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Prerequisite of Using the Assessment Framework

This Assessment Framework (AF) provides theory and structured conceptual map of how the learning outcomes of a programme of study should be assessed at the middle school level. It contains guidelines and principles of assessment as well as several practical examples to illustrate the application in the classroom.

The framework can be considered a blueprint of an assessment programme at the primary school level. As with all assessment frameworks, its enactment in schools and classrooms will require professional judgement guided by the following prerequisites.

Teacher and Head Teacher Development – Where needed, teachers and head teachers would require short courses on a. formative assessment, b. the progressive notions of cyclic purposeful assessment and their need in Pakistani context, and c. the importance and conduct of formative feedback, which facilitates learners' progression from lower-order thinking skills to higher-order thinking abilities. They may also need to learn how to read the curriculum maps and tables of specification to plan for authentic and valid assessment.

School Based Assessment Planning – School based yearly assessment programmes and monthly assessment schemes must be developed taking into account the principles, guidelines and examples from the AF. The framework contains schedules of assessment and assessment weightage. These need to be considered for school level planning.

School Based Mentoring – There is a need to develop mentors who can work with teachers and head teachers in the selected schools to help them translate the AF into various schools' realities. Pakistan has schools of varying systems – from public to private to madrasah; varying contexts - from rural to urban to semi-urban; varying socio-economic background – from schools for high-income group to low-income groups to middle-income groups. Therefore, mentors will be required for at least the first year of the implementation of the AF.

CHAPTER ONE

INTRODUCTION

Chapter One

Introduction

This chapter introduces the National Assessment Framework (NAF), developed as an integral component of the National Curriculum Framework (NCF). By drawing on essential information from different national policy documents and from the relevant international literature, the chapter discusses the philosophical positioning of the assessment framework. It presents a brief overview of the quality of education and the need for developing a uniform national assessment framework. It further outlines the basic structure and the principles of various forms of assessment for Computer Science grades VI to VIII.

Quality of Education

Quality as a complex and contested notion does not have a single definition; the understanding and the provisions of inputs into quality in education vary from society to society and context to context. National Curriculum Framework (NCF) (Government of Pakistan, 2018b) refers to quality of education as a set of elements containing input, process and output of the education system. Quality also entails all the desirable characteristics of learners, processes, learning materials, content, governance and management, and learning outcomes. Elaborating on the definition, NCF (2018b, p.1) further argues, "Quality education satisfies basic learning needs and enriches the lives of learners and their overall experience of living." Policy document on Minimum Standards for Quality of Education in Pakistan (Government of Pakistan, 2018a) refers to the definition used in Education for All (EFA) Global Monitoring Report 2005, which draws on two principles. The first principle identifies learners' cognitive development as the major explicit objective of all education systems, and the second emphasizes education's role in nurturing creative and emotional development for promoting the values and attitudes of responsible citizenship. The document on Minimum Standards for Quality of Education (2018) explains the concept of quality in terms of education that is "meaningful, relevant and responsive to the needs of individuals and the society as a whole." (Government of Pakistan, 2018c, p.5). Similarly, the National Educational Policy (NEP), 2009 recognizes six pillars of quality, which include curriculum, textbooks, assessment, teachers, learning environment and relevance of education to practical life.

The Need for an Assessment Framework

Assessment is an integral part of the quality of education offered to the students. It serves as a tool to measure outputs and outcomes of processes and practices. As such, assessment plays a central role in translating the key ideas in the quality definition into practice.

Erwin (1991) cited in NCF (Government of Pakistan, 2018b) defines assessment as:

> …the process of defining, selecting, designing, collecting, analysing, interpreting, and using information to continuously increase students' learning and development. It is the systematic collection, review and use of information about educational programmes to

> improve student learning. Assessment focuses on what students know, what they are able to do, and what values they have when they receive their education… Assessment is concerned with the collective impact of a series of lessons on student learning. (p.69)

The above definition of assessment implies that on the one hand assessment provides evidence of students' learning of academic content (academic domain) and development in other domains (psychosocial/psycho-emotional, language and affective domains). On the other hand, it supports the collection of relevant information for various purposes such as informing teaching and learning, determining students' progress on an ongoing basis, measuring achievement, and providing information needed for monitoring individual and institutional accountability. These all lead to informed decision-making about improving students' learning outcomes and enhance the overall quality of education focusing on efforts at classroom, school and system levels.

NCF (Government of Pakistan, 2018b), emphasises the need to develop a variety of assessment mechanisms to assess students' competence as per curricula and the SLOs. A robust and coherent national assessment system can help in the realization of the aims, goals and purposes of education articulated in NCF and other policy documents. This can be achievable with the help of a comprehensive and coherent national assessment framework to guide and support education systems, schools and teachers in bringing about improvement in student assessment on a sustainable basis.

The Purpose of Developing Assessment Framework

The purpose of developing an assessment framework is to ensure the standardized implementation of different forms of assessment that includes formative and summative school-based classroom assessments and large-scale assessment. It encompasses a paradigm shift from the traditional ways of assessing to a competency-based assessment considering the implication for its utility, reliability and practicality in different contexts. Underpinning different purposes of assessments, the framework serves as guidance for all the stakeholders in the learning system in developing, implementing and using assessments methodically to instate stronger teaching and learning practices.

The above discussion signifies that the assessment needs to be purposeful. It is a broad process of collecting, synthesizing and interpreting information to support student learning and to report on the amount learned. The supporting function is known as formative assessment and the reporting function is known as summative assessment (as shown below).

Assessment Type	Formative	Summative
	Looking back and preparing forward. **Feeding back and feeding forward.**	**Feeding back. Providing a Snapshot.**
Assessment Objectives & Outcomes	**Assessment *as* and *for* Learning**	**Assessment *of* Learning**
	Focusing on constructive feedback from the teacher and on developing students' capacity to self-assess and to reflect on their learning to improve their future learning and understanding.	**Making judgments about what the student has learned in relation to the teaching and learning goals; should be comprehensive and reflect the learning growth over the time period being assessed.**

Note. Adapted from Chappuis and Stiggins, 2017

The Purpose of Developing Computer Science Assessment Framework

The computer science curriculum is intended to develop the ICT abilities of learners to meet the socio-economic needs of Pakistan, and to keep at pace with the world's on-going rapid advancement. The main goal of curriculum is to create lifelong learners who are responsible, reflective, innovative, engaged and independent. It will help learners to be confident, creative, ethical, and effective users of latest technologies in addition to acquiring the knowledge, skills and attitudes required to cope with the changing world. The computer science curriculum focuses on skill-based assessment instead of using the traditional method that promotes rote learning.

Aligned with the Computer Science curriculum, the computer science Assessment Framework is developed to provide different forms of formative and summative assessment along with the purpose with which each assessment is being introduced.

Computer Science Framework is constructed in the form of tasks that involve taking into account the developmental levels of students. The computer science Framework is multi-dimensional. It is concerned with the development of skills like ICT skills, problem solving, communication, creativity, teamwork and collaborative skills, self-reliance, ability to analyse, synthesize, evaluate, and question. It further entails competency wise weightage of all the grade levels. It will also present a table of specification along with the structure of formative and summative assessment, schedule of assessment and guidelines for providing feedback for improving performance.

