulties in vision. (Apply these adaptations in all the subsequent learning experiences involving manipulation of ICT devices and positioning).</i></p> <ul style="list-style-type: none"> <li>• Listen keenly to a computer resource person when explaining the tasks performed by computers at different evolution stages of computers (mechanical device, abacus, electromechanical modern electronic digital computers).</li> <li>• Brainstorm on the relationship between the difference engine and the analytical engine in relation to computer development. <i>Learners with speech difficulties could use residual speech, sign/mime/write/type/point using assistive technologies such as multipurpose communication board/communication wheels, text to speech software or be lip read by peers/learner support assistant/teacher as they discuss the relationship between difference engine and analytical engine. (Apply this adaptation in all the subsequent learning experiences</i></li> </ul>	
--	--	---	--	--



			<p><i>involving speech).</i></p> <ul style="list-style-type: none"> <li>• Take turn to discuss the difference engine and the analytical engine in relation to computer development.</li> <li>• Share experiences on the use of computer that existed at different evolution stages.</li> <li>• In turns discuss the development of computers in respect to contemporary technology.</li> </ul>	
<p><b>Core competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>• Learning to learn as learners learns from a computer resource person the tasks performed by computers at every stages in evolution of computers.</li> <li>• Communication and collaboration as learners share experiences on the development of computers in respect to contemporary technology.</li> </ul>				
<p><b>Pertinent and Contemporary Issues (PCIs):</b></p> <ul style="list-style-type: none"> <li>• Global citizenship as learners share experiences on the use of computers that existed at different evolution stages.</li> </ul>			<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>• Respect as learners share experiences on the development of computers in respect to contemporary technology.</li> </ul>	
<p><b>Link to other subjects:</b></p> <ul style="list-style-type: none"> <li>• Social studies as learners identifies the evolution stages of computers from the first mechanical device to the modern electronic digital devices</li> <li>• Communication skills as learners use appropriate language to clearly and effectively share experiences on the use of computer skills in real life situation.</li> <li>• Mathematics when using a computing device to perform arithmetic operations such as addition of numbers.</li> </ul>				
<p><b>Suggested Non-Formal Activities:</b></p> <ul style="list-style-type: none"> <li>• Discuss the development of computers in respect to contemporary technology during clubs</li> </ul>			<p><b>Suggested Modes of Assessment:</b></p> <ul style="list-style-type: none"> <li>• Projects, oral questions, aural questions, written tests,, observation, interviews, practical assignments</li> </ul>	
<p><b>Suggested Learning Resources:</b></p> <ul style="list-style-type: none"> <li>• Digital devices, reference materials, productivity tools, computer software (OS, Utility software and Application programs), computer hardware, manila papers, Internet, video, audio clips, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces, weighted pens/pencils, slanting/adjustable tables</i></li> <li>• <b><i>Other related service providers: physiotherapists, occupational therapists, speech therapists, nurses, doctors, learner support assistant</i></b></li> </ul>				





<b>Suggested Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Identifying evolution stages of computers from first mechanical device to modern electronic digital devices.	Relates evolution stages of computers from first mechanical device to modern electronic digital devices.	Identifies evolution stages of computers from first mechanical device to modern electronic digital devices.	Outlines the evolution stages of computers from first mechanical device to modern electronic digital devices.	Lists the evolution stages of computers from first mechanical device to modern electronic digital devices.
Explaining the tasks performed by computers at different evolution stages.	Investigates the tasks performed by computers at different evolution stages.	Explains the tasks performed by computers at different evolution stages.	Recognises the tasks performed by computers at different evolution stages.	Names tasks performed by computers at different evolution stages.
Distinguishing between the difference engine and the analytical engine in relation to computer development.	Compares and contrasts between the difference engine and the analytical engine in relation to computer development.	Distinguishes between the difference engine and the analytical engine in relation to computer development.	Relates the difference engine to the analytical engine in relation to computer development.	Defines the difference engine and the analytical engine in relation to computer development.
Using computer that existed at different evolution stages to perform tasks.	Examines computer that existed at different evolution stages to perform tasks.	Using computer that existed at different evolution stages to perform tasks.	Highlights uses of computers that existed at different evolution stages to perform tasks.	Gives examples of computers that existed at different evolution stages.
Examining the sustained development of computers in respect to contemporary technology.	Correlates the sustained development of computers in respect to contemporary technology.	Examines the sustained development of computers in respect to contemporary technology.	Summarises the sustained development of computers in respect to contemporary technology.	Outlines the sustained development of computers in respect to contemporary technology.



Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
<b>1.0 Foundation of Computer Science</b>	<b>1.3 Generations of Computers (3 Lessons)</b>	<p><b>By the end of the sub strand, the learner should be able to:</b></p> <ul style="list-style-type: none"> <li>a) identify the generations of computers from first to the latest;</li> <li>b) describe the characteristics of different computer generations for awareness;</li> <li>c) apply technologies of different computer generations in daily life situation;</li> <li>d) match computer generations to their corresponding technologies;</li> <li>e) appreciates analysing the technological advancement of computers from one to the next generation.</li> </ul>	<p><b>Individually or in purposive pairs/groups, the learners are guided to:</b></p> <ul style="list-style-type: none"> <li>• Search for information on the generations of computers from first to the latest. <i>Learners with manipulation difficulties such as fine motor skills could use could use alternative functional parts of the body, assistive technology such as universal cuffs, head/mouth pointers, adapted digital devices with accessibility features such as expanded keyboards with sticky keys, key guards, embedded trackball and touchpads, head operated optical/ergonomic mouse to search for information on the generations of computers. Screen resolutions should be regulated for learners with photophobia and those with visual difficulties as they use the digital devices. The learning environment should be accessible and have lowered surfaces like slanting/adjustable tables for learners with short stature and those in wheelchairs. (Apply this adaptation in the subsequent learning experiences involving manipulation of ICT devices).</i></li> <li>• Visit a computer user environment and find out the year of manufacture of the available computers and map them to their appropriate generation. <i>Learners with mobility difficulties could use assistive devices such as crutches, wheel chairs to move as they visit a computer</i></li> </ul>	<ol style="list-style-type: none"> <li>1. Why are there different generations of computers?</li> <li>2. How do you apply different technologies of computers in daily life situation?</li> </ol>



			<p><i>user environment. Safety precaution should be observed for learners with brittle bones and muscular dystrophy by giving them less vigorous tasks and ensuring they move in safe terrains. (Apply this adaptation in all the subsequent learning experiences which involves mobility).</i></p> <ul style="list-style-type: none"> <li>• Share experiences on the characteristics of each generation of computers. <i>Learners with speech difficulties could use residual speech, write/type/point/stamp using assistive technology such as universal communication board, text to speech software or be lip-read by peers/learner support assistant/teacher to share experiences of each generation computers. Learners on positioning devices should be preferentially and appropriately positioned to participate in the discussion. (Apply these adaptations in all the subsequent learning experiences involving speech and positioning).</i></li> <li>• Consult a computer resource person to discuss technologies used in different generations of computers.</li> <li>• Use technologies of different computers generations in daily life situation to search for information on personal hygiene, prepare personal time table. <i>Learners with manipulation difficulties could use any alternative functional part of the body, appropriate assistive technology such as adjustable head/mouth pointers, head</i></li> </ul>	
--	--	--	---	--



			<p><i>operated optical/ergonomic mouse or be physically assisted by peers/learner support assistant/teacher to use technologies of different computer generations. Regulate light intensity and glare for the learners with epilepsy and those with visual difficulties as they use the digital devices (Apply this adaptation in all the subsequent learning experiences involving manipulation of ICT devices).</i></p> <ul style="list-style-type: none"> <li>• Take turns to match computer generations to their corresponding technologies.</li> <li>• Participate in a debate on the technological advancement of computers from one to the next generation.</li> <li>• Use computers of different generation to perform a task and compare their efficiency.</li> </ul>	
<p><b>Core competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>• Self-efficacy as the learners uses computers of different generation to perform a given task and compare their efficiency.</li> <li>• Creativity and imagination as the learner matches computer generations to corresponding technologies.</li> </ul>				
<p><b>Pertinent and Contemporary Issues (PCIs):</b></p> <ul style="list-style-type: none"> <li>• Peer education is promoted as learners assist one another on how to use computers of different generation to perform a task and compare their efficiency.</li> </ul>			<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>• Unity as the learners share experiences on the characteristics of each generation of computers.</li> </ul>	
<p><b>Link to other subjects:</b></p> <ul style="list-style-type: none"> <li>• Integrated Science as the learners distinguishes the technologies used in different generations of computers.</li> </ul>				
<p><b>Suggested Non- formal Activities:</b></p> <ul style="list-style-type: none"> <li>• Discuss trends in the development of computers during clubs activities. Prepare charts showing comparisons of technologies used in different computer generations and display in the learning environment</li> </ul>			<p><b>Suggested Assessment Methods:</b></p> <ul style="list-style-type: none"> <li>• Projects, oral questions, aural questions, written tests, observation, interviews, practical assignments</li> </ul>	

**Suggested Learning Resources:**

- Digital devices, reference materials, productivity tools, computer software (OS, Utility software and Application programs), computer hardware, manila papers, Internet, video, audio clips, *adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces, weighted pens/pencils, slanting/adjustable tables*
- **Other related service providers:** *physiotherapists, occupational therapists, nurses, doctors, learner support assistant*

**Suggested Assessment Rubric**

<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Identifying the generations of computers from first to the latest.	Elaborates on the generations of computers from first to the latest.	Identifies the generations of computers from first to the latest.	Outlines generations of computers from first to the latest.	States generations of computers from first to the latest.
Describing the characteristics of different computer generations for awareness.	Investigates characteristics of different computer generations for awareness.	Describes characteristics of different computer generations for awareness.	Matches the characteristics of different computer generations for awareness.	Lists the characteristics of different computer generations for awareness.
Applying technologies of different computers generations in daily life situation.	Distinguishes technologies of different computers generations in daily life situation.	Applies technologies of different computers generations in daily life situation.	Describes technologies of different computers generations in daily life situation.	Identifies technologies of different computers generations in daily life situation.
Matching computer generations to their corresponding technologies.	Categorises computer generations according to their corresponding technologies.	Matches computer generations to their corresponding technologies.	Relates computer generations to their corresponding technologies.	Comments on computer generations in relation to their corresponding technologies.
Analysing the technological advancement of computers from one to the next generation.	Evaluates technological advancement of computers from one to the next generation.	Analyses the technological advancement of computers from one to the next generation.	Illustrates technological advancement of computers from one to the next generation.	Gives examples of technological advancement of computers from one to the next generation.



Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
<b>1.0 Foundation of Computer Science</b>	<b>1.4 Classification of Computers</b>  <b>(3 Lessons)</b>	<b>By the end of the sub strand, the learner should be able to:</b> a) identify the types of computers in a computer user environment b) apply appropriate criteria to classify computers c) select appropriate types of computers for use in different situations d) describe the use of embedded computers in daily life activities e) appreciate the use of different types of computers in performing tasks.	<b>Individually or in purposive pairs/groups, the learners are guided to:</b> <ul style="list-style-type: none"> <li>• Participate actively in discussing and listing different types of computers in a computer user environment. <i>Learners with speech difficulties such as those with stutters or apraxia could use residual speech, point/write/type/stamp using appropriate assistive technology such as adapted computer, multipurpose stamps, text-to-speech software to discuss types of computers. Learners with manipulation difficulties could use alternative functional part of the body, assistive technology such as head/mouth pointers, universal cuffs, adapted computers with special accessibility features and functions such as trackballs, audio command input to list different types of computers in a computer user environment. (Apply these adaptations in the subsequent learning experiences involving speech and manipulation of ICT devices).</i></li> <li>• Discuss with the resource person the criteria used to classify computers.</li> <li>• Take turns to match different types of computers to their respective classes. <i>Learners with manipulation difficulties could use alternative functional parts of the body like the legs, assistive</i></li> </ul>	<ol style="list-style-type: none"> <li>1. How are different types of computers used?</li> <li>2. Why do you use embedded computers?</li> </ol>



			<p><i>technology such as universal cuffs, wrist/arm braces or be assisted by peer/learner support assistant/teacher to match types of computers to their classes. Learners on positioning devices such as those using prone standers, strapping and splinting should be preferentially and appropriately positioned to take turns in matching the different types of computers to their respective classes. The learning environment should be accessible and have lowered surfaces like slanting/adjustable tables for learners with short stature and those in wheelchairs. (Apply these adaptations in the subsequent learning experiences which involve manipulation and positioning).</i></p> <ul style="list-style-type: none"> <li>• Take turns to assess user computing needs and select appropriate computers for different situations (a user on a fixed budget, a home business user, a gaming enthusiast, a photographer, a home video enthusiast, a distance education user, a human resource manager, an accountant).</li> <li>• Share experiences on the use of embedded computers (ATM machines, MP3 players, DVD players, Drones, Anti-lock braking system, Airbag control system, Digital watches,</li> </ul>	
--	--	--	---	--



			<p>Microwaves).</p> <ul style="list-style-type: none"> <li>• Use different types of computers to perform tasks (draw images, write a letter, play games).</li> </ul>	
<p><b>Core competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>• Critical thinking and Problem solving as learners assess user computing needs and selects appropriate computers for different situations.</li> <li>• Communication and collaboration as learners discusses with the resource person the criteria to use when classifying computers.</li> </ul>				
<p><b>Pertinent and Contemporary Issues (PCIs):</b></p> <ul style="list-style-type: none"> <li>• Financial Literacy as learners assesses user computing needs and selects appropriate computers for different situations.</li> </ul>			<p><b>Values</b></p> <ul style="list-style-type: none"> <li>• Peace as learners take turns to match different types of computers to their respective classes.</li> </ul>	
<p><b>Link to other subjects:</b></p> <ul style="list-style-type: none"> <li>• Music as learners share experiences on the use of embedded computers such as MP3 and DVD players.</li> </ul>				
<p><b>Suggested Non-Formal Activities:</b></p> <ul style="list-style-type: none"> <li>• Demonstrate how to use embedded computers (ATM machines, MP3 players, DVD players, Drones, Anti-lock braking system, Digital watches, Microwaves) during clubs.</li> </ul>			<p><b>Suggested Assessment Methods:</b></p> <ul style="list-style-type: none"> <li>• Projects, oral questions, aural questions, written tests, observation, interviews, practical assignments</li> </ul>	
<p><b>Suggested Learning Resources:</b></p> <ul style="list-style-type: none"> <li>• Digital devices, reference materials, computer software (OS, Utility software and Application programs), computer hardware, manila papers, Internet, video, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces, weighted pens/pencils, slanting/adjustable tables</i></li> <li>• <b><i>Other related service providers: physiotherapists, occupational therapists, nurses, doctors, learner support assistant</i></b></li> </ul>				





<b>Suggested Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Identifying the types of computers in a computer user environment.	Classifies the types of computers in a computer user environment.	Identifies the types of computers in a computer user environment.	Outlines the types of computers in a computer user environment.	Lists the types of computers in a computer user environment.
Applying appropriate criteria to classify computers.	Critiques the criteria used to classify computers.	Applies appropriate criteria to classify computers.	Cites appropriate criteria to classify computers.	States criteria used to classify computers.
Selecting types of computers for different situations.	Interrogates types of computers for different situations.	Selects types of computers for different situations.	Compares types of computers for different situations.	Locates type of computers for different situations.
Describing uses of embedded computers in daily life activities.	Appraises the uses of embedded computers in daily life activities.	Describes uses of embedded computers in daily life activities.	Discusses uses of embedded computers in daily life activities.	States uses of embedded computers in daily life activities.