The framework also provides samples/examples of selected and constructed items, and creative summative and formative assessments including marking guidelines, examples of authentic tasks and rubrics as well as examples of effective feedback.

The Cyclic Assessment

Purposeful assessment is cyclic. There are many versions of cyclic assessment. The one presented here is adapted from Margaret Heritage's model cited in Greenstein (2016).

The cyclic model illustrates how purposeful assessment systematically supports learning by tracking and enhancing student growth towards standards following the seven steps. The seven-step model will be unpacked in the subsequent sections of the framework.

CHAPTER TWO

PRE-ASSESSMENT

Chapter Two

Pre-Assessment

Curriculum Mapping: A Pre-Assessment Strategy

An important consideration in assessment is how well students have mastered the SLOs, what knowledge, skills, and attitudes they have acquired in a particular learning area during an academic year and where they are expected to be at the end of teaching and learning (Greenstein, 2016). The first stage in planning for assessment is, therefore, to develop curriculum maps illustrating the alignment between the SLOs for Computer science acquisition for grades VI-VIII with the various domains of knowledge, skills and attitudes using pre-specified criteria based on Bloom's taxonomy (see Appendices A, B & C).

The detailed curriculum maps have been developed for Computer Science grades VI-VIII and are attached as appendices from Appendices D to F. Curriculum mapping is based on Bloom's Cognitive, Affective and Psychomotor Domains. The following levels were used in each of the three domains:

The Cognitive Domain comprises six (06) cognitive dimensions, namely remember, understand, apply, analyse, evaluate, create and four (04) knowledge dimensions namely factual, conceptual, procedural, and metacognitive. **The Affective Domain** comprises five (05) dimensions comprising receiving, responding, valuing, organizing and characterizing. **The Psychomotor Domain** comprises seven (07) dimensions namely, perception, set, guided response, mechanism, complex overt response, adaptation, and origination.

The description, key words and sample assessment in each dimension are given in Appendices A, B and C. The sources from where the description and examples have been taken are also given underneath the tables in the different appendices.

Curriculum maps were used for the following four purposes:

- Develop topic wise or competency wise weightage
- Develop tables of specifications based on the weightage
- Group SLOs in terms of knowledge, skills and attitudes they are trying to develop
- Develop assessment codes

The following section presents Tables of Specifications followed by List of Assessment Codes, SLOs and Assessment Strategies.

Tables of Specification

Tables of specifications were prepared for each grade levels to align student-learning outcomes with key competencies or instruction units and calculate the number of assessed items.

Grade VI

Total Percentage Share of the Three Domains for Computer Science

Domains	Share in Percentage
Cognitive	59%
Affective	9%
Psychomotor	32%

Weightage of each Domain

No	Domain	Cognitive	Affective	Psychomotor	Weightage
1	Domain A: ICT Fundamentals	7%	-	-	7%
2	Domain B: Digital Skills	17%	-	14%	31%
3	Domain C: Algorithmic Thinking and Problem Solving	8%	-	4%	12%
4	Domain D: Programming	14%	-	9%	23%
5	Domain E: Digital Citizenship	9%	5%	5%	19%
6	Domain F: Entrepreneurship in Digital Age	4%	4%	-	8%
	Total (100%)	59%	9%	32%	100%

Table of Specification

Competency Learning Domain	Domain A: (14%)	Domain B: (28%)	Domain C: (13%)	Domain D: (23%)	Domain E: (15%)	Domain F: (7%)	Total 100 %
Cognitive Domain							
Remember (4%)	-	2	-	1	1	-	4
Understand (23%)	3	6	3	6	3	2	23
Apply (18%)	2	5	3	4	3	1	18
Analyse (5%)	1	1	1	1	1	-	5
Evaluate (-)	-	-	-	-	-	-	-
Create (9%)	1	3	1	2	1	1	9
Affective Domain							
Receiving (5%)	1	1	1	1	1		5
Responding (4%)	1	1	-	1		1	4
Psychomotor Domain							

Set (5%)	1	1	1	1	1	-	5
Guided Response (27%)	4	8	3	6	4	2	27
Total (100%)	14	28	13	23	15	7	100

Grade VII

Total Percentage Share of the Three Domains for Computer Science

Domains	Share in Percentage
Cognitive	50%
Affective	14%
Psychomotor	36%

Weightage of Each Domain

No	Domain	Cognitive	Affective	Psychomotor	Weightage
1	Domain A: ICT Fundamentals	8%	-	5%	13%
2	Domain B: Digital Skills	9%	-	9%	18%
3	Domain C: Algorithmic Thinking and Problem Solving	8%	5%	10%	23%
4	Domain D: Programming	12%	5%	12%	29%
5	Domain E: Digital Citizenship	3%	4%	-	7%
6	Domain F: Entrepreneurship in Digital Age	10%	-	-	10%
	Total (100%)	50%	14%	36%	100

Table of Specification

Competency Learning Domain	Domain A: (13%)	Domain B: (18%)	Domain C: (23%)	Domain D: (28%)	Domain E: (8%)	Domain F: (10%)	Total 100 %
Cognitive Domain							
Remember (5%)	1	1	1	1	-	1	5
Understand (9%)	1	2	2	2	1	1	9
Apply (27%)	4	4	4	7	2	6	27
Analyse (5%)	1	1	1	1	-	1	5
Evaluate (4%)	1	1	-	1	-	1	4
Affective Domain							

Responding (9%)	-	-	5	4	-	-	9
Valuing (5%)	-	-	-	-	5	-	5
Psychomotor Domain							
Perception (5%)	5	-	-	-	-	-	5
Guided Response (31%)	-	9	10	12	-	-	31
Total (100%)	13	18	23	28	8	10	100

Grade VIII

Total Percentage Share of the Three Domains for Computer Science

Domains	Share in Percentage
Cognitive	46%
Affective	15%
Psychomotor	39%

Weightage of Each Domain

No	Domain	Cognitive	Affective	Psychomotor	Weightage
1	Domain A: ICT Fundamentals	7%	5%	8%	19%
2	Domain B: Digital Skills	8%	-	8%	16%
3	Domain C: Algorithmic Thinking and Problem Solving	9%	-	6%	15%
4	Domain D: Programming	12%	7%	9%	28%
5	Domain E: Digital Citizenship	4%	3%	-	7%
6	Domain F: Entrepreneurship in Digital Age	6%	-	8%	14%
	Total (100%)	46%	15%	39%	100

Table of Specification

Competency Learning Domains	Domain A: (20%)	Domain B: (16%)	Domain C: (15%)	Domain D: (28%)	Domain E: (7%)	Domain F: (14%)	Total 100%
Cognitive Domain							
Apply (15%)	3	3	2	4	1	2	15
Analyse (12%)	1	2	2	3	2	2	12
Evaluate (4%)	1	1	1	1	-	-	4
Create (15%)	2	2	4	4	1	2	15
Affective Domain							

Responding (12%)	**5**	**-**	**-**	**7**	**-**	**-**	**12**
Valuing (3%)	**-**	**-**	**-**	**-**	**3**	**-**	**3**
Psychomotor Domain							
Set (4%)	**1**	**1**	**-**	**1**	**-**	**1**	**4**
Guided Response (23%)	**5**	**4**	**4**	**6**	**-**	**4**	**23**
Mechanism (12%)	**2**	**3**	**2**	**2**	**-**	**3**	**12**
Total (100%)	**20**	**16**	**15**	**28**	**7**	**14**	**100**

List of Assessment Codes, SLOs and Assessment Strategies

The following processes were used to develop codes.

- The first letters of **C**ognitive Domain "C", **R**emember Cognitive Dimension "R" and **F**actual Knowledge Dimension "F" to form the overall domain code as "**CRF**". Similarly, first letters of Cognitive Domain "C", **U**nderstand Cognitive Dimension "U" and **C**onceptual Knowledge Dimension "C" were combined to form the overall domain code as "**CUC**". In this way all the overall domain codes were generated for the Cognitive Domain. The same strategy was used for the Affective and Psychomotor Domains.

- The overall domain codes were combined with SNC Reference to form specific codes for each SLO. For example, for the first SLO, "Students will be able to navigate around an Operating System (e.g. Microsoft Windows, MAC OS, Linux, Ubuntu, Android, iOS, etc.)" falling in NCP reference B-01 in CRP overall domain, the specific code of CRP B-01 was developed. The same procedure was used for developing codes for all the SLOs falling in the cognitive, affective and psychomotor domains.

- Specific assessment strategies for each of the overall domain codes suited for assessing specific SLOs were also identified.

This exercise was important to identify the specific domain code in which the SLO was falling so that a valid assessment strategy could be used for assessing each SLO. The table below presents the overall domain code, SNC reference, list of SLOs and assessment strategies for each grade level. The codes can also be used as a reference point in different types of assessments.

Codes, SLOs and Assessment Strategies

Grade VI

Cognitive Domain

Overall Domain Code	NCP Reference	SLOs	Codes	Assessment Strategies
CRP Cognitive Remember Procedural	CS-06-B-01	Students will be able to navigate around an Operating System (e.g., Microsoft Windows, MAC OS, Linux, Ubuntu, Android, iOS, etc.)	CRP B-01	MCQs, Short questions, Know Want Learn Chart, Quick Write, Practice on Computer (use an operating system, create, name, rename, and delete a file or folder, create a shortcut on desktop, cut, copy, paste a file/folder)
CUC Cognitive Understanding Conceptual	CS-06-A-01	Students will be able to recognize various ICT devices and their applications. Assessment strategy of computer programs, MCQs, Charts, real life scenario worksheet, problem analysis worksheets may be added.	CUC A-01	Matching Activities, conceptual maps, Open-Ended Questions, Paper pass, Know Want Learn Chart Assessment strategy of computer programs, MCQs, Charts, real life scenario worksheet, problem analysis worksheets, conducting research may be added for this domain.
	CS-06-A-02	Students will be able to define and differentiate between computer hardware and software	CUC A-02	
	CS-06-C-01	Students will be able to identify, define and analyse a problem	CUC C-01	
	CS-06-D-01	Students will be able to analyse the fundamentals of computer programming	CUC D-01	
	CS-06-E-01	Students will analyse the basics of information literacy and digital civility and appropriate uses of technology	CUC E-01	
CAP Cognitive Application Procedural	CS-06-B-02	Students will be able to develop and demonstrate image-processing skills (using various software tools e.g., Paint, 3D Paint, Tux, etc.), while efficiently using computer hardware (e.g., mouse, keyboard, etc.)	CAP B-02	First of Five, Group project, Matching Activities, Oral Questioning – based on how, why, what if, Muddiest (or Clearest) Point, Practice on Computer (draw a freehand drawing, draw 2D shape & 3D shape image, add text to the drawing and make a greeting card, character, or house, etc.)
	CS-06-B-03	Students will demonstrate how to navigate the internet to conduct a search query and arrive at an authentic result.	CAP B-03	
	CS-06-C-02	Students will be able to apply basic algorithmic thinking to solve different types of problems	CAP C-02	
	CS-06-E-01	Students will analyse the basics of information literacy and digital civility and appropriate uses of technology.	CAP E-01	
CANC	CS-06-A-03	Students will be able to identify and analyse (basic)	CANC A-03	Mini project, Quick write, exit tickets

Cognitive Analysis Conceptual		hardware components of a computing system (e.g., processor, memory and storage).		Classroom presentation, open ended questions matching activities may be added for this domain.
	CS-06-F-01	Students will define and analyse entrepreneurship subtypes and summarize the entrepreneurship process	CANC F-01	
CCP Cognitive Creative Procedural	CS-06-D-02	Students will be able to analyse and apply basic programming constructs (e.g., sequence, selection, repetition, variables, inputs/events); by creating simple single-sprite, single-script programs using a visual programming tool.	CCP D-02	Quiz, coding drills Mini projects may be added for this domain.
	CS-06-D-Add	**Additional SLO:** Students will be able to apply basic programming constructs (e.g., sequence, selection, repetition, variables, inputs/events); by creating simple single-sprite, single-script programs using textual programming tools(p)	CCP D-Add	

Affective Domain

Overall Domain Code	NCP Reference	SLOs	Codes	Assessment Strategies
AR Affective Receiving	CS-06-F-01	Students will define and analyse entrepreneurship subtypes and summarize the entrepreneurship process	AR F-01	Quick write, exit tickets, Presentations may be added
ARE Affective Responding	CS-06-E-01	Students will analyse the basics of information literacy and digital civility and appropriate uses of technology	ARE E-01	In class discussion, quiz Presentations may be added

Psychomotor Domain

Overall Domain Code	NCP Reference	SLOs	Codes	Assessment Strategies
PGR Psychomotor Guided Response	CS-06-B-01	[SLO: CS-06-B-01] Students will be able to navigate around an Operating System (e.g. Microsoft Windows, MAC OS, Linux, Ubuntu, Android, iOS, etc.).	PGR B-01	Practice on Computer, Assessment/Reflection, sentence prompts, quick writes, mind mapping Internet research and mini projects may be added for this whole domain.
	CS-06-B-02	[SLO: CS-06-B-02] Students will be able to develop and demonstrate image-processing skills (using various software tools e.g. Paint, 3D Paint, Tux, etc.), while efficiently using computer hardware (e.g. mouse, keyboard, etc.)	PGR B-02	