<b>Strand</b>	<b>Sub Strand</b>	<b>Specific Learning Outcomes</b>	<b>Suggested Learning Experiences</b>	<b>Key Inquiry Questions</b>
<b>1.0 Foundation of Computer Science</b>	<b>1.5 Computer user Environment (3 Lessons)</b>	<p><b>By the end of the sub strand, the learner should be able to:</b></p> <ul style="list-style-type: none"> <li>a) explain factors to consider when setting up a computer user environment</li> <li>b) identify appropriate resources for computer user environment</li> <li>c) examine emerging trends in computer user environment</li> <li>d) observe safety precautions and practices in the computer user environment</li> </ul>	<p><b>Individually or in purposive pairs/groups, the learners are guided to:</b></p> <ul style="list-style-type: none"> <li>• Watch a video about different computer user environments.</li> </ul> <p><i>Learners on positioning devices should be preferentially and appropriately positioned as they watch the video. Tables/working tops/surfaces should be lowered for learners with short stature and those in wheel chairs. Adjust glare on the screens of digital devices appropriately for learners with epilepsy</i></p>	<ol style="list-style-type: none"> <li>1. Why do you set up a computer user environment?</li> <li>2. How do you take care of computers?</li> </ol>

		<p>e) enjoy setting up a computer user environment.</p>	<p><i>and those who may experience difficulties in vision. (Apply these adaptations in all the subsequent learning experiences involving manipulation of ICT devices and positioning).</i></p> <ul style="list-style-type: none"> <li>• <b>Brainstorm on the factors to consider when setting up a computer user environment.</b> <i>Learners with speech difficulties could use residual speech, point/type/stamp/sign/mime using appropriate assistive technology such as adapted computer, multipurpose stamps, universal communication board, text to speech software or be lip-read by peers/learner support assistant/teacher to convey their ideas on factors to consider when setting up a computer user environment. (Apply this adaptation in all the subsequent learning experiences involving speech).</i></li> <li>• <b>Search for the resources required when setting up a computer user environment and list them.</b> <i>Learners with manipulation difficulties could use alternative functional parts of the body like the leg, assistive technology such as universal cuffs, wrist/arm braces or weighted pencils/pens, pencil/pens with grips, heavy gauge paper or be assisted by peer/learner support</i></li> </ul>	
--	--	---	--	--



			<p><i>assistant/teacher to list resources required to set up a computer user environment. (Apply this adaptation in all the subsequent learning experiences involving manipulation).</i></p> <ul style="list-style-type: none"> <li>• Set rules to follow in a computer user environment.</li> <li>• Practice observing safety precautions when in the computer user environment. <i>Learners using mobility devices such as wheel chair/crutches could use alternative functional parts of the body or assistive technology to move as they practice observing safety precautions in a computer user environment. (Apply this adaptation in all the subsequent learning experiences which involve mobility).</i></li> <li>• Participate actively in setting up a computer user environment.</li> <li>• Share ideas on emerging trends in computer user environment.</li> </ul>	
<p><b>Core competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>• Critical Thinking and Problem Solving as learners set rules to follow in a computer user environment.</li> <li>• Creativity and Imagination as learners sets up a computer user environment.</li> </ul>				
<p><b>Pertinent and Contemporary Issues (PCIs):</b></p> <ul style="list-style-type: none"> <li>• Fire safety mitigation measures when observing safety precautions and practices in the computer user environment.</li> </ul>			<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>• Integrity as learners genuinely identifies appropriate resources for computer user environment.</li> </ul>	
<p><b>Link to other subjects:</b></p> <ul style="list-style-type: none"> <li>• Life Skills Education when setting up a computer user environment.</li> <li>• Health Education when observing safety precautions and practices in the computer user environment.</li> </ul>				



<p><b>Suggested Non-Formal Activities:</b></p> <ul style="list-style-type: none"> <li>Sensitise the school community members on how to observe safety precautions when using computers.</li> </ul>	<p><b>Suggested Assessment Methods:</b></p> <ul style="list-style-type: none"> <li>Projects, oral questions, aural questions, written tests, observation, interviews, practical assignments</li> </ul>
<p><b>Suggested Learning Resources:</b></p> <ul style="list-style-type: none"> <li>Reference materials, computer software (OS, Utility software and Application programs), computer hardware, Internet, video, adaptable locally available materials, models, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces, weighted pens/pencils, slanting/adjustable tables</i></li> <li><b>Other related service providers:</b> <i>physiotherapists, occupational therapists, nurses, doctors, learner support assistant</i></li> </ul>	

<b>Suggested Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Explaining factors to consider when setting up a computer user environment.	Articulates factors to consider when setting up a computer user environment.	Explains factors to consider when setting up a computer user environment.	Describes factors to consider when setting up a computer user environment.	Outlines factors to consider when setting up a computer user environment.
Identifying resources for a computer user environment.	Discusses resources for a computer user environment.	Identifies resources for a computer user environment.	Names resources for a computer user environment.	Recalls resources for a computer user environment.
Examining emerging trends in computer user environment.	Compiles data on emerging trends in computer user environment.	Examines emerging trends in computer user environment.	Discusses emerging trends in computer user environment.	Identifies emerging trends in computer user environment.
Observing safety precautions and practices in the computer user environment.	Assesses safety precautions and practices in the computer user environment.	Observes safety precautions and practices in the computer user environment.	Gives examples of safety precautions and practices in the computer user environment.	Lists safety precautions and practices in the computer user environment.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
1.0 Foundation of Computer Science	1.6 Physical Parts of a Computer (3 Lessons)	<p><b>By the end of the sub strand, the learner should be able to:</b></p> <ul style="list-style-type: none"> <li>a) identify the physical parts of a computer</li> <li>b) explain the functions of the physical parts of a computer</li> <li>c) connect the physical parts of a computer for use</li> <li>d) utilise physical parts of a computer to minimise wastage</li> <li>e) appreciate interacting with physical parts of a computer.</li> </ul>	<p><b>Individually or in purposive pairs/groups, the learners are guided to:</b></p> <ul style="list-style-type: none"> <li>• Visit a computer user environment, observe, name and list various physical parts of a computer including the peripherals. <i>Learners with speech difficulties could use residual speech, write/type/point/mime, use assistive technology such as universal communication board, text to speech software or be lip-read by peers/learner support assistant/teacher to name physical parts of a computer. Learners with manipulation difficulties could use alternative functional parts of the body like the leg, assistive technology such as universal cuffs, wrist/arm braces, weighted pencils/pens, pencil/pens with grips or be assisted by peer/learner support assistant/teacher to list physical parts of a computer. Learners with mobility difficulties could use assistive devices such as crutches/wheel chairs to move as they visit a computer user environment. Learners with epilepsy and those with asthma should be safeguarded against triggers such as heights and dust respectively. Those with brittle bones should keep off rugged or slippery terrains to avoid</i></li> </ul>	<ol style="list-style-type: none"> <li>1. Why do computers have physical parts?</li> <li>2. How do you connect physical parts of a computer?</li> </ol>

			<p><i>fractures. (Apply these adaptations in the subsequent learning experiences which involve manipulation, speech and mobility).</i></p> <ul style="list-style-type: none"> <li>• Take turns to match the physical parts of a computer to their respective functions.</li> <li>• Connect physical parts of a computer for use.</li> </ul> <p><i>Learners using mobility devices and those with short stature should be given preferential sitting positions for a clear view of the activity of connecting parts as they turn take. The learning environment should be accessible and have lowered surfaces like slanting/adjustable tables. (Apply these adaptations in the subsequent learning experiences involving positioning and visibility).</i></p> <ul style="list-style-type: none"> <li>• Take part in modelling interlinked physical parts of a computer.</li> <li>• Take turns to talk about reusing or recycling the physical parts of a computer that are in good working condition to minimise wastage.</li> <li>• Interact with physical parts of a computer.</li> </ul>	
<p><b>Core competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>• Self-efficacy as learners connects physical parts of a computer appropriately and confidently.</li> <li>• Creativity and Imagination as learners takes part in modelling interlinked physical parts of a computer.</li> </ul>				



<p><b>. Pertinent and Contemporary Issues (PCIs):</b></p> <ul style="list-style-type: none"> <li>Environmental issues in education as learners take part in reusing or recycling the physical parts of a computer that are in good working condition.</li> </ul>	<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>Responsibility as learners participates in connecting physical parts of a computer</li> <li>Respect as learners takes turn to match the physical parts of a computer to their respective functions.</li> </ul>
<p><b>Link to other subjects:</b></p> <ul style="list-style-type: none"> <li>Visual Arts as learners take part in modelling interlinked physical parts of a computer.</li> </ul>	
<p><b>Suggested Non-Formal activities:</b></p> <ul style="list-style-type: none"> <li>Visit school computer centre and assist in connecting physical parts of newly purchased computers.</li> </ul>	<p><b>Suggested Assessment Methods:</b></p> <ul style="list-style-type: none"> <li>Projects, oral questions, aural questions, written tests, observation, interviews, practical assignments</li> </ul>
<p><b>Suggested learning Resources:</b></p> <ul style="list-style-type: none"> <li>Digital devices, reference materials, computer hardware, manila papers, Internet, video, audio clips, adaptable locally available materials, models, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces, weighted pens/pencils, slanting/adjustable tables</i></li> <li><b>Other related service providers:</b> <i>physiotherapists, occupational therapists, nurses, doctors, learner support assistant</i></li> </ul>	

<b>Suggested Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Identifying the physical parts of a computer.	Describes the physical parts of a computer.	Identifies the physical parts of a computer.	Outlines the physical parts of a computer.	Lists the physical parts of a computer.
Explaining the functions of the physical parts of a computer.	Illustrates the functions of the physical parts of a computer.	Explains the functions of the physical parts of a computer.	Gives examples of the functions of the physical parts of a computer.	Identifies the functions of the physical parts of a computer.
Connecting the physical parts of a computer for use.	Connects and disconnects physical parts of a computer for use.	Connects the physical parts of a computer for use.	Connects two physical parts of a computer for use.	Assisted to connect two physical parts of a computer for use.
Utilising physical parts of a computer to minimise wastage.	Modifies physical parts of a computer to minimise wastage.	Utilises physical parts of a computer to minimise wastage.	Collects physical parts of a computer to minimise wastage.	Assists to store physical parts of a computer to minimise wastage.



Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
<b>1.0 Foundation of Computer Science</b>	<b>1.7 Hands on skills concepts  (6 Lessons)</b>	<b>By the end of the sub strand the learner should be able to:</b> a) explain the functions of the keys in a computer keyboard b) categorize the keys in a computer keyboard c) apply the appropriate procedure to start and shut down a computer d) use pointing devices to manipulate objects in the computer e) appreciate interacting with the keyboard and the pointing devices of a computer.	<b>Individually or in purposive pairs/groups, the learners are guided to:</b> <ul style="list-style-type: none"> <li>• Take part in starting and shutting down a computer using appropriate procedure. <i>Learners with manipulation difficulties could use alternative functional part of the body, assistive technology such as adapted digital devices with accessibility features such as expanded keyboards with sticky keys, key guards, embedded trackball/touchpads, head operated optical/ergonomic mouse head/mouth pointer or be physically assisted by peers/learner support assistant/teacher to start and shut down a computer/adapted computer using the correct procedure. Screen resolutions should be regulated for learners with photophobia and those with visual difficulties as they use the ICT devices. (Apply this adaptation in the subsequent learning experiences involving manipulation of ICT devices).</i></li> <li>• Take turn to locate different keys on the computer keyboard and demonstrate their functions. <i>Learners with speech difficulties could use residual speech as they are be lip-read by peers/learner support assistant/teacher or write/type/point/stamp, use universal communication board, text to speech software as they take turns to locate</i></li> </ul>	<ol style="list-style-type: none"> <li>1. Why are there different keys in a computer keyboard?</li> <li>2. How do you use a computer keyboard?</li> </ol>





			<p><i>different keys and demonstrate their functions. Learners on positioning devices should be preferentially and appropriately positioned. Tables/working tops/surfaces should be lowered for learners with short stature. (Apply these adaptations in all the subsequent learning experiences which involve speech and positioning).</i></p> <ul style="list-style-type: none"> <li>• <i>Model or draw different categories of the keys on the computer keyboard. Learners with manipulation difficulties could use alternative functional parts of the body like the legs, assistive technology such as universal cuffs, wrist/arm braces, weighted pencils/pens or pencil/pen with grip or be assisted by peer/learner support assistant/teacher to model/draw different categories of the keys. . (Apply this adaptation in all the subsequent learning experiences which involve manipulation).</i></li> <li>• <i>Take part in manipulating objects in the computer using pointing devices skills.</i></li> <li>• <i>Practice different ways of using the computer keyboard; typing a simple text, multiplying numbers, drawing diagrams.</i></li> <li>• <i>Practice typing using the home keys on the computer keyboard.</i></li> <li>• <i>Use computer keyboard and pointing devices to scroll up pages of a document,</i></li> </ul>	
--	--	--	--	--



			make corrections in a text document, draw diagrams.	
<b>Core competencies to be developed:</b> <ul style="list-style-type: none"> <li>Digital Literacy as learners uses the computer keyboard and a pointing device to type simple text and manipulate objects on the screen.</li> <li>Learning to learn as learners practice typing using the home keys on the computer keyboard.</li> </ul>				
<b>Pertinent and Contemporary Issues (PCIs):</b> <ul style="list-style-type: none"> <li>Peer education as learners assist one another on how to use pointing devices to manipulate objects in the computer.</li> </ul>			<b>Values:</b> <ul style="list-style-type: none"> <li>Love as learners share experiences on the use of the computer keyboard and pointing devices.</li> <li>Responsibility as learners shuts down a computer appropriately.</li> </ul>	
<b>Links to other subjects:</b> <ul style="list-style-type: none"> <li>Visual Arts as a learners creatively and correctly models or draws a well labelled computer keyboard showing the categories of the keys.</li> </ul>				
<b>Suggested Non-Formal Activities:</b> <ul style="list-style-type: none"> <li>Assist in typing programs to be used during community activities.</li> <li>Participate in a competition involving the use of computer keyboard and pointing devices: typing a simple text, multiplying numbers, drawing diagrams.</li> </ul>			<b>Suggested Assessment Methods:</b> <ul style="list-style-type: none"> <li>Projects, oral questions, aural questions, written tests, observation, interviews, practical assignments</li> </ul>	
<b>Suggested Learning Resources:</b> <ul style="list-style-type: none"> <li>Digital devices, reference materials, productivity tools, computer software (OS, Utility software and Application programs), computer hardware, manila papers, Internet, video, audio clips, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces, weighted pens/pencils, slanting/adjustable tables</i></li> <li><b>Other related service providers:</b> <i>physiotherapists, occupational therapists, nurses, doctors, learner support assistant</i></li> </ul>				



<b>Suggested Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Explaining the functions of the keys in a computer keyboard.	Analyses the functions of the keys in a computer keyboard.	Explains the functions of the keys in a computer keyboard.	Outline the functions of the keys in a computer keyboard.	Mentions the functions of the keys in a computer keyboard.
Categorizing the keys in a computer keyboard.	Assesses the keys in a computer keyboard.	Categorizes the keys in a computer keyboard.	Recognises the keys in a computer keyboard.	Draws the keys in a computer keyboard.
Applying the appropriate procedure to start and shut down a computer.	Critiques the procedure to start and shut down a computer.	Applies the appropriate procedure to start and shut down a computer.	Explains the appropriate procedure to start and shut down a computer.	Recalls appropriate procedure to start and shut down a computer.
Using pointing devices to manipulate objects in the computer.	Analyses pointing devices used to manipulate objects in the computer.	Uses pointing devices to manipulate objects in the computer.	Gives examples of pointing devices used to manipulate objects in the computer.	Names pointing devices used to manipulate objects in the computer.

<b>Strand</b>	<b>Sub Strand</b>	<b>Specific Learning Outcomes</b>	<b>Suggested Learning Experiences</b>	<b>Key Inquiry Questions</b>
<b>1.0 Foundation of Computer Science</b>	<b>1.8 Computer Systems Overview</b>  (3 Lessons)	<b>By the end of the sub strand the learner should be able to:</b> a) identify the components of a computer system in a computer user environment b) describe the linkage among the components of a computer system c) relate computer system components to their functions d) use computer system components to perform tasks e) appreciate the importance of computer systems in the	<b>Individually or in purposive pairs/groups, the learners are guided to:</b> <ul style="list-style-type: none"> <li>Search for the meaning of the terms system and computer system, and share the findings with peers. <i>Learners with manipulation difficulties could use alternative functional parts of the body like the legs, adapted digital devices with accessibility features such as expanded keyboards with sticky keys, key guards, embedded trackball and touchpads, head operated optical/ergonomic mouse, assistive technology such as universal cuffs, wrist/arm braces, head/mouth pointers to search for meaning of given terms. Learners with speech</i></li> </ul>	<ol style="list-style-type: none"> <li>Why do you use computer systems?</li> <li>How do computer system components interact?</li> </ol>



		society.	<p><i>difficulties could use residual speech, point/write/type/stamp using assistive technology such as multipurpose stamps, text-to-speech software or be lip read by peers/learner support assistant/teacher to search for the meaning of the terms system and computer system. Screen resolutions should be regulated for learners with photophobia such as those with epilepsy as they use ICT devices. Learners using mobility devices and those with short stature should be given preferential sitting positions for ease of access to the ICT devices. (Apply these adaptations in the subsequent learning experiences involving manipulation, speech, visibility and use of ICT devices).</i></p> <ul style="list-style-type: none"> <li>• Discuss the components of a computer system (hardware, software, liveware) and list them.</li> <li>• Take turns to match components of computer system to their functions.</li> <li>• Use computer system components to perform a task (draw diagrams, search for learning materials).</li> <li>• Take part in creating an illustration of the linkage among the components of a computer system.</li> <li>• Share experiences on the importance of computer systems in the society.</li> </ul>	
<p><b>Core competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>• Learning to Learn as learners share experiences on the importance of computer systems in the society.</li> <li>• Creativity and Imagination as learners create an illustration of the linkage among the components of a computer system.</li> </ul>				



<p><b>Pertinent and Contemporary Issues (PCIs):</b></p> <ul style="list-style-type: none"> <li>Positive discipline as learners take turns in matching components of computer system to their corresponding functions.</li> </ul>	<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>Peace as learners create an illustration of the linkage among the components of a computer system.</li> </ul>
<p><b>Link to other subjects:</b></p> <ul style="list-style-type: none"> <li>Visual Arts as learners create an illustration of the linkage among the components of a computer system.</li> </ul>	
<p><b>Suggested Non-Formal Activities:</b></p> <ul style="list-style-type: none"> <li>Debate on the importance of computer systems in the society during clubs.</li> </ul>	<p><b>Suggested Assessment Methods:</b></p> <ul style="list-style-type: none"> <li>Projects, oral questions, aural questions, written tests, observation, interviews, practical assignments</li> </ul>
<p><b>Suggested Learning Resources:</b></p> <ul style="list-style-type: none"> <li>Digital devices, reference materials, productivity tools, computer software (OS, Utility software and Application programs), computer hardware, manila papers, Internet, video, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces, weighted pens/pencils, slanting/adjustable tables</i></li> <li><b>Other related service providers:</b> <i>physiotherapists, occupational therapists, nurses, doctors, learner support assistant</i></li> </ul>	

<b>Suggested Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Identifying the components of a computer system in a computer user environment.	Compares components of a computer system in a computer user environment.	Identifies components of a computer system in a computer user environment.	Outlines components of a computer system in a computer user environment.	Lists components of a computer system in a computer user environment.
Describing the linkage among the components of a computer system.	Interrogates the linkage among the components of a computer system.	Describes the linkage among components of a computer system.	Discusses the linkage between components of a computer system.	Recounts the linkage between components of a computer system.
Relating computer system components to their functions.	Draws conclusions on the components of a computer system based on their functions.	Relates components of a computer system to their functions.	Tabulates the components of a computer system and their functions.	Names components of a computer system.
Using computer system components to perform tasks.	Assesses computer system components for performing tasks.	Uses computer system components to perform tasks.	Matches computer system components to their tasks.	Mentions computer system components and the tasks they perform.



Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
<b>1.0 Foundation of Computer Science</b>	<b>1.9 Computer Hardware Concepts</b>  <b>(3 lessons)</b>	<p><b>By the end of the sub strand, the learner should be able to:</b></p> <ol style="list-style-type: none"> <li>identify categories of hardware in a computer system</li> <li>examine the role of hardware components in a computer</li> <li>relate categories of computer hardware to their functions</li> <li>select appropriate hardware for different situations</li> <li>use different components of computer hardware in performing daily life activities</li> <li>appreciate the role of hardware components in a computer.</li> </ol>	<p><b>Individually or in purposive pairs/groups, the learners are guided to:</b></p> <ul style="list-style-type: none"> <li>Visit a computer user environment and list the hardware devices in use. <i>Learners with mobility difficulties could use assistive devices such as crutches/wheel chairs to move to a computer user environment. Learners on mobility devices and those with short stature should be given preferential sitting positions for a clear view of the computer user environment. Learners with manipulation difficulties could use alternative functional parts of the body like the legs, assistive technology such as universal cuffs, wrist/arm braces, weighted pencils/pens or pencil/pen with grip or be assisted by peer/learner support assistant/teacher to list the hardware devices. (Apply these adaptations in all the subsequent learning experiences involving manipulation and mobility).</i></li> <li>Engage in a discussion on the categories of computer hardware (input devices, central processing unit, output devices and storage devices). <i>Learners with speech difficulties could use residual speech, point/write/type/stamp using assistive technology such as adapted computer, multipurpose stamps, text-to-speech software or be lip read by peers/learner support assistant/teacher as they discuss categories of a computer system. (Apply this adaptation in the subsequent learning experiences involving</i></li> </ul>	<ol style="list-style-type: none"> <li>Why do you categorize computer hardware?</li> <li>How do you use different components of computer hardware?</li> </ol>



			<p><i>speech).</i></p> <ul style="list-style-type: none"> <li>• Search for the functions of computer hardware and make a presentation. <i>Learners with manipulation difficulties could use adapted digital devices with filter keys, key guards, larger mouse, head control input devices such as head wand to search for functions of each computer hardware. Adjust glare on the screens of the ICT devices for learners with epilepsy and those who may experience difficulties in vision. (Apply this adaptation in the subsequent learning experiences involving use of ICT devices).</i></li> <li>• Take turns to match categories of hardware to their functions.</li> <li>• Assess user computing needs and select appropriate computer hardware for different situations.</li> <li>• Use different components of computer hardware to input data, store and output information.</li> </ul>	
<p><b>Core competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>• Critical Thinking as learners assesses user computing needs and selects appropriate hardware for different situations.</li> <li>• Communication and collaboration as learners engages in a discussion on the categories of a computer hardware.</li> </ul>				
<p><b>Pertinent and Contemporary Issues (PCIs):</b></p> <ul style="list-style-type: none"> <li>• Financial Literacy as learners assesses user computing needs and selects appropriate hardware for different situations.</li> </ul>			<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>• Integrity as learners assesses user computing needs and selects appropriate computer hardware for different situations.</li> <li>• Unity as the learners engages in a discussion on the categories of a computer hardware.</li> </ul>	
<p><b>Link to other subjects:</b></p> <ul style="list-style-type: none"> <li>• Life Skills Education as learners use different hardware of a computer to input data, store and output information.</li> </ul>				



<p><b>Suggested Non-Formal Activities:</b></p> <ul style="list-style-type: none"> <li>Sensitise school community members on the uses of computer hardware.</li> </ul>	<p><b>Suggested Assessment Methods:</b></p> <ul style="list-style-type: none"> <li>Projects, oral questions, aural questions, written tests, observation, interviews, practical assignments</li> </ul>
<p><b>Suggested Learning Resources:</b></p> <ul style="list-style-type: none"> <li>Digital devices, reference materials, productivity tools, computer hardware, manila papers, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces, weighted pens/pencils, slanting/adjustable tables</i></li> <li><b>Other related service providers:</b> <i>physiotherapists, occupational therapists, nurses, doctors, learner support assistant</i></li> </ul>	

<b>Suggested Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Identifying categories of hardware in a computer system.	Describes categories of hardware in a computer system.	Identifies categories of hardware in a computer system.	Outlines categories of hardware in a computer system.	Lists categories of hardware in a computer system.
Examining the role of hardware components in a computer.	Critiques the role of hardware elements in a computer.	Examines the role of hardware components in a computer.	Summarises the role of hardware elements in a computer.	Recognises the role of hardware elements in a computer.
Relating categories of hardware to their functions.	Develops a logical argument on categories of hardware and their functions.	Relates categories of hardware to their functions.	Gives illustrations on the categories of hardware and their functions.	Quotes categories of hardware and their functions.
Selecting appropriate hardware for different situations.	Evaluates appropriate hardware for different situations.	Selects appropriate hardware for different situations.	Identifies hardware for different situations.	Names hardware for different situations.
Using different components of computer hardware in performing daily life activities.	Examines different components of computer hardware in performing daily life activities.	Uses different components of computer hardware in performing daily life activities.	Collects different components of computer hardware to perform daily life activities.	Recognises the need for different components of computer hardware in performing daily life activities.





Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
<b>1.0 Foundation of Computer Science</b>	<b>1.10 Input Devices</b>  <b>(3 Lessons)</b>	<p><b>By the end of the sub strand, the learner should be able to:</b></p> <ol style="list-style-type: none"> <li>identify input devices in a computer system</li> <li>categorize input devices based on their functionality</li> <li>select appropriate input devices for different situations</li> <li>use input devices to perform tasks</li> <li>reuse input devices to minimise wastage</li> <li>appreciate the role of input devices in different situations.</li> </ol>	<p><b>Individually or in purposive pairs/groups, the learners are guided to:</b></p> <ul style="list-style-type: none"> <li>Name and list input devices available in a computer user environment (barcode scanner, digital camera, keyboard, microphone, optical mouse, touch screen (resistive, capacitive and infra-red), two-dimensional (2d) and three-dimensional (3d) scanners). <i>Learners with speech difficulties could use residual speech, point/write/type/stamp using assistive technology such as adapted computer, multipurpose stamps, text-to-speech software or be lip read by peers/learner support assistant/teacher as they name input devices. Learners with manipulation difficulties could use alternative functional parts of the body like the legs, assistive technology such as universal cuffs, wrist/arm braces, weighted pencils/pens, heavy gauge papers or pencil/pen with grip or be assisted by peer/learner support assistant/teacher to list input devices. (Apply these adaptations in the subsequent learning experiences involving speech and manipulation).</i></li> <li>Consult a computer resource person to demonstrate how different categories of input devices operate. <i>Learners using mobility devices and those with short stature should be given preferential sitting positions for a clear view of the demonstration. The learning</i></li> </ul>	<ol style="list-style-type: none"> <li>Why do computers have input devices?</li> <li>How are input device used?</li> </ol>



			<p><i>environment should be accessible and have lowered surfaces like slanting or adjustable tables. (Apply this adaptation in the subsequent learning experiences involving visibility).</i></p> <ul style="list-style-type: none"> <li>• Match input devices to their respective categories such as keying devices, pointing devices, scanning devices, voice input devices, touch screen, digitizer, digital cameras and other data capture devices.</li> <li>• In turns discuss factors to consider when selecting an input device.</li> <li>• Assess user computing needs and select appropriate input devices for different situations (such as user on a fixed budget, a home user, business user, a gaming enthusiast, a photographer, a distance education user, a human resources manager, an accountant).</li> <li>• Use available input devices to perform tasks assigned by the facilitator. <i>Learners with manipulation difficulties could use alternative functional part of the body, assistive technology such as adjustable head/mouth pointer or be physically assisted by peers/learner support assistant/teacher to perform assigned tasks using input/adapted input devices Adjust glare on the screens of the ICT devices appropriately for learners with epilepsy and those who may experience difficulties in vision.</i></li> <li>• Share experience on how to reuse input devices which are still in good condition to minimise</li> </ul>	
--	--	--	---	--



			wastage.	
<b>Core competencies to be developed:</b>				
<ul style="list-style-type: none"> <li>• Critical Thinking and Problem Solving as learners assesses user computing needs and selects appropriate input devices for different situations.</li> <li>• Communication and Collaboration as learners listens keenly as they discuss on the factors considered when selecting an input device.</li> </ul>				
<b>Pertinent and Contemporary Issues (PCIs):</b>			<b>Values:</b>	
<ul style="list-style-type: none"> <li>• Environmental Education is promoted as learners practice reusing input devices to minimise wastage.</li> </ul>			<ul style="list-style-type: none"> <li>• Responsibility as learners use available input devices to perform tasks.</li> </ul>	
<b>Link to other subjects:</b>				
<ul style="list-style-type: none"> <li>• Integrated Science when categorizing input devices based on their functionality.</li> </ul>				
<b>Suggested Non-Formal Activities:</b>			<b>Suggested Assessment Methods:</b>	
<ul style="list-style-type: none"> <li>• Deliberate on the factors to consider when selecting an input device at different forums in the school.</li> </ul>			<ul style="list-style-type: none"> <li>• Projects, oral questions, aural questions, written tests, observation, interviews, practical assignment</li> </ul>	
<b>Suggested Learning Resources:</b>				
<ul style="list-style-type: none"> <li>• Digital devices, reference materials, computer hardware, manila papers, Internet, video, audio clips, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces, weighted pens/pencils, slanting/adjustable tables</i></li> <li>• <b>Other related service providers:</b> <i>physiotherapists, occupational therapists, nurses, doctors, learner support assistant</i></li> </ul>				

<b>Suggested Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Identifying input devices in a computer system.	Describes input devices in a computer system.	Identifies input devices in a computer system.	Defines input devices in a computer system.	Recognises by showing input devices in a computer system.
Categorising input devices based on their functionality.	Evaluates input devices according to their functionality.	Categorises input devices based on their functionality.	Gives a brief description of input devices according to their functionality.	Names input devices according to their functionality.
Selecting appropriate input devices for different situations.	Categorises input devices for different situations.	Selects appropriate input devices for different situations.	Identifies input devices for different situations.	Lists input devices for different situations.



Using input devices to perform tasks.	Assembles input devices to perform tasks.	Uses input devices to perform tasks.	Groups input devices according to tasks performed.	Identifies input devices based on tasks performed.
Reusing input devices to minimise wastage.	Modifies input devices for reuse to minimise wastage.	Reuses input devices to minimise wastage.	Collects input devices that can be reused to minimise wastage.	Names input devices that can be reused to minimise wastage.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
<b>1.0 Foundation of Computer Science</b>	<b>1.11 Central Processing Unit (CPU)</b>  <b>(4 Lessons)</b>	<b>By the end of the sub strand, the learner should be able to:</b> a) locate the CPU in a computer system b) explain functional elements of the CPU in a computer system c) explore different types of processors used in computing devices d) use computers with different types of processors to perform tasks e) appreciate the role of processors in computers.	<b>Individually or in purposive pairs/groups, the learners are guided to:</b> <ul style="list-style-type: none"> <li>Search for the meaning of the term CPU and motherboard. <i>Learners with manipulation difficulties such as fine motor skills could use universal cuffs, head/mouth pointers, adapted digital devices with accessibility features such as expanded keyboards with sticky keys, key guards, embedded trackballs and touchpads, head operated optical/ergonomic mouse to search for the meaning of the term CPU and motherboard. Regulate light intensity for learners with epilepsy and those with visual difficulties as they use the digital devices. (Apply this adaptation in all the subsequent learning experiences involving manipulation of ICT devices).</i></li> <li>In groups watch a video that shows the location of the CPU in a computer. <i>Learners on positioning devices should be preferentially and appropriately</i></li> </ul>	1. How does a computer system use the CPU? 2. Why do computers have processors?



			<p><i>positioned. Tables/working tops/surfaces should be lowered for learners with short stature and in wheelchair. (Apply this adaptation in the subsequent learning experience involving visibility).</i></p> <ul style="list-style-type: none"> <li>• Watch a video simulation of the functional organisation of the CPU.</li> <li>• Consult a computer resource person to discuss the functional elements of a CPU (arithmetic and logic unit, control unit and the main memory). <i>Learners with speech difficulties could use residual speech, point/write/type/stamp using assistive technology such as adapted computer, multipurpose stamps, text-to-speech software or be lip read by peers/learner support assistant/teacher as they seek clarification during the discussion. (Apply this adaptation in the subsequent learning experiences involving speech).</i></li> <li>• In turns navigate computer system specifications to determine the type of processor in a computer and list them. <i>Learners with manipulation difficulties could use alternative functional parts of the body like the legs, assistive technology such as universal cuffs, wrist/arm braces, weighted pencils/pens or pencil/pen with grip, heavy gauge paper or be assisted by peer/learner support assistant/teacher to list the type</i></li> </ul>	
--	--	--	--	--



			<p><i>of a processor in a computer.</i></p> <ul style="list-style-type: none"> <li>• Use computers with different types of processors to perform tasks; draw diagrams, type words, add numbers.</li> <li>• Discuss the role of processors in computers.</li> </ul>	
<p><b>Core competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>• Self-efficacy as learners navigates through computer system specifications to determine the type of processor.</li> <li>• Creativity and imagination as learners creates illustrations showing the functional elements of the CPU and display in the learning environment.</li> </ul>				
<p><b>Pertinent and Contemporary Issues (PCIs):</b></p> <ul style="list-style-type: none"> <li>• Self-esteem as learners navigate through computer system specifications to determine the type of processor.</li> </ul>			<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>• Unity as learners work together to achieve a common goal when searching for the technological trends in the development of the CPU.</li> </ul>	
<p><b>Link to other Subjects:</b></p> <ul style="list-style-type: none"> <li>• Life Skills Education as learners navigate through computer system specifications to determine the type of processor.</li> </ul>				
<p><b>Suggested Non-Formal Activities:</b></p> <ul style="list-style-type: none"> <li>• Share a video simulation of the functional organisation of the CPU during computer club activities.</li> </ul>			<p><b>Suggested Assessment Methods:</b></p> <ul style="list-style-type: none"> <li>• Projects, oral questions, aural questions, written tests, observation, interviews, practical assignments,</li> </ul>	
<p><b>Suggested Learning Resources:</b></p> <ul style="list-style-type: none"> <li>• Digital devices, reference materials, computer hardware, manila papers, Internet, video, audio clips, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces, weighted pens/pencils, slanting/adjustable tables</i></li> <li>• <b>Other related service providers:</b> <i>physiotherapists, occupational therapists, nurses, doctors, learner support assistant</i></li> </ul>				

<b>Suggested Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Locating the CPU in a computer system.	Describes functions of the CPU in a computer system.	Locates the CPU in a computer system.	Identifies the CPU in a computer system.	Defines the term CPU in a computer system.
Explaining functional elements of CPU in a computer system.	Illustrates functional elements of CPU in a computer system.	Explains functional elements of CPU in a computer system.	Outlines functional elements of CPU in a computer system.	Names functional elements of CPU in a computer system.