	CS-06-B-03	[SLO: CS-06-B-03] Students will demonstrate how to navigate the internet to conduct a search query and arrive at an authentic result.	PGR B-03	
	CS-06-C-02	[SLO: CS-06-C-02] Students will be able to apply basic algorithmic thinking to solve different types of problems.	PGR C-02	
	CS-06-D-02	[SLO: CS-06-D-02]Students will be able to analyse and apply basic programming constructs (e.g. sequence, selection, repetition, variables, inputs/events); by creating simple single-sprite, single-script programs using a visual programming tool.	PGR D-02	Practice on computer, coding drill, quiz
	CS-06-D-Add	[SLO: CS-06-D-Add] Additional SLO: Students will be able to apply basic programming constructs (e.g. sequence, selection, repetition, variables, and inputs/events); by creating simple single-sprite, single-script programs using textual programming tools.	PGR D-Add	

List of Codes, SLOs and Assessment Strategies

Grade VII

Cognitive Domain

Overall Domain Code	NCP Reference	SLOs	Codes	Assessment Strategies
CRC Cognitive Remember Conceptual	CS-07-A-02	Students will be able to identify (advanced) hardware components of a computing system (e.g. different types of I/O ports, different types of peripherals, and networking components).	CRCA-02	Matching Activities, conceptual maps, Open-Ended Questions, Paper pass, Know Want Learn Chart MCQs may be added for this SLO.
CUC Cognitive Understanding Conceptual	CS-07-A-01	Students will be able to identify the use of emerging technologies in various walks of life (e.g. artificial intelligence, biometrics, robotics, computer-assisted translation, 3D and holographic imaging, virtual reality, Cloud Computing, and open source software.	CUCA01	Turn and talk, research and present, short quiz, quick write MCQs and scenario-based questions may be added for this domain.
	CS-07-D-01	Students will be able to explain how computers encode and decode computer programs (i.e. identification of decimal to binary and vice versa, conversion of texts, images and sounds in binary).	CUCD-01	
CAP Cognitive Application Procedural	CS-07-B-01	Students will be able to develop and demonstrate word-processing and presentation skills (using various software tools e.g. MS Word, MS PowerPoint, Prezi, Canvas, Photo Story, Movie-maker, etc.)	CAPB-01	Group project, Matching Activities, Oral Questioning – based on how, why, what if, Problem solving, Practice on Computer, quiz Peer review and Observational assessment may be added for this domain.
	CS-07-B-02	Students will get introduced to electronic mailing systems (email) and learn appropriate usage.	CAPB-02	
	CS-07-C-01	Students will be able to apply the concept of computational thinking to handle complex problems.	CAPC-01	
	CS-07-C-02	Students will be able to apply concepts of conditional statements, finite, and infinite loops to write different algorithms.	CAPC-02	
	CS-07-D-02	Students will be able to apply fundamental programming constructs to create multi-sprite, multi-script programs using visual programming tools.	CAPD-02	
	CS-07-D-ADD	Students will be able to apply fundamental programming constructs to create multi sprite and multi-script programs using textual programming tools.	CAPD-ADD	
CANC	CS-07-F-01	Students will analyse the uses and benefits of design	CANCF-01	short answers, mind maps, matching,

Cognitive Analysis Conceptual		thinking for entrepreneurs.		(quiz) Group project may be added for this SLO
CEC Cognitive Evaluation Conceptual	CS-07-E-01	Students will identify ways to protect against malicious activities or behaviours in the digital environment.	CECE-01	Mind-maps, Matching Activities Classroom discussion followed by rubrics may be added for this SLO

Affective Domain

Overall Domain Code	NCP Reference	SLOs	Codes	Assessment Strategies
ARE Affective Responding	CS-07-C-01	Students will be able to apply the concept of computational thinking to handle complex problems.	AREC-01	Oral Questioning – based on how, why, what if.
	CS-07-D-01	Students will be able to explain how computers encode and decode computer programs (i.e., identification of decimal to binary and vice versa, conversion of texts, images and sounds in binary).	ARED-01	
AV Affective Valuing	CS-07-E-01	Students will identify ways to protect against malicious activities or behaviours in the digital environment.	AVE-01	P-E-O (Predict-Explain-Observe), mind maps, short questions Case study, discussions followed by rubrics/checklist may be added.

Psychomotor Domain

Overall Domain Code	NCP Reference	SLOs	Codes	Assessment Strategies
PP Psychomotor Perception	CS-07-A-02	Students will be able to identify (advanced) hardware components of a computing system (e.g., different types of I/O ports, different types of peripherals, and networking components).	PPA-02	Teach a friend, think pair share MCQs, Assembling/Disassembling practice, Short Answers may be added.
PGR Psychomotor Guided Response	CS-07-B-01	Students will be able to develop and demonstrate word-processing and presentation skills (using various software tools e.g., MS Word, MS PowerPoint, Prezi, Canvas, Photo Story, Moviemaker, etc.)	PGRB-01	Open ended questions, Practice on computer, mind mapping, coding drills, speed code competition, mini projects
	CS-07-B-02	Students will get introduced to electronic mailing systems (email) and learn appropriate usage.	PGRB-02	

	CS-07-C-01	Students will be able to apply the concept of computational thinking to handle complex problems.	PGRC-01	Error Analysis may be added. for this whole domain.
	CS-07-C-02	Students will be able to apply concepts of conditional statements, finite and infinite loops to write different algorithms.	PGRC-02	
	CS-07-D-02	Students will be able to apply fundamental programming constructs to create multi-sprite, multi-script programs using visual programming tools.	PGRD-02	
	CS-07-D-ADD	Students will be able to apply fundamental programming constructs to create multi sprite, multi-script programs using textual programming tools.	PGRD-ADD	
	CS-07-F-01	Students will analyse the uses and benefits of design thinking for entrepreneurs.	PGRF-01	

List of Codes, SLOs and Assessment Strategies

Grade VIII

Cognitive Domain

Overall Domain Code	NCP Reference	SLOs	Codes	Assessment Strategies
CAP Cognitive Application Procedural	CS-08-B-01	Students will be able to develop and demonstrate data handling skills (using various software tools e.g. MS Excel, Google sheets, etc.)	CAPB-01	Quiz, project-based assessment, problem solving, concept mapping, Gallery walk. Presentation and Peer Assessment may be added for this whole domain.
	CS-08-B-ADD	Students will learn how to research information from the internet for a report that answers a research question and communicates results and conclusions.	CAPB-ADD	
	CS-08-C-01	Students will be able to apply the concepts of computational thinking and problem-solving strategies to solve complex problems by identifying the most efficient algorithm.	CAPC-01	
	CS-08-C-02	Students will be able to apply the concepts of nesting in algorithmic design thinking.	CAPC-02	
CANC Cognitive Analysis Conceptual	CS-08-A-01	Students will be able to analyse the usage of emerging technologies in various walks of life (e.g., artificial intelligence, 5G, robotics, computer-assisted translation, 3D and holographic imaging, virtual reality, distributed applications, block chain, and Machine Learning.)	CANCA-01	In-class or Homework Prompt, Student Self-Assessment/Reflection, sentence prompts, quick writes,

	CS-08-A-02	Students will be able to identify and analyse a network and identify core networking components and their roles.	CANCA-02	In class project: groups explore working of digital systems and protocols through presentation, role-play, diagram, flowchart, Take and pass for core networking components
	CS-08-D-ADD	Students will be able to analyse constructs and fundamentals of textual (syntax-based) programming.	CANCD-ADD	
CEC Cognitive Evaluation Conceptual	CS-08-E-01	Students will identify ways of protecting against cybercrimes.	CECE-01	Word cloud, online poll, videos, google forms, padlet. Teachers can task students to create a 60 second or less video to demonstrate their understanding. Students can create simulations, skits, analogies, or illustrations on this versatile and user-friendly app
CCP Cognitive Creative Procedural	CS-08-D-01	Students will be able to apply intermediate-level programming constructs (e.g. functions, cloning, conditional movement); by creating mini-games using a visual programming tool.	CCPD-01	Speed code" competition, Coding drills, mini projects, quiz, Scratch snippet MCQs quiz, Project based assessment, mind maps, Oral Questioning – based on how, why, what if. Gallery walk
	CS-08-D-ADD	Students will be able to apply intermediate level programming constructs (e.g. functions, cloning, conditional movement); by creating mini-games using a textual programming tool.	CCPD-ADD	
	CS-08-F-01	Students will develop an understanding of the basics of digital marketing platforms and social media marketing to develop a marketing plan for a business.	CCPF-01	
	CS-08-F-02	Students will be able to identify and create different components of a business plan i.e. market need, product design, costing, operations, and marketing.	CCPF-02	

Affective Domain

Overall Domain Code	NCP Reference	SLOs	Codes	Assessment Strategies
ARE Affective Responding	CS-08-A-01	Students will be able to analyse the usage of emerging technologies in various walks of life (e.g. artificial intelligence, 5G, robotics, computer-assisted translation, 3D and holographic imaging, virtual reality, distributed applications, block chain, and Machine Learning.)	AREA-01	In-class discussions - Students can present and play each other's games and explain code.
	CS-08-A-02	Students will be able to identify and analyse a network and identify core networking components and their roles.	AREA-02	
	CS-08-D-01	Students will be able to apply intermediate-level programming	ARED-01	

		constructs (e.g. functions, cloning, conditional movement); by creating mini-games using a visual programming tool.		
AV Affective Valuing	CS-08-E-01	Students will identify ways of protecting against cybercrimes.	AVE-01	Debate, role plays Case Studies may be added.

Psychomotor Domain

Overall Domain Code	NCP Reference	SLOs	Codes	Assessment Strategies
PS Psychomotor Set	CS-08-A-01	Students will be able to analyse the usage of emerging technologies in various walks of life (e.g. artificial intelligence, 5G, robotics, computer-assisted translation, 3D and holographic imaging, virtual reality, distributed applications, block chain, and Machine Learning.)	PSA-01	Project based assessment, gallery walk, presentations, graffiti wall, quiz
PGR Psychomotor Guided Response	CS-08-B-01	Students will be able to develop and demonstrate data handling skills (using various software tools e.g. MS Excel, Google sheets, etc.)	PGRB-01	Project based assessment, gallery walk, presentations, graffiti wall, quiz
	CS-08-B-ADD	Students will learn how to research information from the internet for a report that answers a research question and communicates results and conclusions.	PGRB-ADD	
	CS-08-C-01	Students will be able to apply the concepts of computational thinking and problem-solving strategies to solve complex problems by identifying the most efficient algorithm.	PGRC-01	
	CS-08-C-02	Students will be able to apply the concepts of nesting in algorithmic design thinking.	PGRC-02	
	CS-08-F-01	Students will develop an understanding of the basics of digital marketing platforms and social media marketing to develop a marketing plan for a business.	PGRF-01	
	CS-08-F-02	Students will be able to identify and create different components of a business plan i.e. market need, product design, costing, operations, and marketing.	PGRF-02	Mind maps, Oral Questioning – based on how, why, what if.
PM Psychomotor Mechanism	CS-08-D-01	Students will be able to apply intermediate-level programming constructs (e.g. functions, cloning, conditional movement); by creating mini-games using a visual programming tool.	PMD-01	Speed code" competition, Coding drills, mini projects, quiz, Scratch snippet MCQs quiz
	CS-08-D-ADD	Students will be able to apply intermediate-level programming constructs (e.g. functions, cloning, conditional movement); by creating mini-games using a textual programming tool.	PMD-ADD	
	CS-08-D-ADD	Students will be able to analyse constructs and fundamentals of textual (syntax-based) programming.	PMD-ADD	

CHAPTER THREE

ASSESSMENT DURING INSTRUCTION

Chapter Three

Assessment during Instruction

Designing Classroom Assessment

The design of classroom assessment depends on how classroom learning is approached. The three commonly understood approaches to learning are surface learning, strategic learning and deep learning (Entwistle, 2000). Differences between deep, surface and strategic learners are summarized below.

Surface Approach	Strategic Approach	Deep Approach
Reproducing Intention – merely to cope with course requirements by: - Treating the course as unrelated bits of knowledge - Memorizing facts and carrying out procedures routinely - Finding difficulty in making sense of new ideas presented - Seeing little value or meaning in either courses or tasks set - Feeling undue pressure and worry about work	***Reflective Organising Intention*** - to achieve the highest possible grades by: - Putting consistent effort into studying - Managing time and effort effectively - Finding the right conditions and materials for studying - Monitoring the effectiveness of ways of studying - Being alert to assessment requirements and criteria - Using previous exam papers and assessments to predict questions	***Seeking Meaning Intention*** - to understand ideas by: - Relating ideas to previous knowledge and experience - Looking for patterns and underlying principles - Examining logic and argument cautiously and critically - Actively interacting with the course content - Reading and studying beyond the course requirements - Taking interest

Note: Adapted from Entwistle, 1988; Entwistle and Ramsden, 2015

It is the teachers' responsibility to foster deep and/or strategic learning so that students can engage with the subject with the help of purposeful assessment strategies.

Assessment Strategies

Literature abounds with the different types of assessment strategies. The important question that perplexes teachers is which strategy to use and for what purposes. The simple response is that teachers must align their assessment with the SLOs. However, this alignment is not easy. Chapter Two presents a list of codes aligned with the SLOs and sample assessment strategies.

This chapter presents an explanation and examples of selected formative and summative assessment strategies, which are aimed at fostering deep approaches to learning.

Formative Assessment for Deep Learning Approach – Meaningful Examples

This framework further elaborates the following four strategies for assessing students' knowledge, skills, and dispositions at the primary school level with examples. This framework provides examples for the formative purposes of the first two strategies and summative purposes of the last two strategies.

1. Portfolio Assessment
2. Group Project Assessment
3. Selected Response (Multiple Choice)
4. Constructed Response (Short and long essay questions)

Portfolio Assessment

A portfolio is a record of the development in learners' thinking and ideas. A portfolio enables learners to assemble examples of their work to tell stories of their learning over a period of time. It enables teachers to assess learners' progress in ideas and understanding that cannot be adequately measured in any other way (Chappuis & Stiggins, 2017; Crockett & Churches, 2017). A portfolio can include the following:

- Examples of students' work with feedback about quality – multiple drafts with revisions
- Students' self-assessment
- Student reflections on their growth as learners

Portfolio Assessment in the Computer Science Classroom

A portfolio is a collection of student work that can demonstrate learning and be used as an effective assessment tool. Teachers can use a portfolio to assess learners' growth and achievement in programming. The following are the uses of portfolios to learners and teachers.