Exploring different types of processors used in computing devices.	Examines different types of processors used in computing devices.	Explores different types of processors used in computing devices.	Describes different types of processors used in computing devices.	Identifies different types of processors used in computing devices.
Using computers with different types of processors to perform tasks.	Critiques computers with different types of processors and the tasks they perform.	Uses computers with different types of processors to perform tasks.	Gives examples of computers with different types of processors.	Names computers with different types of processors.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
<b>1.0 Foundation of Computer Science</b>	<b>1.12 Output Devices (3 Lessons)</b>	<p><b>By the end of the sub strand, the learner should be able to:</b></p> <ol style="list-style-type: none"> <li>identify output devices of a computer system</li> <li>describe the functions of output devices in a computer system</li> <li>categorize computer output devices based on the output generated</li> <li>examine technological trends in the development of output devices</li> <li>select appropriate output devices for different situations</li> <li>use output devices to perform daily life activities</li> <li>appreciate technological trends in the development of output devices.</li> </ol>	<p><b>Individually or in purposive pairs/groups, the learners are guided to:</b></p> <ul style="list-style-type: none"> <li>Observe and list available output devices in the computer user environment, (printers, monitors, speakers, projectors, plotters, and actuators). <i>Learners with manipulation difficulties could use alternative functional parts of the body like the legs, assistive technology such as universal cuffs, wrist/arm braces, weighted pencils/pens or pencil/pen with grip or be assisted by peer/learner support assistant/teacher to list output devices. (Apply this adaptation in the subsequent learning activities which involve manipulation).</i></li> <li>Consult a computer resource person to discuss and demonstrate the various functions of output devices. <i>Learners on positioning devices should be preferentially and appropriately positioned. The learning environment should be accessible and have lowered surfaces like slanting/adjustable</i></li> </ul>	<ol style="list-style-type: none"> <li>Why are there different output devices?</li> <li>How do you use output device?</li> </ol>



			<p><i>tables for learners with short stature and in wheelchair as they listen to the resource person and observe the demonstration. Learners with speech difficulties could use residual speech, point/write/type/stamp using assistive technology such as adapted computer, multipurpose stamps, text-to-speech software or be lip read by peers/learner support assistant/teacher as they seek clarification during the discussion. (Apply these adaptations in the subsequent learning experiences involving visibility and speech).</i></p> <ul style="list-style-type: none"> <li>• Watch a video clip on categories of output devices and list them. <i>Learners with manipulation difficulties could use adapted digital devices with filter keys, key guards, larger mouse, head control input devices such as head wand to play the video. Regulate light intensity and glare for the learners with epilepsy and those with visual difficulties as they use the digital devices. (Apply this adaptation in the subsequent learning experiences involving use of digital devices)</i></li> <li>• In turns participate in matching output devices into their appropriate categories. <i>Learners with mobility difficulties could use assistive devices such as crutches, wheel chairs, scooter boards to move as they take turns to select appropriate output devices for different situations. (Apply this</i></li> </ul>	
--	--	--	--	--





			<p><i>adaptation in the subsequent learning experiences involving mobility).</i></p> <ul style="list-style-type: none"> <li>• Compare hardcopy output and softcopy output outlining their advantages and disadvantages.</li> <li>• In turns discuss the factors considered when selecting an output device.</li> <li>• Take turns in selecting appropriate output devices for different situations.</li> <li>• Share experiences on safe use and care of output devices.</li> <li>• Perform a task assigned by the facilitator using available output device.</li> </ul>	
<p><b>Core competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>• Critical Thinking and Problem Solving as learners develops evaluation and decision making skills as they compare softcopy and hardcopy output.</li> <li>• Citizenship as learners participates in a discussion on the factors considered when selecting an output device.</li> </ul>				
<p><b>Pertinent and Contemporary Issues (PCIs):</b></p> <ul style="list-style-type: none"> <li>• Effective communication as learners practice safe use and care of output devices.</li> </ul>		<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>• Responsibility as learners practice safe use and care of output devices.</li> <li>• Unity as learners participates in a discussion on the factors considered when selecting output devices.</li> </ul>		
<p><b>Link to other subjects:</b></p> <ul style="list-style-type: none"> <li>• Health Education as learners practice safe use and care of output devices.</li> </ul>				
<p><b>Suggested Non-Formal Activities:</b></p> <ul style="list-style-type: none"> <li>• During sports gatherings share ideas on how to assess user computing needs and select appropriate input devices for different situations.</li> </ul>		<p><b>Suggested Assessment Methods</b></p> <ul style="list-style-type: none"> <li>• Projects, oral questions, aural questions, written tests, observation, interviews, practical assignments</li> </ul>		
<p><b>Suggested Learning Resources</b></p> <ul style="list-style-type: none"> <li>• Digital devices, reference materials, computer hardware, manila papers, Internet, video, audio clips, adaptable locally available materials, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces, weighted pens/pencils, slanting/adjustable tables</i></li> <li>• <b>Other related service providers:</b> <i>physiotherapists, occupational therapists, nurses, doctors, learner support assistant</i></li> </ul>				



<b>Suggested Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Identifying output devices of a computer system.	Interrelates output devices of a computer system.	Identifies output devices of a computer system.	Labels output devices of a computer system.	Names output devices of a computer system.
Describing the functions of output devices in a computer system.	Demonstrates the functions of output devices in a computer system.	Describes the functions of output devices in a computer system.	Outlines the functions of output devices in a computer system.	Lists the functions of output devices in a computer system.
Categorising computer output devices based on the output generated.	Assesses computer output devices based on the output generated.	Categorises computer output devices based on the output generated.	Identifies computer output devices based on the output generated.	Matches computer output devices to the output generated.
Examining technological trends in the development of output devices.	Analyses technological trends in the development of output devices.	Examines technological trends in the development of output devices.	Tabulates technological trends in the development of output devices.	Lists the technological trends in the development of output devices.
Selecting appropriate output devices for different situations.	Develops a logical argument on the appropriate output devices for different situations.	Selects appropriate output devices for different situations.	Classifies appropriate output devices according to different situations.	Names appropriate output devices for different situations.
Using output devices to perform daily life activities.	Assesses output devices to perform daily life activities.	Uses output devices to perform daily life activities.	Displays output devices to perform daily life activities.	Matches output devices to tasks they perform in daily life activities.



Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
<b>1.0 Foundation of Computer Science</b>	<b>1.13 Ports and Cables</b>  <b>(3 Lessons)</b>	<p><b>By the end of the sub strand the learner should be able to:</b></p> <ol style="list-style-type: none"> <li>a) identify cables and ports in computer systems</li> <li>b) explain the types of cables used in computer systems</li> <li>c) relate cables to their corresponding ports in computer systems</li> <li>d) connect cables to ports in computer systems</li> <li>e) appreciate the use of cables and ports in computer systems.</li> </ol>	<p><b>Individually or in purposive pairs/groups, the learners are guided to:</b></p> <ul style="list-style-type: none"> <li>• Search for information on different cables and ports used in computer systems. <i>Learners with manipulation difficulties could use universal cuffs, adapted digital devices with accessibility features such as expanded keyboards with sticky keys, key guards, embedded trackball and touchpads, head control input devices such as head wand, head operated optical/ergonomic mouse, text to speech software to search for information on different cables and ports used in computers. Adjust glare on the screens of the ICT devices appropriately for learners with epilepsy and those who may experience difficulties in vision. (Apply this adaptation in the subsequent learning experiences involving manipulation of ICT devices)</i></li> <li>• Consult a computer resource person to engage in a discussion on the types of cables and ports used in computer systems. <i>Learners on positioning devices should be preferentially and appropriately positioned. The learning environment should be accessible and have lowered surfaces like slanting/adjustable tables for learners with short stature and in wheelchair as they follow instructions from the resource person. Learners with speech difficulties could use residual speech,</i></li> </ul>	<ol style="list-style-type: none"> <li>1. Why do computer systems have ports?</li> <li>2. How do you use cables?</li> </ol>



			<p><i>write/type/point/mime, use universal communication board, text to speech software or be lip-read by peers/learner support assistant/teacher to convey their ideas during the discussion. (Apply these adaptations in the subsequent learning experiences involving visibility and speech).</i></p> <ul style="list-style-type: none"> <li>• Take turns to match ports to their corresponding cables.</li> <li>• Participate actively in communal activities which deal with reusing or recycling the cables to minimize wastage. <i>Learners with mobility difficulties could use assistive devices such as crutches, wheel chairs, scooter boards as they participate in communal services. Learners with epilepsy and those with asthma should be safeguarded against triggers such as heights and dust. Those with brittle bones should keep off rugged or slippery terrains to avoid fractures. (Apply this adaptation in the subsequent learning experiences involving mobility).</i></li> <li>• Consult a computer user to discuss and demonstrate how to use cables and ports appropriately.</li> <li>• In purposive groups connect cables to their corresponding ports in computer systems. <i>Learners with manipulation difficulties could use alternative functional parts of the body like the legs or assistive technology such as universal cuffs, wrist/arm braces to connect cables to their corresponding ports.</i></li> </ul>	
--	--	--	--	--



<p><b>Core competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>• Self-efficacy as learners take turns to match ports to their corresponding cables.</li> <li>• Communication and collaboration as learners consults a computer specialist to engage in a discussion and demonstration on the types of cables and ports used in a computer.</li> <li>• Citizenship as learners participates in communal activities which deals with reusing or recycling cables to minimize wastage.</li> </ul>	
<p><b>Pertinent and Contemporary Issues (PCIs):</b></p> <ul style="list-style-type: none"> <li>• Peer education is enhanced as learners discuss and demonstrate how to use cables and ports appropriately during clubs.</li> </ul>	<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>• Patriotism as learners participate in communal activities which deals with reusing or recycling of cables to minimize wastage.</li> </ul>
<p><b>Link to other subjects:</b></p> <ul style="list-style-type: none"> <li>• Integrated Science as learners relates ports to their corresponding cables.</li> </ul>	
<p><b>Suggested Non-Formal Activities:</b></p> <ul style="list-style-type: none"> <li>• Demonstrate to school community members how to connect cables to their respective ports.</li> </ul>	<p><b>Suggested Assessment Methods:</b></p> <ul style="list-style-type: none"> <li>• Projects, oral questions, aural questions, written tests, observation, interviews, practical assignments</li> </ul>
<p><b>Suggested Learning Resources</b></p> <ul style="list-style-type: none"> <li>• Digital devices, reference materials, computer hardware, manila papers, Internet, video, audio clips, adaptable locally available materials, models, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces, weighted pens/pencils, slanting/adjustable tables</i></li> <li>• <b>Other related service providers:</b> <i>physiotherapists, occupational therapists, nurses, doctors, learner support assistant</i></li> </ul>	

<b>Suggested Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Identifying cables and ports in computer systems.	Compares cables and ports in computer systems and explains how to connect them.	Identifies cables and ports in computer systems.	Shows cables and ports in computer systems.	Names cables and ports in computer systems.
Explaining the types of cables used in computer systems.	Investigates types of cables used in computer systems.	Explains the types of cables used in computer systems.	Gives examples of devices that can be connected to cables used in computer systems.	Names types of cables used in computer systems.

Relating ports to their corresponding cables in computer systems.	Distinguishes between ports and their corresponding cables in computer systems.	Relates ports to their corresponding cables in computer systems.	Matches ports to their corresponding cables in a computer.	Lists ports in computer systems.
Connecting cables to ports in computer systems.	Explains the concepts of connecting cables to their ports in computer systems.	Connects cables to their ports in computer systems.	Arranges cables next to their ports in computer systems.	Recognises cables and their ports in computer systems.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
<b>1.0 Foundation of Computer Science</b>	<b>1.14 Computer Setup (3 Lessons)</b>	<p><b>By the end of the project the learner should be able to:</b></p> <ol style="list-style-type: none"> <li>identify problems experienced when setting up computers</li> <li>describe the procedure of setting up computers in a computer user environment</li> <li>apply appropriate instructions to set up computers for use</li> <li>explore ways to overcome the challenges experienced when setting up computers</li> <li>boot computers successfully for use</li> <li>Enjoy setting up computers in a computer user environment.</li> </ol>	<p><b>Individually or in purposive pairs/groups, the learners are guided to:</b></p> <ul style="list-style-type: none"> <li>Visit a computer user environment, discuss with the users and list the challenges they experience when setting up computers. <i>Learners with mobility difficulties could use assistive devices such as crutches, wheel chairs, scooter boards as they carry out activities involving movement. Learners with epilepsy and those with asthma should be safeguarded against triggers such as heights and dust. Those with brittle bones should keep off rugged or slippery terrains to avoid fractures. Learners with manipulation difficulties could use alternative functional parts of the body like the legs, assistive technology such as universal cuffs, wrist/arm braces, weighted pencils/pens or pencil/pen with grip or be assisted by peer/learner support assistant/teacher</i></li> </ul>	<ol style="list-style-type: none"> <li>How do you set up a computer?</li> <li>Why are safety precautions observed when setting up a computer?</li> </ol>



			<p><i>to list challenges experienced when setting up computers. (Apply these adaptations in the subsequent learning experiences involving mobility and manipulation).</i></p> <ul style="list-style-type: none"> <li>• Search online/print media for different ways of setting up computers. <i>Regulate light intensity and glare for the learners with epilepsy and those with visual difficulties as they use the digital devices. (Apply this adaptation in the subsequent learning experiences involving use of ICT devices).</i></li> <li>• Share experiences on precautions to follow when setting up computers.</li> <li>• Consult a computer resource person to guide on tools and requirements needed when setting up computers and to demonstrate how to setup computers.</li> <li>• Take part in setting up computers appropriately.</li> <li>• Consult a computer resource person to assist in identification of computers which are not functioning, select the parts which are still in good condition and are suitable to be reused or recycled, and make use of them when setting up computers.</li> <li>• Take turns to share the benefits and challenges experienced when setting up computers.</li> </ul>	
--	--	--	---	--



			<ul style="list-style-type: none"> <li>• In turns device ways to overcome the challenges experienced when setting up computers.</li> <li>• In turns enjoy booting computers successfully for use. <i>Learners with manipulation difficulties could use alternative functional part of the body like the legs, assistive technology such as head/mouth pointers, universal cuffs, adapted digital devices to press the start button.</i></li> <li>• Participate actively in school communal activities which involve setting up computers.</li> </ul>	
<b>Core competencies to be developed:</b> <ul style="list-style-type: none"> <li>• Communication and Collaboration as learners contributes to discussions and participates in setting up computers</li> <li>• Citizenship as learners discusses with the users in the community and lists the challenges they experience when setting up computers.</li> <li>• Creativity and Imagination as learners device ways to overcome the challenges experienced when setting up computers.</li> </ul>				
<b>Pertinent and Contemporary Issues (PCIs):</b> <ul style="list-style-type: none"> <li>• School governance is promoted as learners share experiences on precautions to follow when setting up computers during society and clubs.</li> </ul>		<b>Values:</b> <ul style="list-style-type: none"> <li>• Unity as learners teams up with others in setting up computers.</li> <li>• Respect as learners recognises the input of every member of the team when connecting the devices to the system unit.</li> </ul>		
<b>Link to other subjects:</b> <ul style="list-style-type: none"> <li>• Pre-Technical Studies as learners demonstrates ability to apply appropriate instructions when setting up computers.</li> </ul>				
<b>Suggested Non-Formal Activities:</b> <ul style="list-style-type: none"> <li>• Educate family members on how to setup computers.</li> </ul>		<b>Suggested Assessment Methods:</b> <ul style="list-style-type: none"> <li>• Projects, oral questions, aural questions, written tests, observation, interviews, practical assignments</li> </ul>		
<b>Suggested Learning Resources:</b> <ul style="list-style-type: none"> <li>• Digital devices, reference materials, productivity tools, computer software (OS, Utility software and Application programs), computer hardware, Internet, video, audio clips, adaptable locally available materials, models, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces,</i></li> </ul>				





*weighted pens/pencils, slanting/adjustable tables*

- **Other related service providers:** *physiotherapists, occupational therapists, nurses, doctors, learner support assistant*

<b>Suggested Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Identifying challenges experienced when setting up computers.	Discusses challenges experienced when setting up computers.	Identifies challenges experienced when setting up computers.	Outlines challenges experienced when setting up computers.	Lists challenges experienced when setting up computers.
Applying appropriate instructions to set up computers.	Assesses the appropriate instructions to set up computers.	Applies appropriate instructions to set up computers.	Illustrates appropriate instructions to set up computers.	Repeats instructions to set up computers.
Exploring ways to overcome the challenges experienced when setting up a computer.	Integrates ways of overcoming the challenges experienced when setting up a computer.	Explores ways to overcome the challenges experienced when setting up a computer.	Restates ways to overcome the challenges experienced when setting up a computer.	Lists ways to overcome the challenges experienced when setting up a computer.
Booting computer successfully for use.	Boots and uses computer successfully for use.	Boots computer successfully for use.	Locates computer successfully for use.	Assisted to boot computer successfully for use.