Benefits of Portfolios to the Learners

1. Portfolio provides multiple ways of assessing students' learning over time
2. It encourages students to think of creative ways to share what they are learning
3. It provides multiple opportunities for observation and assessment
4. It provides an opportunity for students to demonstrate his/her strengths as well as weakness.
5. Portfolios offer opportunities for reflection and the development of self-awareness.
6. It encourages students to develop some abilities needed to become independent, self-directed learners.

Benefits of Portfolios to Teachers

Portfolio assessment becomes an integral part of the instructional process rather than a separate activity.

Portfolios give teachers more information about the learners' programming skills than do scores or grades on tests. The variety of learning evidences within a portfolio can give teachers insights into the learners' strengths and weaknesses (Murphy & Camp, 1996).

Essential Elements of a Portfolio

1. Cover page
2. Introduction to the portfolio
3. Table of contents
4. Entries with dates
5. Drafts of your work (projects and assignments, tests and quizzes, etc.)
6. Artefacts (awards and certificates, posters, photos, images, videos, presentations, concept maps, etc.)
7. Reflections

Before assigning a student portfolio:

1. Explain the goals of the portfolio
2. Explain how it will be graded
3. Supply a checklist of items that you will be looking for when the portfolio is handed in
4. The portfolio can be organized with paper documents in a notebook or scrapbook, or digitally online.
5. Students can make e-portfolio also to showcase their learning.
6. Portfolio can be made by using snipping tool, MS PowerPoint, Google site/Google slides presentation outlining the different topics they learned about.

An Introduction to My Portfolio

Date: _____ I am in Class _____ at _____School

My name is _____ My teacher's name is _____

1. You will find different things in my portfolio. These are _____

_____

_____

2. I understand the purpose of scratch, and I'm able to prepare programs like

_____

3. I am able to analyse and apply basic programming constructs e.g.

_____

4. I am able to prepare worksheets including

_____

5. I can make presentation by adding features like

_____

6. I learned to use various features of word processing software like

_____

7. This is not my best work, but I could have improved by

_____

8. I still need to work on

---

9. I got stuck working on this task when _____I got unstuck by _____

_____

10. I am very proud of this because

_____

_____

11. I am making this project because I want to (focus on learning target and the portfolio type)

_____

_____

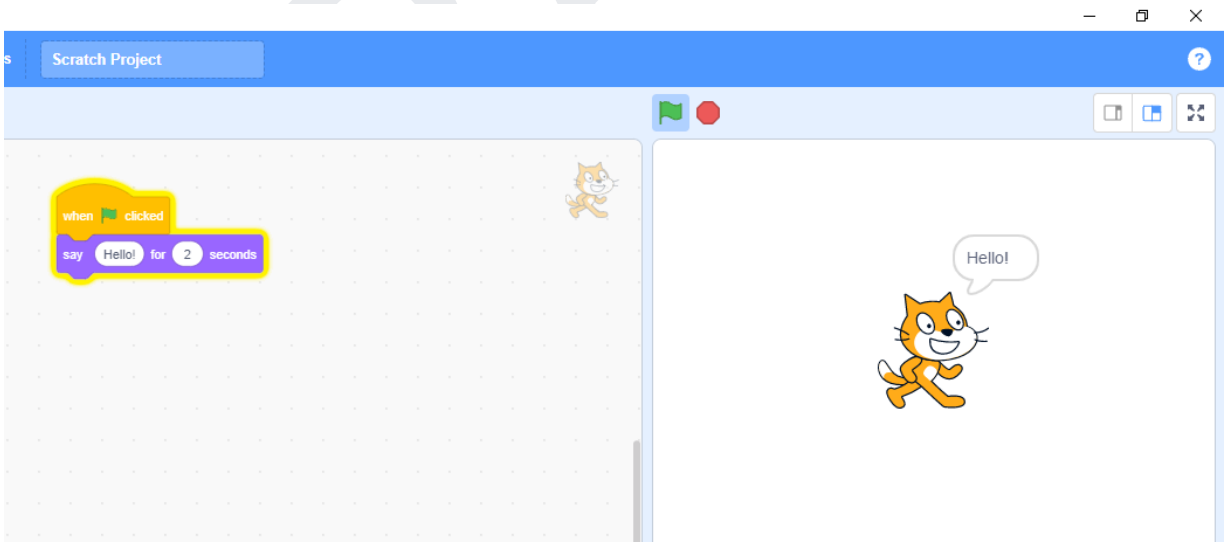
_____

Student's signature: _____

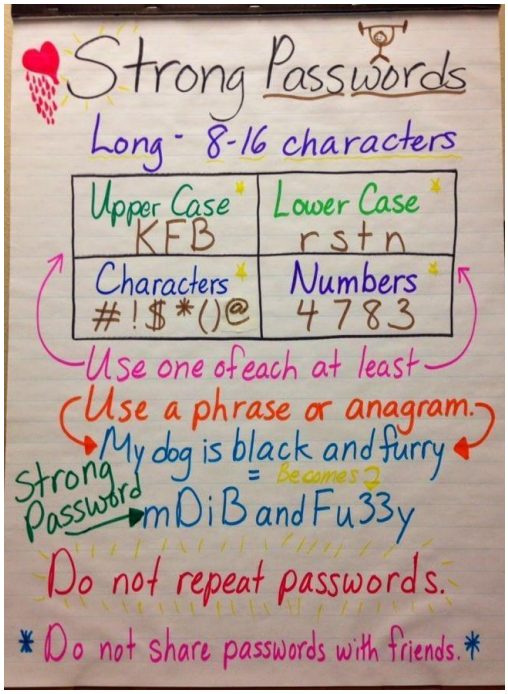
A Sample of Concept Mapping on components of computer

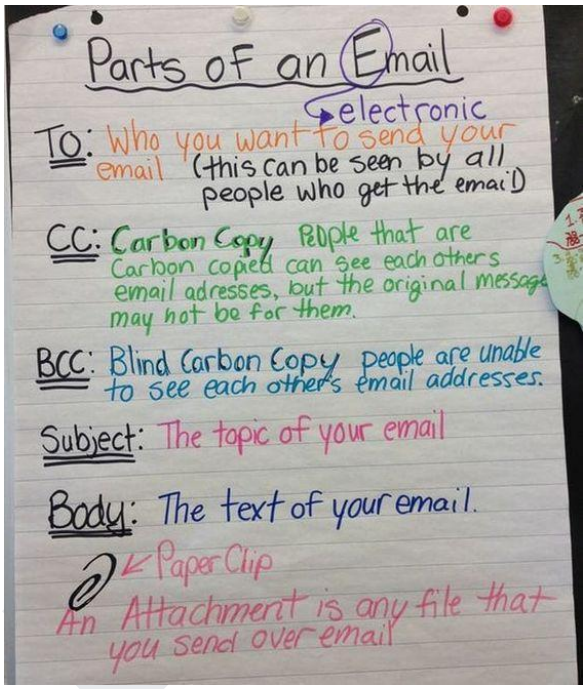
Brainstorming/Mind Mapping

Learners can be encouraged to brainstorm about the topic they wish to write upon. These can be collected in their portfolios.



Students can take the screenshot of output of the code and include it in portfolio.





Classwork and tests can be included in portfolio.

https://www.pinterest.com/pin/71635450313644036/

Source: https://www.pinterest.com/pin/146930006578412631/

Posters made by learners can be included in portfolio.

-

Explain why internet-based entrepreneurship provides rapid opportunity to grow as compared to home-based entrepreneurship?

Draft 01

Teacher's Feedback on Draft 01

Tell me more about how internet-based entrepreneurs have more opportunity to grow as compared to home-based.

How is internet helping in business growth? What is the impact of internet on target audience and clients?

Draft 02

A Sample of Periodic Student Self-Reflection

Prompts to activate Self-Reflection.

Portfolio Type	Starters
Celebration	**I am happiest/proudest of _____ because_____** **I really liked doing _____ because _____.** **What this portfolio says about me..._____.** **I have learnt that_____.** **I now understand_____.** **I can now do _____.** **I now feel_____.** **_____.**
Growth	**I have become better at_____, I used to _____, but now I_____** **Here is what has helped me improve: _____** **Here is what has helped me as a learner: _____** **Here is what I learned about myself as a learner: _____** **Here is what gets in my way as a learner: _____** **Here is what is difficult for me: _____.** **This used to be hard, but now it is easy: _____ Here is what made it easier: _____.** **Here are "before" and "after" pictures of my learning. The first one shows _____ The second shows _____ _____.**
Project	**Here is what I learnt about myself as a learner while doing this project: _____ .** **I developed the following skills while doing this project: _____** **Here is what I liked least/most about doing this project _____. Here's why: _____** **Here is how my thinking changed about_____ because of doing this project:_____** **This project has affected my interest in _____. It has caused me to_____**
Achievement	**My selections have shown I have mastered _____. Here is how they show that _____.** **My strength in (subjects or learning target) are _____.** **I still need to work on _____.** **Here is how I achieved mastery of _____ (learning target):_____.** **Here how I would change what I did if I had it to do over: _____.** **Here is what doing _____ has taught me about myself as a learner: _____.**

Criterion Referenced Assessment

Criterion referenced assessment (CRA) is the process evaluating students' learning against some pre-specified qualities or criteria (Brown, 1998; Harvey, 2004). The criteria are presented to the students in the form of a rubric, so that they know what is being assessed. The teacher can also involve the students in developing rubrics.

Course Number(s):_____Date Submitted:_____								
RUBRIC FOR PORTFOLIO-BASED ASSESSMENT								
Assessment Ratings	**1**	**Does not meet expectations (6 points)**	**2**	**Partially meets expectations (12 points)**	**3**	**Meets expectations (18 points)**	**4**	**Exceeds expectations (24 points)**	**Score**
Sources of Learning ***Experiences relevant to learning outcomes***	**Documentation and description of learning experiences related to course learning outcomes are *lacking or substantially inadequate***		**Documentation and description of learning experiences related to course learning outcomes are *not effectively or completely presented***		**Documentation and description of learning experiences related to course learning outcomes are *appropriate and effectively presented***		**Documentation and description of learning experiences related to course learning outcomes *exceed expectations***		
Demonstration of Learning ***Artefacts***	**The portfolio's materials and artefacts are *not appropriate and/or adequate*, and are not supported by the presentation**		**The portfolio materials and artefacts are *not fully supported* by or connected to the course's learning outcomes**		**The portfolio includes *appropriate* artefacts that support the demonstration of learning outcomes**		**The presentation of artefacts is *convincing*, with *strong support* for the course's learning outcomes**		
Evidence of Learning Competencies	**The portfolio shows *little or no evidence* of learning tied to sound educational theory**		**The portfolio documents some, but *not sufficient*, learning tied to sound educational theory (or grounded in appropriate academic frameworks)**		**The portfolio *adequately* documents learning tied to sound educational theory (or grounded in appropriate academic frameworks)**		**The portfolio provides *clear evidence* of learning tied to sound educational theory (or grounded in appropriate academic frameworks)**		
Mastering Knowledge & Skills ***Application of Learning***	**The portfolio provides *little evidence* of the student's ability to use knowledge and skills for the course's learning outcomes in practice**		**The portfolio demonstrates the student's ability to use the knowledge and skills for the course learning outcomes in practice is *limited***		**The portfolio documents the *acquisition* of knowledge and skills for the course learning outcomes, with *some ability* to apply them in practice**		**The portfolio demonstrates the student has *mastered* the knowledge and skills for the course learning outcomes and can *apply them in practice***		
Reflection on Learning Aligned with course learning outcomes	**The portfolio provides *little or no evidence of reflection* to increase learning aligned with the course learning outcomes for which credit is being sought**		**The portfolio provides *inadequate evidence of reflection* to increase learning aligned with the course learning outcomes for which credit is being sought.**		**The portfolio provides *evidence of reflection* to increase learning aligned with the course learning outcomes for which credit is being sought**		**The portfolio shows that the student has reflected with *substantial depth* upon how the prior learning experience is aligned to the course learning outcomes for which credit is being sought.**		
Presentation ***Completeness***	**Assembly instructions have**		***Most of the expected elements* are included; the quality of**		**The portfolio is *well organized* with all critical**		**The portfolio is *well organized* with all critical elements**		

and quality of the Portfolio Presentation	***not been followed* with critical portfolio elements *not* included; the quality of written, visual and/or digital presentation *does not meet postsecondary standards***	**written, visual and/or digital presentation does not meet postsecondary standards with *too many errors* in spelling, grammar and punctuation**	**elements included; the quality of written, visual and/or digital the presentation is *competent* with minor errors in spelling, grammar and punctuation**	**included; learning is *well-documented* with writing and production skills that *exceed* those of most students**	
Overall Assessment	**The recommended cut score for a successful (i.e., passing) portfolio is 12, with a score of at least 2 in each of the 6 assessment criteria.**				**TOTAL**

Name of Assessor (print):_____ Date: _____

Source: https://www.starkstate.edu/wp-content/uploads/2016/02/REVISED-MASTER-RUBRIC.pdf

Portfolio Assessment Rubric (Alternative)