## STRAND 2.0: COMPUTER AND SOCIETY

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
2.0 Computer and Society	<b>2.1 Physical Safety of Computers (2 Lessons)</b>	By the end of the sub strand the learner should be able to: a) identify physical threats to computers, b) explore ways of mitigating physical threats to computers, c) apply appropriate control measures to minimise physical threats to computers, d) appreciate using computers in a physically secured computer user environment.	<b>The learner is guided to:</b> <ul style="list-style-type: none"> <li>Discuss and list physical threats to computers (theft, natural disasters, hardware failure) in a computer user environment.</li> </ul> Learners with speech difficulties could use residual speech, write/type, use universal communication board, text to speech software or be lip-read by peers/learner support assistant/teacher to discuss physical threats to computers. Learners with manipulation difficulties could use alternative functional parts of the body like the legs, assistive technology such as universal cuffs/wrist braces/arm braces, weighted pencils/pens, pencil/pen with grip or be assisted by peer/learner support assistant/teacher to list physical threat to computers. (Apply this adaptation in the subsequent learning experiences involving speech and manipulation). <ul style="list-style-type: none"> <li>Consult a computer resource person to discuss ways of mitigating physical threats to computers in a computer user environment.</li> </ul> Screen resolutions should be regulated for learners with photo phobia such as those with epilepsy and visual difficulties as they use the computers/adapted computers. (Apply this adaptation in the subsequent	<ol style="list-style-type: none"> <li>Why are computers protected from physical threats?</li> <li>How do you secure computers from physical threats?</li> </ol>



			learning experiences involving use of ICT devices) <ul style="list-style-type: none"> <li>• Participate in using appropriate control measures to minimise physical threats to computers in a computer user environment,</li> <li>• In purposive groups use computers in a physically secured user environment.</li> </ul>	
<b>Core competencies to be developed:</b> <ul style="list-style-type: none"> <li>• Critical Thinking and Problem Solving as learners explores ways of mitigating physical threats to computers in a computer user environment.</li> </ul>				
<b>Pertinent and Contemporary Issues (PCIs):</b> <ul style="list-style-type: none"> <li>• Safety and security as learners applies physical mitigation measures to secure computers in a computer user environment.</li> </ul>			<b>Values:</b> <ul style="list-style-type: none"> <li>• Responsibility as learners participate in securing computers in a computer user environment.</li> </ul>	
<b>Link to other subjects:</b> <ul style="list-style-type: none"> <li>• Health Education as learners applies physical mitigation measures to secure a computer user environment.</li> </ul>				
<b>Suggested Non-Formal Activities</b> <ul style="list-style-type: none"> <li>• Demonstrate in a community forum how to organise workstation to minimise health complications when using computers.</li> </ul>			<b>Suggested Assessment Methods</b> <ul style="list-style-type: none"> <li>• Rating scales, rubrics, questionnaires, projects, journals, portfolios, oral questions, aural questions, interview schedules, learner’s profile, written tests, anecdotal records, observation schedules, checklists</li> </ul>	
<b>Suggested Learning Resources</b> <ul style="list-style-type: none"> <li>• Digital devices, reference materials, visual programming tools, computer software (OS, Utility software and Application programs), computer hardware, manila papers, Internet, video, audio clips, adaptable locally available materials, models, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces, weighted pens/pencils, slanting/adjustable tables</i></li> </ul>				



<b>Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Identifying physical threats to computers	Identifies more than three physical threats to computers	Identifies four physical threats to computers	Identifies three physical threats to computers	Identifies less than three physical threats to computers
Exploring ways of mitigating physical threats to computers	Explores more than four ways of mitigating physical threats to computers	Explores four ways of mitigating physical threats to computers	Explores three ways of mitigating physical threats to computers	Explores less than three ways of mitigating physical threats to computers
Applying appropriate control measures to minimise physical threats to computers	Applies appropriate control measures to minimise more than four physical threats to computers	Applies appropriate control measures to minimise four physical threats to computers	Applies appropriate control measures to minimise three physical threats to computers	Applies appropriate control measures to minimise one physical threats to computers

<b>Strand</b>	<b>Sub Strand</b>	<b>Specific Learning Outcomes</b>	<b>Suggested Learning Experiences</b>	<b>Key Inquiry Questions</b>
<b>2.0 Computer and Society</b>	<b>2.2 Health and Safety</b>  <b>(2 Lessons)</b>	By the end of the sub strand, the learner should be able to: a) identify health complications associated with the use of computers b) apply appropriate techniques to mitigate health complications associated with the use of computers c) observe safe use and best practices when using computers d) organise workstation to minimise health complications when using computers e) appreciate safe use of	Individually or in purposive pairs/groups, the learners are guided to: <ul style="list-style-type: none"> <li>Discuss health complications associated with the use of computers. <i>Learners with speech difficulties could use residual speech, write/type/mime/point using assistive technology such as multipurpose stamp, universal communication board, text to speech software or be lip-read by peers/learner support assistant/teacher to discuss health complications associated with the use of computers. (Apply this adaptation in the subsequent learning experiences involving speech).</i></li> <li>In turns discuss techniques to mitigate health</li> </ul>	<ol style="list-style-type: none"> <li>Why is your health at risk when using a computer?</li> <li>How do you minimise health complications associated with the use of computers?</li> </ol>



		<p>computers to minimise health complications.</p>	<p>complications associated with the use of computers.</p> <ul style="list-style-type: none"> <li>• Use appropriate techniques to mitigate health complications. <i>Learners on positioning devices should be preferentially and appropriately positioned. The learning environment should be accessible and have lowered surfaces like slanting/adjustable tables for learners with short stature and those on mobility devices such as crutches and wheelchairs. Screen resolutions should be regulated for learners with photophobia. (Apply this adaptation in the subsequent learning experiences involving use of ICT devices).</i></li> <li>• Share experiences on the safety practices to be observed when using computers.</li> <li>• Observe safety precautions and best practices when using computers. <i>Learners with manipulation difficulties could use alternative functional parts of the body like the legs, assistive technology such as universal cuffs, wrist/arm braces to observe best practices when using computers. (Apply this adaptation in the subsequent learning experiences involving manipulation).</i></li> <li>• Take turns to organise workstation to minimise health complications when using computers.</li> </ul>	
<p><b>Core competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>• Critical Thinking and Problem Solving as learners explores techniques to mitigate health complications associated with the use of computers.</li> </ul>				



<ul style="list-style-type: none"> <li>Communication and Collaboration as learners share experiences on the safety practices to be observed when using a computer.</li> </ul>	
<p><b>Suggested non-formal Activities:</b></p> <ul style="list-style-type: none"> <li>Participate actively in school activities which educates the peers on health and safety of computer use.</li> </ul>	<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>Respect as learners accommodates others opinion when discussing techniques to mitigate health complications associated with the use of computers in a computer user environment.</li> </ul>
<p><b>Pertinent and Contemporary Issues (PCIs):</b></p> <ul style="list-style-type: none"> <li>Self-awareness as learners observes safe use and best practices when using a computer in a computer user environment.</li> </ul>	
<p><b>Links to other subjects:</b></p> <ul style="list-style-type: none"> <li>Health Education as learners observes safe use and best practice when using computers in a computer user environment.</li> </ul>	
<p><b>Suggested Non-Formal Activities:</b></p> <ul style="list-style-type: none"> <li>Participate in activities which educates peers on health and safety of computer use.</li> </ul>	<p><b>Suggested Assessment Methods:</b></p> <ul style="list-style-type: none"> <li>Projects, oral questions, aural questions, written tests, observation, interviews, practical assignments</li> </ul>
<p><b>Suggested Learning Resources:</b></p> <ul style="list-style-type: none"> <li>Digital devices, reference materials, productivity tools, computer software (OS, Utility software and Application programs), computer hardware, manila papers, Internet, video, audio clips, adaptable locally available materials, models, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces, weighted pens/pencils, slanting/adjustable tables</i></li> <li><i>Other related service providers: physiotherapists, occupational therapists, nurses, doctors, learner support assistant</i></li> </ul>	

<b>Suggested Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Identifying health complications associated with the use of computers.	Discusses health complications associated with the use of computers.	Identifies health complications associated with the use of computers.	Outlines health complications associated with the use of computers.	Names health complications associated with the use of computers.
Applying appropriate techniques to mitigate health complications associated with the use of computers.	Critiques appropriate techniques to mitigate health complications associated with the use of computers.	Applies appropriate techniques to mitigate health complications associated with the use of computers.	Describes appropriate techniques to mitigate health complications associated with the use of computers.	Identifies appropriate techniques to mitigate health complications associated with the use of computers.

Observing safe use and best practices when using computers.	Investigates safe use and best practices when using computers.	Observes safe use and best practices when using computers.	Describes safe use and best practices when using computers.	Recognises the need for safe use and best practices when using computers.
Organising workstation to minimise health complications when using computers.	Critiques the organisation of workstation in order to minimise health complications when using computers.	Organises workstation to minimise health complications when using computers.	Discusses how to organise workstation to minimise health complications when using computers.	States how to organise the workstation to minimise health complications when using computers.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
<b>2.0 Computer and Society</b>	<b>2.3 Repetitive Strain Injury (RSI)</b>  <b>(2 Lessons)</b>	<b>By the end of the sub strand, the learner should be able to:</b> a) identify the symptoms of repetitive strain injury for awareness b) explain the causes of repetitive strain injury for consciousness when using a computer c) apply appropriate strategies to prevent repetitive strain injury when using a computer d) appreciate using computers safely to minimise the repetitive strain injury.	<b>Individually or in purposive pairs/groups, the learners are guided to:</b> <ul style="list-style-type: none"> <li>Share experiences on common symptoms of repetitive strain injury (upper limb disorders, eye strain, stress and fatigue) for awareness. <i>Learners with speech difficulties could use residual speech, write/type/mime/point using assistive technology such as multipurpose stamp, universal communication board, text to speech software or be lip-read by peers/learner support assistant/teacher to share experiences on common symptoms of repetitive strain injury. (Apply this adaptation in the subsequent learning experiences involving speech).</i></li> <li>Consult a resource person and ask questions for clarity on the causes of repetitive strain injury.</li> </ul>	<ol style="list-style-type: none"> <li>Why does prolonged use of computers affect your health?</li> <li>How does repetitive strain injury affect your health?</li> </ol>



			<ul style="list-style-type: none"> <li>• Watch a video about the causes of repetitive strain injury and list them. <i>Learners with manipulation difficulties could use alternative functional parts of the body like the legs, assistive technology such as universal cuffs, wrist/arm braces, weighted pencils/pens, pencil/pen with grips or be assisted by peer/ learner support assistant/teacher to list causes of repetitive strain injury. Adjust glare on the screens of the ICT devices appropriately for learners with epilepsy and those who may experience difficulties in vision. (Apply this adaptation in the subsequent learning experiences involving manipulation of ICT devices).</i></li> <li>• Discuss the strategies for preventing repetitive strain injury when using a computer.</li> <li>• Use the appropriate strategies to prevent repetitive strain injury when using a computer.</li> <li>• Practice observing safe ways when using computers for a longer period.</li> </ul>	
<p><b>Core competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>• Critical Thinking and Problem Solving as learners ask questions for clarity on the causes of repetitive strain injury.</li> <li>• Communication and collaboration as learners share experiences on the symptoms of repetitive strain injury.</li> </ul>				
<p><b>Pertinent and Contemporary Issues (PCIs):</b></p> <ul style="list-style-type: none"> <li>• Common communicable diseases as learners observe safe use and best</li> </ul>			<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>• Responsibility as learners observe safe use and best practices when</li> </ul>	





practices when using a computer for a longer period.	using a computer for a longer period.
<b>Link to other subjects:</b> <ul style="list-style-type: none"> <li>Health Education as learners observes safe use and best practice when using computers.</li> </ul>	
<b>Suggested Non-Formal Activities:</b> <ul style="list-style-type: none"> <li>Sensitize peers on the appropriate strategies of preventing repetitive strain injury when using a computer.</li> </ul>	<b>Suggested Assessment Methods:</b> <ul style="list-style-type: none"> <li>Projects, oral questions, aural questions, written tests, observation, interviews, practical assignments</li> </ul>
<b>Suggested Learning Resources:</b> <ul style="list-style-type: none"> <li>Digital devices, reference materials, productivity tools, computer software (OS, Utility software and Application programs), computer hardware, manila papers, Internet, video, audio clips, adaptable locally available materials, models, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces, weighted pens/pencils, slanting/adjustable tables</i></li> <li><b>Other related service providers:</b> <i>physiotherapists, occupational therapists, nurses, doctors, learner support assistant</i></li> </ul>	

<b>Suggested Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Identifying three symptoms of repetitive strain injury for awareness.	Discusses three symptoms of repetitive strain injury for awareness.	Identifies three symptoms of repetitive strain injury for awareness.	Outlines two symptoms of repetitive strain injury for awareness.	Names two symptoms of repetitive strain injury for awareness.
Explaining the causes of repetitive strain injury for consciousness when using a computer.	Analyses causes of repetitive strain injury for consciousness when using a computer.	Explains causes of repetitive strain injury for consciousness when using a computer.	Makes a summary of causes of repetitive strain injury for consciousness when using a computer.	Lists causes of repetitive strain injury for consciousness when using a computer.
Applying appropriate strategies to prevent repetitive strain injury when using a computer.	Evaluate appropriate strategies to prevent repetitive strain injury when using a computer.	Applies appropriate strategies to prevent repetitive strain injury when using a computer.	Explains appropriate strategies to prevent repetitive strain injury when using a computer.	Identifies appropriate strategies to prevent repetitive strain injury when using a computer.



Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
2.0 Computer And Society	2.4 Data Safety in Computers  (2 Lessons)	<p><b>By the end of the sub strand, the learner should be able to:</b></p> <ul style="list-style-type: none"> <li>a) explain threats to data in a computer</li> <li>b) identify the control measures for securing data in a computer</li> <li>c) apply the control measures to secure data in a computer</li> <li>d) appreciate securing data in a computer.</li> </ul>	<p><b>Individually or in purposive pairs/groups, the learners are guided to:</b></p> <ul style="list-style-type: none"> <li>• Brainstorm on the meaning of the terms data safety, data privacy and data threats. <i>Learners with speech difficulties could use residual speech, point/write/type/stamp using assistive technology such as adapted computer or multipurpose stamps, text-to-speech software or be lip read by peers/learner support assistant/teacher as they give meaning of terms data safety, data privacy and data threats. (Apply this adaptation in the subsequent learning experiences involving speech).</i></li> <li>• Consult a computer resource person to discuss data threats and their control measures.</li> <li>• Watch a video on control measures for securing data in a computer. <i>Learners with manipulation difficulties could use adapted digital devices with filter keys/key guards, larger mouse, head control input devices such as head wand to start the video. Regulate light intensity and glare for the learners with epilepsy and those with visual difficulties as they use the digital devices. (Apply this adaptation in the subsequent learning experiences involving use of ICT devices)</i></li> <li>• In turns discuss ways of securing data stored in a computer (use of passwords, backup, anti-viruses, user access level, and user logs).</li> </ul>	<ol style="list-style-type: none"> <li>1. How is data in a computer exposed to threats?</li> <li>2. Why do you secure data in a computer?</li> </ol>



			<ul style="list-style-type: none"> <li>Share ideas on how to secure data in a computer.</li> </ul>	
<b>Core competencies to be developed:</b> <ul style="list-style-type: none"> <li>Communication and Collaboration as learners discuss ways of securing data stored in a computer.</li> <li>Critical Thinking and Problem Solving as learners intelligently applies the control measures to secure data in a computer.</li> </ul>				
<b>Pertinent and Contemporary Issues (PCIs):</b> <ul style="list-style-type: none"> <li>Disaster risk reduction as learners uses data safety measures to secure data in a computer.</li> </ul>		<b>Values:</b> <ul style="list-style-type: none"> <li>Peace as learners calmly watches a video on control measures for securing data in a computer.</li> </ul>		
<b>Link to other subjects:</b> Life Skills Education as leaners uses appropriate data safety measures to secure data in a computer. Health Education as learners observe safe use and best practice when using computers.				
<b>Suggested Non-Formal Activities:</b> <ul style="list-style-type: none"> <li>Sensitize peers on data safety best practices that ensures security of data in a computer during clubs.</li> </ul>		<b>Suggested Assessment Methods:</b> <ul style="list-style-type: none"> <li>Projects, oral questions, aural questions, written tests, observation, interviews, practical assignments</li> </ul>		
<b>Suggested Learning Resources:</b> <ul style="list-style-type: none"> <li>Digital devices, reference materials, productivity tools, computer software (OS, Utility software and Application programs), computer hardware, manila papers, Internet, video, audio clips, adaptable locally available materials, models, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces, weighted pens/pencils, slanting/adjustable tables</i></li> <li><b>Other related service providers:</b> <i>physiotherapists, occupational therapists, nurses, doctors, learner support assistant</i></li> </ul>				

<b>Suggested Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Explaining threats to data in a computer.	Examine threats to data in a computer.	Explains threats to data in a computer.	Identifies threats to data in a computer.	Retells threats to data in a computer.
Identifying the control measures for securing data in a computer.	Explains the control measures for securing data in a computer.	Identifies the control measures for securing data in a computer.	Recognises the control measures for securing data in a computer.	Recalls the control measures for securing data in a computer.



Applying the control measures to secure data in a computer.	Justifies control measures used to secure data in a computer.	Applies control measures to secure data in a computer.	Gives examples of control measures applied to secure data in a computer.	Recognises the need to have control measures to secure data in a computer.
---	---	--	--	--

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
<b>2.0 Computer and Society</b>	<b>2.5 Online Safety Concepts  (3 Lessons)</b>	<b>By the end of the sub strand, the learner should be able to:</b> a) explain online threats to a computer user b) identify online safety measures to observe when using a computer c) examine the importance of online safety when using a computer d) apply online safety measures when using a computer e) appreciate importance of online safety when using a computer.	<b>Individually or in purposive pairs/groups, the learners are guided to:</b> <ul style="list-style-type: none"> <li>Brainstorm on the meaning of the terms online safety and online safety risks. <i>Learners with speech difficulties could use residual speech, point/write/type/stamp using assistive technology such as adapted computer, multipurpose stamps, text-to-speech software or be lip read by peers/learner support assistant/teacher as they give the meaning of the terms online safety and online safety risks. (Apply this adaptation in the subsequent learning experiences involving speech).</i></li> <li>Take turns to share the online threats experienced when using a computer.</li> <li>Consult a computer resource person to discuss online threats (cyber bullying, phishing, online fraud, friend requests from unknown people) to a computer user.</li> <li>Watch a video on safety measures to observe when online (not sharing pictures, location, securing profiles). <i>Regulate light intensity and glare for the learners with</i></li> </ul>	<ol style="list-style-type: none"> <li>How do you share data when online?</li> <li>How do you protect yourself from cyber bullying?</li> </ol>



			<p><i>photophobia and those with visual difficulties as they use the digital devices. (Apply this adaptation in the subsequent learning experiences involving use of ICT devices).</i></p> <ul style="list-style-type: none"> <li>• Discuss with a resource person how to solve online safety issues (cyber bullying, phishing, online fraud, friend requests from unknown people).</li> <li>• Practice observing online safety measures when using a computer.</li> <li>• Share experiences about the importance of online safety when using a computer.</li> </ul>	
<p><b>Core competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>• Communication and Collaboration as learners take turns to share the online threats experienced when using a computer.</li> <li>• Learning to learn as learners shares experiences about online safety.</li> </ul>				
<p><b>Pertinent and Contemporary Issues (PCIs):</b></p> <ul style="list-style-type: none"> <li>• Cyber security as learners applies safety measures when online.</li> </ul>			<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>• Responsibility as learners applies safety measures when online.</li> </ul>	
<p><b>Link to other subjects:</b></p> <ul style="list-style-type: none"> <li>• Life Skills Education as learners always practice observing online safety measures when using a computer.</li> </ul>				
<p><b>Suggested Non-Formal Activities:</b></p> <ul style="list-style-type: none"> <li>• Discuss in a forum safety measures to observe when online (not sharing pictures, location, securing profiles).</li> </ul>			<p><b>Suggested Assessment Methods:</b></p> <ul style="list-style-type: none"> <li>• Projects, oral questions, aural questions, written tests, observation, interviews, practical assignments</li> </ul>	
<p><b>Suggested Learning Resources:</b></p> <ul style="list-style-type: none"> <li>• Digital devices, reference materials, productivity tools, computer software (OS, Utility software and Application programs), computer hardware, manila papers, Internet, video, audio clips, adaptable locally available materials, models, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces, weighted pens/pencils, slanting/adjustable tables</i></li> <li>• <b><i>Other related service providers: physiotherapists, occupational therapists, nurses, doctors, learner support assistant</i></b></li> </ul>				



<b>Suggested Assessment Rubric:</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Explaining three online threats to a computer user.	Investigates three online threats to a computer user.	Explains three online threats to a computer user.	Gives three examples of online threats to a computer user.	Recalls three online threats to a computer user.
Identifying online safety measures to observe when using a computer.	Tabulates online safety measures to observe when using a computer.	Identifies online safety measures to observe when using a computer.	Outlines online safety measures to observe when using a computer.	Names online safety measures to observe when using a computer.
Examining the importance of online safety when using a computer.	Draws conclusions on importance of online safety when using a computer.	Examines importance of online safety when using a computer.	Identifies the importance of online safety when using a computer.	Recognises the importance of online safety when using a computer.
Applying online safety measures when using a computer.	Analyses online safety measures when using a computer.	Applies online safety measures when using a computer.	Discusses online safety measures when using a computer.	Records online safety measures to observe when using a computer.

<b>Strand</b>	<b>Sub Strand</b>	<b>Specific Learning Outcomes</b>	<b>Suggested Learning Experiences</b>	<b>Key Inquiry Questions</b>
<b>2.0 Computer and Society</b>	<b>2.6 Online Identity Safety</b>  <b>(3 Lessons)</b>	<b>By the end of the sub strand, the learner should be able to:</b> a) analyse the characteristics of personal data for protection from online identity theft b) describe techniques that protect personal data from online disclosure c) apply appropriate methods to protect personal data from	<b>Individually or in purposive pairs/groups, the learners are guided to:</b> <ul style="list-style-type: none"> <li>Share the online identity threats experienced when using a computer. <i>Learners with speech difficulties could use residual speech, write/type/mime/point using assistive technology such as multipurpose stamp, universal communication board, text to speech software or be lip-read by peers/learner</i></li> </ul>	<ol style="list-style-type: none"> <li>Why do you post personal information online?</li> <li>How is online identity theft protected?</li> </ol>



		<p>online disclosure</p> <p>d) adhere to rules associated with online etiquette when interacting with computers</p> <p>e) use of computers responsibly to safeguard digital footprint</p> <p>f) appreciate the personal data protection when online.</p>	<p><i>support assistant/teacher to discuss online identity threats experienced when using a computer. (Apply this adaptation in the subsequent learning experiences involving speech).</i></p> <ul style="list-style-type: none"> <li>• Discuss the characteristics of personal and sensitive data (personal name, address, family details, images, date of birth, a photograph in school uniform, medical history).</li> <li>• Take turns to share ideas and illustrations on how to keep personal and sensitive data from public when online. <i>Learners with manipulation difficulties such as fine motor skills could use universal cuffs, head/mouth pointers, adapted digital devices with accessibility features such as expanded keyboards with sticky keys, key guards, embedded trackball and touchpads, head operated optical/ergonomic mouse or be physically assisted by peers/learner support assistant/teacher to illustrate how to keep personal and sensitive data from public when online. Adjust glare on the screens of the ICT devices appropriately for learners with photophobia and those who may experience difficulties in vision. (Apply this adaptation in the subsequent learning experiences involving manipulation of ICT devices).</i></li> <li>• Consult a resource person to discuss the use of social media including knowing how to</li> </ul>	
--	--	--	---	--



			<p>block and report unwanted users.</p> <ul style="list-style-type: none"> <li>• Discuss awareness of potential dangers of meeting an online contact face to face.</li> <li>• Take turns to elaborate on rules associated with online etiquette (avoid distribution of inappropriate images, avoid use of inappropriate language, respecting confidentiality of personal data of other people).</li> <li>• Share experiences on responsible use of computers when online to safeguard digital footprint.</li> </ul>	
<p><b>Core competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>• Communication and Collaboration as learners takes turn to elaborate on rules associated with online etiquette.</li> <li>• Learning to learn as learners share experiences on responsible use of computers to safeguard digital footprint.</li> </ul>				
<p><b>Pertinent and Contemporary Issues (PCIs):</b></p> <ul style="list-style-type: none"> <li>• Cyber security as learners share experiences about online identity safety.</li> </ul>			<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>• Integrity as learners use computers responsibly to safeguard digital footprint.</li> <li>• Respect as learners takes turn to elaborate on rules associated with online etiquette.</li> <li>• Love as learners share experiences on responsible use of computers to safeguard digital footprint.</li> </ul>	
<p><b>Links to other subjects:</b></p> <ul style="list-style-type: none"> <li>• Social Studies as learners share experiences on responsible use of computers to safeguard digital footprint.</li> </ul>				
<p><b>Suggested Non-Formal Activities:</b></p> <ul style="list-style-type: none"> <li>• Educate school community members how to keep personal and sensitive data from public when online.</li> </ul>			<p><b>Suggested Assessment Methods:</b></p> <ul style="list-style-type: none"> <li>• Projects, oral questions, aural questions, written tests, observation, interviews, practical assignments</li> </ul>	
<p><b>Suggested Learning Resources:</b></p> <ul style="list-style-type: none"> <li>• Digital devices, reference materials, productivity tools, computer software (OS, Utility software and Application programs), computer hardware, manila papers, Internet, video, audio clips, adaptable locally available materials, models, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs,</i></li> </ul>				





*wrist/arm braces, weighted pens/pencils, slanting/adjustable tables*

- **Other related service providers:** *physiotherapists, occupational therapists, nurses, doctors, learner support assistant*

<b>Suggested Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Analysing the characteristics of personal and sensitive data for protection from online identity theft.	Critiques the characteristics of personal and sensitive data for protection from online identity theft.	Analyses characteristics of personal and sensitive data for protection from online identity theft.	Discusses characteristics of personal and sensitive data for protection from online identity theft.	States characteristics of personal and sensitive data for protection from online identity theft.
Describing the techniques of protecting personal data from online disclosure.	Examines techniques of protecting personal data from online disclosure.	Describes techniques of protecting personal data from online disclosure.	Completes information on techniques of protecting personal data from online disclosure.	Recalls information on techniques of protecting personal data from online disclosure.
Applying appropriate methods to protect personal data from online disclosure.	Designs appropriate methods to protect personal data from online disclosure.	Applies appropriate methods to protect personal data from online disclosure.	Compares different methods to protect personal data from online disclosure.	Recalls appropriate methods to protect personal data from online disclosure.
Adhering to rules associated with online etiquette when interacting with computers.	Researches on the rules associated with online etiquette when interacting with computers.	Adheres to rules associated with online etiquette when interacting with computers.	Give examples of rules associated with online etiquette when interacting with computers.	Reads the rules associated with online etiquette when interacting with computers.
Using computers responsibly when online to safeguard digital footprint.	Investigates the responsible use of computers when online to safeguard digital footprint.	Uses computers responsibly when online to safeguard digital footprint.	Explains how computers can be used responsibly when online to safeguard digital footprint.	Recognises the need to use computers responsibly when online to safeguard digital footprint.



### STRAND 3.0: COMPUTER NETWORKS

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
3.0 Computer Networks	3.1 Computer Network Concepts  (3 Lessons)	<p><b>By the end of the sub strand, the learner should be able to:</b></p> <ul style="list-style-type: none"> <li>a) relate computer networks to available types of networks</li> <li>b) use locally available materials to model computer networks</li> <li>c) explain the benefits of computer networks in the society</li> <li>d) identify the challenges of computer networks in the society</li> <li>e) examine the purpose of computer networks in the society</li> <li>f) appreciate use of computer networks in the society.</li> </ul>	<p><b>Individually or in purposive pairs/groups, the learners are guided to:</b></p> <ul style="list-style-type: none"> <li>• Watch a video clip simulating a computer network and discuss how internet works. <i>Learners with speech difficulties could use residual speech, point/write/type/stamp using assistive technology such as adapted computer, multipurpose stamps, text-to-speech software or be lip read by peers/learner support assistant/teacher as they discuss how internet works. Screen resolutions should be regulated for learners with photophobia and those with visual difficulties as they watch a video clip. (Apply these adaptations in the subsequent learning experiences involving speech and use of ICT devices).</i></li> <li>• Brainstorm the definition of the term network and computer network.</li> <li>• Share ideas on available networks in the society such as road network and then relate them to computer networks.</li> <li>• Use locally available materials to model computer networks. <i>Learners with manipulation difficulties could use alternative functional parts of the body like the legs, assistive technology such as universal cuffs, wrist/arm braces or be</i></li> </ul>	<ul style="list-style-type: none"> <li>1. Why do you use computer networks?</li> <li>2. How do you form computer networks?</li> </ul>



			<p><i>assisted by peers/ learner support assistance/teacher to model computer networks using locally available materials. Learners on positioning devices such as those using prone standers, strapping and splinting should be preferentially and appropriately positioned to participate in the modelling. The learning environment should be accessible and have lowered surfaces like slanting or adjustable tables. (Apply these adaptations in the subsequent learning experiences which involve manipulation and positioning).</i></p> <ul style="list-style-type: none"> <li>• Debate on the benefits of computer networks in the society.</li> <li>• Share experiences on the challenges of computer networks in the society.</li> <li>• In turns discuss the purpose of computer networks in the society.</li> </ul>	
<p><b>Core competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>• Self-efficacy as learners share ideas on available networks in the society.</li> <li>• Creativity and Imagination as learners creatively and innovatively uses locally available materials to model a computer network.</li> <li>• Effective communication as learners debates on the benefits of computer networks in the society.</li> </ul>				
<p><b>Pertinent and Contemporary Issues (PCIs):</b></p> <ul style="list-style-type: none"> <li>• Assertiveness as learners debates on the benefits of computer networks in the society.</li> </ul>			<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>• Respect as learners accommodates others ideas on available networks in the society.</li> </ul>	
<p><b>Link to other subjects:</b></p> <ul style="list-style-type: none"> <li>• Visual Arts as learners use locally available materials to model computer networks.</li> </ul>				
<p><b>Suggested Non-Formal Activities:</b></p> <ul style="list-style-type: none"> <li>• Sensitise peers on the benefits of computer networks in the society</li> </ul>			<p><b>Suggested Assessment Methods:</b></p> <ul style="list-style-type: none"> <li>• Projects, oral questions, aural questions, written tests, observation,</li> </ul>	

during games.	interviews, practical assignments
<b>Suggested Learning Resources:</b> <ul style="list-style-type: none"> <li>Digital devices, reference materials, productivity tools, computer software (OS, Utility software and Application programs), computer hardware, manila papers, Internet, video, audio clips, adaptable locally available materials, models, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces, weighted pens/pencils, slanting/adjustable tables</i></li> <li><b>Other related service providers:</b> <i>physiotherapists, occupational therapists, nurses, doctors, learner support assistant</i></li> </ul>	

<b>Suggested Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Relating computer networks to available types of networks.	Compares different types of computer networks.	Relates computer networks to available types of networks.	Chooses computer networks from available types of networks.	Matches computer networks to available types of networks.
Using locally available materials to model computer networks.	Assembles a computer network using locally available materials.	Uses locally available materials to model computer networks.	Explains how to use locally available materials to model computer networks.	Draws a model of computer networks.
Explaining the benefits of computer networks in the society.	Assesses benefits of computer networks in the society.	Explains the benefits of computer networks in the society.	Outlines the benefits of computer networks in the society.	States the benefits of computer networks in the society.
Identifying three challenges of computer networks in the society.	Explains three challenges of computer networks in the society.	Identifies three challenges of computer networks in the society.	Identifies two challenges of computer networks in the society.	Identifies one challenge of computer networks in the society.
Examining the purpose of computer networks in the society.	Dissects purpose of computer networks in the society.	Examines the purpose of computer networks in the society.	Describes the purpose of computer networks in the society.	Highlights the purpose of computer networks in the society.



Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
3.0 Computer Networks	3.2 Connecting to Computer Networks (3 Lessons)	<p><b>By the end of the sub strand, the learner should be able to:</b></p> <ul style="list-style-type: none"> <li>a) identify available computer networks in the immediate environment</li> <li>b) connect to the available computer networks in the immediate environment</li> <li>c) use the available computer networks in the immediate environment</li> <li>d) share resources through computer networks in the immediate environment</li> <li>e) appreciate computer networks for ease of communication.</li> </ul>	<p><b>Individually or in purposive pairs/groups, the learners are guided to:</b></p> <ul style="list-style-type: none"> <li>• Visit a computer user environment and list the type of available computer networks (wireless or cabled networks). <i>Learners using mobility devices such as wheel chair could use assistive technology such as heel cast, alternative functional parts of the body like the hands or could be assisted by peer/learner support assistant/ teacher as they visit a computer user environment. Safety precaution should be observed for learners with brittle bones and muscular dystrophy by ensuring they move in safe terrains. Learners with manipulation difficulties could use alternative functional parts of the body like the legs, assistive technology such as universal cuffs, wrist/arm braces, weighted pencils/pens or pencil/pen with grip or be assisted by peer/learner support assistant/teacher to list types of computer networks available. Learners with speech difficulties could use residual speech, point/write/type/stamp using assistive technology such as adapted computer, multipurpose stamps, text-to-speech software or be lip read by peers/learner support assistant/teacher as they discuss types of available computer networks. (Apply these adaptations in all the</i></li> </ul>	<ol style="list-style-type: none"> <li>1. Why do you connect to a computer network?</li> <li>2. How is the computer network useful in daily life?</li> </ol>



			<p><i>subsequent learning experiences that involve mobility, manipulation and speech).</i></p> <ul style="list-style-type: none"> <li>• Watch a video clip simulating how to connect to available computer networks in the immediate environment (wireless or cabled networks). <i>Learners using mobility devices and those with short stature should be given preferential sitting positions for a clear view of the video being played. Screen resolutions should be regulated for learners with photophobia and those with visual difficulties as they watch the video. (Apply this adaptation in all the subsequent learning experiences that involve use of ICT devices).</i></li> <li>• Connect to a computer network in the immediate environment.</li> <li>• Use digital devices such as phones, tablets, computers to share data files, photos with peers through computer networks in the immediate environment. <i>Learners with manipulation difficulties such as fine motor skills could use alternative functional part of the body, assistive technology such as adjustable head/mouth pointer or be physically assisted by peers/learner support assistant/teacher to use digital devices to share data.</i></li> </ul>	
<p><b>Core competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>• Digital Literacy as learners connects to a computer network in the immediate environment.</li> <li>• Self-efficacy as learners connects to computer networks and shares resources with peers.</li> </ul>				



<p><b>Pertinent and Contemporary Issues (PCIs):</b></p> <ul style="list-style-type: none"> <li>• Problem-solving as learners connects to and uses available computer networks in the immediate environment to share resources with peers.</li> </ul>	<p><b>Values:</b></p> <p>Unity as learners shares resources with peers through computer networks in the immediate environment.</p>
<p><b>Link to other subjects:</b></p> <ul style="list-style-type: none"> <li>• Social Studies as learners use digital devices such as phones, tablets, computers to share a data files, photos with peers through computer networks in the immediate environment.</li> </ul>	
<p><b>Suggested Non-Formal Activities:</b></p> <ul style="list-style-type: none"> <li>• Demonstrate to a school gathering how to connect to computer networks.</li> </ul>	<p><b>Suggested Assessment Methods:</b></p> <ul style="list-style-type: none"> <li>• Projects, oral questions, aural questions, written tests, observation, interviews, practical assignments</li> </ul>
<p><b>Suggested Learning Resources:</b></p> <ul style="list-style-type: none"> <li>• Digital devices, reference materials, productivity tools, computer software (OS, Utility software and Application programs), computer hardware, manila papers, Internet, video, audio clips, adaptable locally available materials, models, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces, weighted pens/pencils, slanting/adjustable tables</i></li> <li>• <b>Other related service providers:</b> <i>physiotherapists, occupational therapists, nurses, doctors, learner support assistant</i></li> </ul>	

<b>Suggested Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Identifying four available computer networks in the immediate environment.	Giving examples, identifies four available computer networks in the immediate environment.	Identifies four available computer networks in the immediate environment.	Identifies three available computer networks in the immediate environment.	Names two available computer networks in the immediate environment.
Connecting to the available computer networks in the immediate environment.	Demonstrates the procedure of connecting to the available computer networks in the immediate environment.	Connects to the available computer networks in the immediate environment.	Locates the available computer networks in the immediate environment.	Recognises the available computer networks in the immediate environment.
Using the available computer networks in the immediate environment.	Experiments on use of available computer networks in the immediate environment.	Uses the available computer networks in the immediate environment.	Gives examples of the available computer networks in the immediate environment.	Cites available computer networks in the immediate environment.



Sharing resources through computer networks in the immediate environment.	Develops resources to share through computer networks in the immediate environment.	Shares resources through computer networks in the immediate environment.	Gives examples of resources shared through computer networks in the immediate environment.	States resources shared through computer networks in the immediate environment.
---	---	--	--	---

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
<b>3.0 Computer Networks</b>	<b>3.3 Internet Concepts (4 Lessons)</b>	<p><b>By the end of the sub strand, the learner should be able to:</b></p> <ul style="list-style-type: none"> <li>a) describe the internet as a resource that runs on a global network of computers</li> <li>b) explain benefits and challenges of internet in the immediate environment</li> <li>c) explore ways of overcoming challenges of internet in the immediate environment</li> <li>d) identify basic requirements for internet connectivity</li> <li>e) connect to the internet to search for a topical issue</li> <li>f) appreciate the use of internet as a computer network resource.</li> </ul>	<p><b>Individually or in purposive pairs/groups, the learners are guided to:</b></p> <ul style="list-style-type: none"> <li>• Search for the meaning of the term internet and present to peers. <i>Learners with manipulation difficulties could use adapted digital devices with filter keys, key guards, larger mouse, head control input devices such as head wand to search for meaning of the term internet. Learners on positioning devices should be preferentially and appropriately positioned. Screen resolutions should be regulated for learners with photophobia and those with visual difficulties as they use the digital devices. The learning environment should be accessible and have lowered surfaces like slanting/adjustable tables for learners with short stature and those in wheelchairs. (Apply these adaptations in the subsequent learning experiences involving manipulation of ICT devices and positioning).</i></li> <li>• Debate on the benefits and challenges of the internet. <i>Learners with speech difficulties could use residual speech, point/write/type/stamp using</i></li> </ul>	<ol style="list-style-type: none"> <li>1. Why do you use internet?</li> <li>2. How do you connect to the internet?</li> </ol>





			<p><i>assistive technology such as adapted computer, multipurpose stamps, text-to-speech software or be lip read by peers/learner support assistant/teacher as they debate on the benefits and challenges of the internet. (Apply this adaptation in the subsequent learning experiences involving speech).</i></p> <ul style="list-style-type: none"> <li>• Discuss ways of overcoming challenges of the internet in the immediate environment.</li> <li>• Discuss the basic requirements for internet connectivity (Internet Service Provider (ISP), Internet software, communication media, communication device).</li> <li>• Share experiences on interaction with the internet and list the services available. <i>Learners with manipulation difficulties could use alternative functional parts of the body like the legs, assistive technology such as universal cuffs, wrist/arm braces, weighted pencils/pens or pencil/pen with grip or be assisted by peer/learner support assistant/teacher to list internet services available.</i></li> <li>• In turns select service available in the internet and use it to search for a relevant topical issue.</li> <li>• Use the internet to search for a topical issue.</li> </ul>	
<p><b>Core competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>• Citizenship as learners connects and shares ideas worldwide through the internet.</li> <li>• Digital Literacy as learners accesses internet and searches for a relevant topical issue.</li> </ul>				



<p><b>Pertinent and Contemporary Issues (PCIs):</b></p> <ul style="list-style-type: none"> <li>Peer Education as learners share experiences on the use of the internet to search for a topical issue.</li> </ul>	<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>Respect as learners accommodate others' views when debating on the benefits and challenges of internet.</li> </ul>
<p><b>Link to other subjects:</b></p> <ul style="list-style-type: none"> <li>Social Studies as learners connects to and uses the internet to search for a relevant topical issue.</li> </ul>	
<p><b>Suggested Non-Formal Activities:</b></p> <ul style="list-style-type: none"> <li>Debate on the responsible use of internet during clubs.</li> </ul>	<p><b>Suggested Assessment Methods:</b></p> <ul style="list-style-type: none"> <li>Projects, oral questions, aural questions, written tests, observation, interviews, practical assignments</li> </ul>
<p><b>Suggested Learning Resources:</b></p> <ul style="list-style-type: none"> <li>Digital devices, reference materials, productivity tools, computer software (OS, Utility software and Application programs), computer hardware, manila papers, Internet, video, audio clips, adaptable locally available materials, models, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces, weighted pens/pencils, slanting/adjustable tables</i></li> <li><b>Other related service providers:</b> <i>physiotherapists, occupational therapists, nurses, doctors, learner support assistant</i></li> </ul>	

<b>Suggested Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Describing the internet as a resource that runs on a global network of computers.	Examines the internet as a resource that runs on a global network of computers.	Describes the internet as a resource that runs on a global network of computers.	Outlines internet as a resource that runs on a global network of computers.	Mentions the internet as a resource that runs on a global network of computers.
Explaining benefits and challenges of internet in the immediate environment.	Investigates benefits and challenges of internet in the immediate environment.	Explains benefits and challenges of internet in the immediate environment.	Identifies benefits and challenges of internet in the immediate environment.	States benefits and challenges of internet in the immediate environment.
Identifying three basic requirements for internet	Explains three basic requirements for internet	Identifies three basic requirements for internet	Identifies two basic requirements for internet	Identifies one basic requirements for internet



connectivity.	connectivity.	connectivity.	connectivity.	connectivity.
Exploring ways of overcoming challenges of internet in the immediate environment.	Examines ways of overcoming challenges of internet in the immediate environment.	Explores ways of overcoming challenges of internet in the immediate environment.	Summarises ways of overcoming challenges of internet in the immediate environment.	Recalls ways of overcoming challenges of internet in the immediate environment.
Connecting the internet to search for a topical issue.	Connects the internet and searches for a topical issue and assists others.	Connects the internet to search for a topical issue.	Connects the internet to search for a topical issue with hints.	Assisted to connect the internet to search for a topical issue.

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
<b>3.0 Computer Networks</b>	<b>3.4 World Wide Web (WWW)</b> <b>(5 Lessons)</b>	<b>By the end of the sub strand, the learner should be able to:</b> a) explain the importance of WWW as used in computer networks b) identify the features of a web browser c) describe the components of a uniform resource locator (URL) used to access resources in the internet d) use a web browser to locate resources in the WWW e) appreciate the use of WWW as a repository of information.	<b>Individually or in purposive pairs/groups, the learners are guided to:</b> <ul style="list-style-type: none"> <li>Use available learning resources to search for the meaning of the terms World Wide Web (WWW), web browsers, uniform resource locator (URL). <i>Learners with manipulation difficulties could use other functional parts of the body, assistive technologies such as adapted digital devices with filter keys/key guards, larger mouse, head control input devices such as head wand to search for meaning of the term WWW, web browsers, uniform resource locator (URL). Screen resolutions should be regulated for learners with photophobia and those with visual difficulties as they use the digital devices. (Apply this adaptation in the subsequent learning experiences involving manipulation of ICT devices).</i></li> </ul>	<ol style="list-style-type: none"> <li>How do you access internet resources?</li> <li>Why do you use a web browser?</li> </ol>



			<ul style="list-style-type: none"> <li>• In turns discuss examples of web browsers (explorer, Firefox, Chrome, Netscape, Opera, Safari). <i>Learners with speech difficulties could use residual speech, point/write/type/stamp using assistive technology such as adapted computer, multipurpose stamps, text-to-speech software or be lip read by peers/learner support assistant/teacher to discuss examples of web browsers. (Apply this adaptation in the subsequent learning experiences involving speech).</i></li> <li>• Launch and navigate a web browser to identify its features.</li> <li>• Take turns to write URL format; protocol://hostname/other information</li> <li>• Participate in giving examples of URL.</li> <li>• Type a web resource Uniform Resource Locator (URL), and discuss its components.</li> <li>• Take turns to demonstrate how web browsers work. <i>Learners on positioning devices such as those using prone standers, strapping and splinting should be preferentially and appropriately positioned to have a clear view of the demonstration. The learning environment should be accessible and have lowered surfaces like slanting/adjustable tables.</i></li> <li>• Practice using a web browser to locate relevant internet resources.</li> </ul>	
<p><b>Core competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>• Learning to learn as learners uses the acquired knowledge, skills and attitude to search for relevant resources using a web browser.</li> <li>• Digital Literacy as learners develops connecting skill when using a web browser to search for and share information.</li> </ul>				



<b>Pertinent and Contemporary Issues (PCIs):</b> <ul style="list-style-type: none"> <li>Global citizenship as learners connects to the rest of the world through WWW.</li> </ul>	<b>Values:</b> <ul style="list-style-type: none"> <li>Peace as learners take turns to demonstrate how web browsers work.</li> <li>Responsibility as learners uses a web browser to locate resources.</li> </ul>
<b>Link to other subjects:</b> <ul style="list-style-type: none"> <li>Life Skills Education as learners use a web browser to search for relevant topical issues.</li> </ul>	
<b>Suggested Non-Formal activities:</b> <ul style="list-style-type: none"> <li>Demonstrates how web browsers work to congregations of peers.</li> </ul>	<b>Suggested Assessment Methods:</b> <ul style="list-style-type: none"> <li>Projects, oral questions, aural questions, written tests, observation, interviews, practical assignments.</li> </ul>
<b>Suggested Learning Resources:</b> <ul style="list-style-type: none"> <li>Digital devices, reference materials, productivity tools, computer software (OS, Utility software and Application programs), computer hardware, manila papers, Internet, video, audio clips, adaptable locally available materials, models, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces, weighted pens/pencils, slanting/adjustable tables</i></li> <li><b>Other related service providers:</b> <i>physiotherapists, occupational therapists, nurses, doctors, learner support assistant</i></li> </ul>	

<b>Suggested Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Explaining the importance of WWW as used in computer networks.	Examines the importance of WWW as used in computer networks.	Explains the importance of WWW as used in computer networks.	Recognises the importance of WWW as used in computer networks.	Comments on the importance of WWW as used in computer networks.
Identifying three features of a web browser.	Discusses three features of a web browser.	Identifies three features of a web browser.	Labels two features of a web browser.	Lists two features of a web browser.
Describing the components of a uniform resource locator (URL).	Interprets the components of a uniform resource locator (URL).	Describes the components of a uniform resource locator (URL).	Identifies the components of a uniform resource locator (URL).	Mentions the components of a uniform resource locator (URL).
Using a web browser to locate resources in the WWW.	Uses a web browser to locate and download resources in the WWW.	Uses a web browser to locate resources in the WWW.	Uses a web browser to locate resources in the WWW with hints.	Assisted to use a web browser to locate resources in the WWW.



## STRAND 4.0: COMPUTER PROGRAMMING

Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
<b>4.0 Computer Programming</b>	<b>4.1 Computer Programming Concepts</b>  (3 Lessons)	<b>By the end of the sub strand, the learner should be able to:</b> a) explain the importance of programming as used in computing b) identify areas where computer programs are used in daily life c) launch and interact with a computer program for awareness d) appreciate using computer programs in performing daily life activities.	<b>Individually or in purposive pairs/groups, the learners are guided to:</b> <ul style="list-style-type: none"> <li>Use available learning resources to search for the meaning of the term programming and programs. <i>Learners with manipulation difficulties could use adapted digital devices with filter keys/key guards, larger mouse, head control input devices such as head wand to search for meaning of the term programming and programs. Screen resolutions should be regulated for learners with photophobia and those with visual difficulties as they use the digital devices. (Apply this adaptation in the subsequent learning experiences involving manipulation of ICT devices).</i></li> <li>Discuss the importance of computer programs. <i>Learners with speech difficulties could use residual speech, point/write/type/stamp using assistive technology such as adapted computer, multipurpose stamps, text-to-speech software or be lip read by peers/learner support assistant/teacher to discuss importance of computer programs. (Apply this adaptation in the subsequent learning experiences involving speech).</i></li> <li>Take turns to discuss areas where computer programs are used in daily life and list them. <i>Learners with manipulation difficulties such as those with fine motor skills could use</i></li> </ul>	<ol style="list-style-type: none"> <li>Why do computers have programs?</li> <li>How do you use computer programs?</li> </ol>



			<p><i>alternative functional parts of the body like the legs, assistive technology such as universal cuffs, wrist/arm braces, weighted pencils/pens, pencil/pen with grip or be assisted by peer/learner support assistant/teacher to list areas where computer programs are used in daily life. (Apply this adaptation in the subsequent learning experiences involving manipulation).</i></p> <ul style="list-style-type: none"> <li>• Share ideas on the use of programming in daily life activities.</li> <li>• Start and interact with a computer program accessory such as a computer game, calculator, paint, snipping tool, media player and notepad.</li> <li>• Share experiences on performing daily life activities (playing computer games, listening to music, performing mathematical operations, drawing objects, type text) using available computer programs accessories.</li> </ul>	
<p><b>Core competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>• Learning to Learn as learners launch and interact with a computer program for exposure to programming.</li> <li>• Communication and Collaboration as learners share ideas on the use of programming in daily life activities.</li> </ul>				
<p><b>Pertinent and Contemporary Issues (PCIs):</b></p> <ul style="list-style-type: none"> <li>• Self-esteem as learners launches and interacts with computer programs.</li> </ul>			<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>• Unity as learners share ideas on the use of programming in daily life.</li> </ul>	
<p><b>Link to other subjects:</b></p> <ul style="list-style-type: none"> <li>• Integrated Science as learners interacts with computer programs.</li> <li>• Visual Arts as learners play computer games and draws objects using computer program accessories.</li> </ul>				
<p><b>Suggested Non-Formal Activities:</b></p> <ul style="list-style-type: none"> <li>• Share experience with the school community on how to perform daily life activities (playing computer games, listening to music, performing</li> </ul>			<p><b>Suggested Assessment Methods:</b></p> <ul style="list-style-type: none"> <li>• Projects, oral questions, aural questions, written tests, observation, interviews, practical assignments</li> </ul>	



mathematical operations, drawing objects, type text) using available computer program accessories.	
<p><b>Suggested Learning Materials:</b></p> <ul style="list-style-type: none"> <li>Digital devices, reference materials, productivity tools, visual programming tools, computer software (OS, Utility software and Application programs), computer hardware, manila papers, Internet, video, audio clips, adaptable locally available materials, models, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces, weighted pens/pencils, slanting/adjustable tables</i></li> <li><b>Other related service providers:</b> <i>physiotherapists, occupational therapists, nurses, doctors, learner support assistant</i></li> </ul>	

<b>Suggested Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Explaining the importance of programming as used in computing.	Assesses the importance of programming as used in computing.	Explains the importance of programming as used in computing.	Recognises the importance of programming as used in computing.	Lists the importance of programming as used in computing.
Identifying areas where computer programs are used in daily life.	Describes areas where computer programs are used in daily life.	Identifies areas where computer programs are used in daily life.	Outlines areas where computer programs are used in daily life.	Names areas where computer programs are used in daily life.
Launching and interacting with a computer program for exposure to programming.	Plans, launches and interacts with a computer program for exposure to programming.	Launches and interacts with a computer program for exposure to programming.	Launches a computer program for exposure to programming.	Assisted to launch a computer program for exposure to programming.





Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
<b>4.0 Computer Programming</b>	<b>4.2 Visual Programming Concepts</b>  <b>(3 Lessons)</b>	<p><b>By the end of the sub strand, the learner should be able to:</b></p> <ul style="list-style-type: none"> <li>a) identify types of visual programming applications for use</li> <li>b) explain the procedure of launching a visual programming application</li> <li>c) launch a visual programming application in a computer</li> <li>d) navigate a visual programming application interface</li> <li>e) appreciate the role of visual programming applications in different situations.</li> </ul>	<p><b>Individually or in purposive pairs/groups, the learners are guided to:</b></p> <ul style="list-style-type: none"> <li>• Use available resources to search for the meaning of the term visual programming. <i>Learners with manipulation difficulties could use universal cuffs, adapted digital devices with accessibility features such as expanded keyboards with sticky keys, key guards, embedded trackball and touchpads, head operated optical/ergonomic mouse, head/mouth pointers, speech to text software to search for meaning of the term visual programming. Screen resolutions should be regulated for learners with photophobia and those with visual difficulties as they use the digital devices. Learners on positioning devices should be preferentially and appropriately positioned. Tables/working tops/surfaces should be lowered for learners with short stature. (Apply these adaptations in the subsequent learning experiences involving manipulation of ICT devices and positioning).</i></li> <li>• Discuss and list examples of visual programming applications used in computer programming. <i>Learners with speech difficulties could use residual speech, write/type/sign/stamp/point using</i></li> </ul>	<ol style="list-style-type: none"> <li>1. Why do you use visual programming applications?</li> <li>2. How do you launch visual programming application?</li> </ol>



			<p><i>assistive technology such as universal communication board, communication wheels, text to speech software or be lip-read by peers/learner support assistant/teacher to discuss visual programming applications. (Apply this adaptation in the subsequent learning experiences involving speech).</i></p> <ul style="list-style-type: none"> <li>• Discuss the procedure of launching a visual programming application.</li> <li>• Consult a computer resource person to demonstrate how to launch visual programming applications used in computer programming. <i>Learners using mobility devices and those with short stature should be given preferential sitting positions for a clear view of the demonstrations. (Apply this adaptation in the subsequent learning experiences involving visibility).</i></li> <li>• Launch a visual programming application such as Microsoft MakeCode, Scratch, Code.org, Sprite box.</li> <li>• Share experiences on navigating the visual programming application interface with peers.</li> </ul>	
<p><b>Core competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>• Self-efficacy as learners navigates a visual programming application interface.</li> <li>• Learning to Learn as learners launch and interacts with a visual programming application.</li> </ul>				
<p><b>Pertinent and Contemporary Issues (PCIs):</b></p> <ul style="list-style-type: none"> <li>• Peer Education as learners consults a computer specialist to demonstrate</li> </ul>			<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>• Peace as learners calmly share experiences on navigating the</li> </ul>	



how to launch visual programming applications used in computer programming.	visual programming application interface with peers.			
<b>Link to other subjects:</b>				
<ul style="list-style-type: none"> <li>Pre-Technical Studies as learners follow instructions when launching visual programming applications used in computer programming.</li> </ul>				
<b>Suggested Non-formal Activities:</b>			<b>Suggested Assessment Methods:</b>	
<ul style="list-style-type: none"> <li>Demonstrate how to navigate the visual programming application interface to peers during clubs.</li> </ul>			<ul style="list-style-type: none"> <li>Projects, oral questions, aural questions, written tests, observation, interviews, practical assignments.</li> </ul>	
<b>Suggested Learning Resources:</b>				
<ul style="list-style-type: none"> <li>Digital devices, reference materials, productivity tools, visual programming tools, computer software (OS, Utility software and Application programs), Internet, video, audio clips, adaptable locally available materials, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces, weighted pens/pencils, slanting/adjustable tables</i></li> <li><b>Other related service providers:</b> <i>physiotherapists, occupational therapists, nurses, doctors, learner support assistant</i></li> </ul>				
<b>Suggested Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Identifying three types of visual programming applications for use.	Describes three types of visual programming applications for use.	Identifies three types of visual programming applications for use.	Identifies two types of visual programming applications for use.	Identifies one type of visual programming applications for use.
Explaining the procedure of launching a visual programming application.	Demonstrates the procedure of launching a visual programming application.	Explains the procedure of launching a visual programming application.	Outlines the procedure of launching a visual programming application.	Attempts to outline the procedure of launching a visual programming application.
Launching a visual programming application in a computer	Experiments on the launching of a visual programming application in a computer.	Launches a visual programming application in a computer.	Gives a summary of launching a visual programming application in a computer.	Repeats launching a visual programming application in a computer.
Navigating a visual programming application interface.	Demonstrates how to navigate a visual programming application interface.	Navigates a visual programming application interface.	Explains how to navigate a visual programming application interface.	Repeats steps used to navigate a visual programming application interface.



Strand	Sub Strand	Specific Learning Outcomes	Suggested Learning Experiences	Key Inquiry Questions
4.0 Computer Programming	4.3 Visual Programming Features  (9 Lessons)	<p><b>By the end of the sub strand, the learner should be able to:</b></p> <ul style="list-style-type: none"> <li>a) explore features of a visual programming application</li> <li>b) relate the features of a visual programming application to their function</li> <li>c) describe terminologies used in a visual programming application</li> <li>d) use the features of a visual programming application to create a sequence of instructions</li> <li>e) enjoy applying features of a visual programming application to create a sequence of instructions.</li> </ul>	<p><b>Individually or in purposive pairs/groups, the learners are guided to:</b></p> <ul style="list-style-type: none"> <li>• Discuss the features of a visual programming application. <i>Learners with speech difficulties could use residual speech, write/type/sign/stamp/point using assistive technology such as universal communication board, communication wheels, text to speech software or be lip-read by peers/learner support assistant/teacher to discuss features of a visual programming application. (Apply this adaptation in the subsequent learning experiences involving speech).</i></li> <li>• Discuss the functional features of a visual programming application.</li> <li>• Match the features of a visual programming application to their functions. <i>Learners with manipulation difficulties could use alternative functional parts of the body like the legs, assistive technology such as universal cuffs, wrist/arm braces, weighted pencils/pens, pencil/pen with grips or be assisted by peer/learner support assistant/teacher to match visual programming applications to their functions. (Apply this adaptation in the subsequent learning experiences involving manipulation).</i></li> <li>• Discuss and demonstrate the use of visual programming terms (reserved words, syntax, variables, input/output statements, control</li> </ul>	<ol style="list-style-type: none"> <li>1. Why is visual programming popular in introducing computer programming?</li> <li>2. How do you use visual programming application features?</li> </ol>



			<p>structures, variable declarations). <i>Learners using mobility devices and those with short stature should be given preferential sitting positions for a clear view of the demonstrations. (Apply this adaptation in the subsequent learning experiences involving visibility).</i></p> <ul style="list-style-type: none"> <li>• Create a sequence of actions using the features of a visual programming application (animations, sound).</li> <li>• Share experiences on the use of the features of a visual programming application.</li> </ul>	
<p><b>Core competencies to be developed:</b></p> <ul style="list-style-type: none"> <li>• Learning to learn as learners share experiences on the use of the features of a visual programming application.</li> <li>• Creativity and Imagination as learners create animations and sounds using the features of a visual programming application.</li> </ul>				
<p><b>Pertinent and Contemporary Issues (PCIs):</b></p> <ul style="list-style-type: none"> <li>• Sustainable consumption as learners use features of visual programming application to create animations and sound.</li> </ul>			<p><b>Values:</b></p> <ul style="list-style-type: none"> <li>• Unity as learners discuss features of the visual programming application with peers.</li> </ul>	
<p><b>Link to other subjects:</b></p> <ul style="list-style-type: none"> <li>• Pre-Technical Studies as learners uses the features of visual programming applications to create animations and sounds.</li> </ul>				
<p><b>Suggested Non-Formal Activities:</b></p> <ul style="list-style-type: none"> <li>• Create a sequence of actions using the features of a visual programming application (animations, sound) during club activities.</li> </ul>			<p><b>Suggested Assessment Methods:</b></p> <ul style="list-style-type: none"> <li>• Projects, oral questions, aural questions, written tests, observation, interviews, practical assignments</li> </ul>	
<p><b>Suggested Learning Resources:</b></p> <ul style="list-style-type: none"> <li>• Reference materials, productivity tools, visual programming tools, computer software, computer hardware, Internet, video, audio clips, adaptable locally available materials, models, <i>adapted digital devices with antiglare screens, key guards, filter keys, larger mouse, head/mouth pointers, universal communication boards, communication wheels, heavy gauge papers, universal cuffs, wrist/arm braces, weighted pens/pencils, slanting/adjustable tables</i></li> <li>• <b>Other related service providers:</b> <i>physiotherapists, occupational therapists, nurses, doctors, learner support assistant</i></li> </ul>				



<b>Suggested Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Exploring features of a visual programming application.	Analyses the features of a visual programming application.	Explores features of a visual programming application.	Describes features of a visual programming application.	Identifies features of a visual programming application.
Relating the features of a visual programming application to their function.	Develops logical argument on features of a visual programming application to their function.	Relates the features of a visual programming application to their function.	Recognises features of a visual programming application to their function.	Names features of a visual programming application.
Describing terminologies used in a visual programming application.	Analyses terminologies used in a visual programming application.	Describes terminologies used in a visual programming application.	Defines terminologies used in a visual programming application.	Recalls terminologies used in a visual programming application.
Using the features of a visual programming application to create a sequence of instructions.	Demonstrates using the features of a visual programming application to create a sequence of instructions.	Uses the features of a visual programming application to create a sequence of instructions.	Describes features of a visual programming application used to create a sequence of instructions.	Relates features of a visual programming application to a sequence of instructions.



## COMMUNITY SERVICE LEARNING CLASS ACTIVITY

Community Service Learning (CSL) is an experiential learning strategy that integrates classroom learning and community service to enable learners reflect, experience and learn from the community. The CSL project is expected to benefit the learner, the school and local community. Knowledge and skills on how to carry out a CSL project have been covered in Life Skills Education (LSE).

All learners with physical impairment in Grade 7 will be expected to participate in a CSL class activity. The activity will give learners an opportunity to practise the CSL Project skills covered under LSE. This activity will be undertaken in groups where learners with physical impairment will be purposively grouped to complement each other. Learners will be expected to apply the steps provided to carry out the CSL project.

The activity will take the form of a whole school approach, where the entire school community will be engaged in the learning process. Teachers will guide learners with physical impairment to execute a simple school based CSL class activity. This activity can be done in 4 to 6 weeks outside the classroom time. The duration may be adjusted accordingly to accommodate learners with physical impairment who may require more time to implement the CSL project.

### CSL Skills to be covered

- i) **Research:** Learners will develop research skills as they investigate PCIs to address, ways and tools to use in collecting data, analysing information and presenting their findings.
- ii) **Communication:** Learners will develop effective communication skills as they engage with peers and school community members. These will include listening actively, asking questions, and presentation skills using varied modes.
- iii) **Citizenship:** Learners will be able to explore opportunities for engagement as members of the school community and provide a service for the common good.
- iv) **Leadership:** Learners will develop leadership skills as they take up various roles within the CSL activity.
- v) **Financial Literacy Skills:** Learners will consider how to source and utilise resources effectively and efficiently.
- vi) **Entrepreneurship:** Learners will consider ways of generating income through innovation for the CSL class activity.



Suggested PCIs	Specific Learning Outcomes	Suggested Learning Experiences (Customise to the focus of the grade)	Key Inquiry Questions
<p>Learners will be guided to consider the various PCIs provided in the subject in Grade 7 and choose one suitable to their context and reality</p>	<p>By the end of the CSL class activity, the learner should be able to:</p> <ol style="list-style-type: none"> <li>identify a problem in the school community through research;</li> <li>develop a plan to solve the identified problem in the community</li> <li>design solutions to the identified problem</li> <li>implement solution to the identified problem</li> <li>share the findings to relevant actors</li> <li>reflect on own learning and relevance of the project</li> <li>appreciate the need to belong to a community.</li> </ol>	<p><b>The learners are guided in purposive pairs or groups to:</b></p> <ul style="list-style-type: none"> <li>brainstorm on pertinent and contemporary issues in the community that need attention and share in class. <i>Learners with speech difficulties could be lip-read by peers, teacher, learner support assistant as they use residual speech or sign, point, write, use multipurpose communication board, speech generating device, eye tracking device or be allowed extra time to express their views. (Apply this adaptation to subsequent learning experiences involving use of speech).</i></li> <li>discuss various PCIs within the school community and identify the one that requires immediate attention giving reasons for their choice.</li> <li>discuss possible solutions to the identified issue and propose the most appropriate solution to the problem.</li> <li>brainstorm on the resources needed for the activity and source for them.</li> <li>discuss different methods and tools of collecting data and determine the ones suitable for the selected project.</li> <li>develop appropriate tools (<i>Questionnaires, interview schedule, observation checklist</i>) for collecting data with the guidance of the teacher. <i>Learners with manipulation difficulties could be provided with adapted writing materials such as pen/pencils with grip, weighted pens/pencils or writing claws. They could type on tablet or be assisted by a scribe or learner support assistant to develop their tools.</i></li> <li>collect data and record findings. Learners with mobility difficulties could collect data remotely or be supported by peers and learner support assistant during data collection. Apply the adaptation on manipulation above here.</li> </ul>	<ol style="list-style-type: none"> <li>How does one determine community needs?</li> <li>Why is it necessary to be part of a community?</li> </ol>





		<ul style="list-style-type: none"> <li>● discuss their findings, develop various reporting documents and use them to report on their findings. <i>Apply adaptation on the use of speech and manipulation in this experience.</i></li> <li>● implement a project to get solutions to the identified problem based on the research report. <i>Apply adaptation on the use of speech, manipulation and mobility in this experience. Ensure the safety of the learners as they manipulate the tools, materials, equipment and as they explore the environment.</i></li> <li>● use feedback from peers and the school community to improve on the implementation of the project.</li> <li>● discuss the successes, challenges faced while implementing the project activities and lessons learnt; write a report and share through various media to peers and the school community. <i>Apply adaptation on the use of speech and writing above. Learners with manipulation difficulties could be provided with adapted digital resources with appropriate accessibility features or be supported by peers, learner support assistant or teacher to manipulate the digital resources. Light intensity should be controlled for learners with epilepsy and those with visual impairment.</i></li> <li>● reflect on how the project enhanced learning while at the same time facilitating service to the school by providing solutions to the identified issue(s).</li> </ul>	
--	--	---	--



<b>Assessment Rubric</b>				
<b>Criteria</b>	<b>Exceeds Expectation</b>	<b>Meets Expectation</b>	<b>Approaches Expectation</b>	<b>Below Expectation</b>
Identifying a pertinent issue in school the community to be addressed.	Gives Justification for the identified pertinent issue in the school community to be addressed.	Identifies a pertinent issue in the school community to be addressed.	States a pertinent issue in the school community to be addressed.	Recalls a pertinent issue discussed in class.
Planning to solve the identified issue.	Designs and develops a step-by-step plan of the activities to be carried out in the process of solving the problem.	Plans to solve the identified issue.	Outlines a plan to solve the identified problem.	States activities to be included in a plan to solve the identified problem.
Designing and implementing solutions to the identified problem.	Designs, analyses and implements solutions to the identified problem.	Designs and implements solutions to the identified problem.	Designs solutions to the identified problem.	Suggests solutions to the identified problem.