Category	Exemplary (20 pts)	Proficient (15 pts)	Partially Proficient (10 pts)	Incomplete (5 pts)
Selection of Artefacts	**All artefacts and work samples are clearly and directly related to the social studies content.**	**Most artefacts and work samples are related to the social studies content.**	**Few artefacts and work samples are related to the social studies content.**	**Most artefacts and work samples are unrelated to the social studies content.**
Use of Graphics	**The use of graphics/ photographs is integrated seamlessly into several different artefacts.**	**The use of graphics/ photographs is included and appropriate.**	**The use of graphics/ photographs is included but is used randomly and without purpose.**	**No use of graphics. The photos are distracting from the content of the portfolio.**
Reflections	**All reflections clearly describe why artefacts in the portfolio demonstrate achievement.**	**Most of the reflections describe why artefacts in the portfolio demonstrate achievement.**	**A few reflections describe why artefacts in the portfolio demonstrate achievement.**	**Reflections are missing, and those that are there do not describe why artefacts in the portfolio demonstrate achievement.**
Creativity and purpose of the Index	**The index serves its purpose and shows creativity. The layout and design is attractive and well thought out.**	**The index serves its purpose and shows some creativity.**	**The index serves its purpose but lacks style.**	**The index does not serve its purpose and lacks style.**
Organization	**The portfolio is well organized and easy to navigate.**	**The portfolio is somewhat organized and thus little difficult to navigate.**	**The portfolio is rather messy and quite challenging to navigate.**	**The portfolio lacks complete organization.**

Source: https://www.bhprsd.org/cms/lib02/NJ01001930/Centricity/Domain/352/E-portfolio%20Rubric.pdf

Group Project Assessment

Group projects are based on cooperative learning goals, which are reflected in the figure below.

In cooperative learning structures, a student can obtain his or her goal only when other students in the group obtain theirs (Arends, 2007). Project work is a very good example of group work.

According to the Buck Institute of Education (BIE, 2021), students work on a project over an extended period of time – from a week up to a semester – that engages them in solving a real-world problem or answering a complex question. They demonstrate their knowledge and skills by developing a public product or presentation for a real audience. As a result, students develop deep content knowledge as well as critical thinking, creativity, and communication skills in the context of doing an authentic, meaningful project.

Guidelines for Projects

Step 1: Select a topic: Start by thinking of a current topic about which you would like to read and study and/or think of problems you would like to see solved. The topic should be something you are curious about and may include events, people, or places. It may be helpful to look through newspapers, current magazines, or to listen to news broadcasts and then brainstorm possible topics. There are unlimited topics for study; therefore, care should be taken regarding the scope of the project. It should not be so broad that it cannot be given good in-depth treatment. It should not be too specific as information about the topic may be limited.

Example from Computer Science NCP Grade VII (p.61):

1. Prepare a story in English or Urdu by inserting related pictures.
2. A group of students are required to search about "The seven wonders" on internet or compose material on Microsoft Word that should include minimum 7 pictures and a brief about those pictures. Students are then required to draft an email for teacher to share research work as an attachment of the email.

Step 2: It may be helpful to list several questions about your topic and then narrow your list to the best research question by considering the following:

1. Is the topic relevant?
2. Can you find information on the topic using multiple resources?
3. Will the story be of any interest to the readers?

Step 3: Determine the purpose for choosing the topic: Why have you chosen the topic?

Step 4: Methods of research: The method of research involves gathering, analysing and interpreting data needed to compose the story. This project may require the study of publications. Resources are available at the school library, the Internet, books, magazines, newspapers, encyclopaedias and through interviews.

Step 5: Conduct the research: Review published materials related to your topic. The information/data collected should be organized in a logical format. Making note cards while doing the research will help organize facts and information. When taking notes, write key words that will help you recall information. Write notes in your own words on index cards. It is important to include the sources on each note card. Charts, concept maps, and other graphic organizers may also be used to record information.

Step 6: Writing the story: Once a sufficient amount of information is gathered and the data is organized, the student may use critical thinking processes to interpret the data and make inferences that lead to generating ideas for the story.

Source:
https://www.stcharles.k12.la.us/site/handlers/filedownload.ashx?moduleinstanceid=13737&dataid=18923&FileName=Social%20Studies%20Fair%20Project%20Handbook.pdf

Project Assessment

When it comes to grading in computer science class and more specifically, coding projects, the task of grading can easily consume your time and energy as you find yourself getting caught up in line-by-line details. Teachers have to spent hours grading projects and going through each student's project, taking screenshots of key areas where they needed to check for bugs, and then wrote feedback to each student.

Here are some practices that can be used to alleviate the grading burden, save some time, and evaluate students' foundational knowledge, problem solving skills, and creativity.

RUBRICS

Use short grading checklists or rubrics to grade projects, which focus on a few major concepts in the project. Develop a rubric according to what you want to grade, share with the students before they begin their project, and use that as a framework for grading. A typical rubric will look for specific elements and challenges accomplished in the project and assign a point value for each. For example, a rubric for a coding project might address the following broad topics by providing students with specific, demonstrable goals:

1. Does the program accomplish the objective?
2. Does the program show creativity?
3. Does the program utilize the coding concepts taught in the lesson?
4. Did the student demonstrate effort and perseverance in trying to accomplish the objective?
5. Was the project turned in on time?

The following are examples of a simple rubric and checklists:

Debugging Project Rubric:

Criteria	Proficient 5 points each	Emerging 3 points each	Beginning 1 point each
Bug free program	**This program runs without errors and includes at least three sprites, uses programming fundamental constructs like coordinates, conditionals, loops, and variables**	**The program runs without errors but does not include at least three sprites, uses programming fundamental constructs like coordinates, conditionals, loops, and variables**	**When run, program displays an error message on the screen**
Flawed program	**The program has 5-7 bugs of varying types**	**The program has 3-4 bugs of varying types**	**The program has fewer than 3 errors**
Error explanation (Your	**The explanation of your flawed program thoroughly explains all**	**The explanation of your flawed program thoroughly explains most**	**The explanation is incomplete or missing.**

Program)	**errors and their locations**	**errors and their locations**	
Error explanation (Partner's program)	**The explanation of your partner's program thoroughly explains all errors and their locations**	**The explanation of your partner's program thoroughly explains most errors and their locations**	**The explanation is incomplete or missing.**

Total Points: _____/20

Grading Checklist:

Name: _____ Total Points _____/10

1. Create a program which takes input from the user to move a sprite, uses programming fundamental constructs like; ---Write a program using the following constructs.

Event	**/02**
Loop	**/02**
Motion	**/02**
Variable	**/02**
Conditional statement	**/02**
Total Points	**/02**

- Event - take input from the user e.g., when the user presses an arrow key on the keyboard, or when the user clicks the mouse button – a certain action is executed.
- Loop - repeats an instruction(s) a finite number of times or forever.
- Motion - That involves the motion of a sprite/object.
- Variable- creates and assigns values to a variable(s) (as per the event e.g., create an integer variable such as a score or a counter, and increase or decrease the value when certain events take place)
- Conditional statement (if-else block) – running a block of code only if a specific condition is true.

Using a rubric or a checklist, you can appreciate the overall project while still focusing on a few key items.

PEER REVIEW

Take some of the load off of your shoulders. Pair students to share their projects with each other and conduct peer reviews. The peer review process can provide general feedback, or students could complete a more detailed rubric or checklist. Allowing students, a chance to review each other's projects, share comments, help with debugging ideas, and test whether the program works not only helps teacher, but can be very empowering and beneficial for student development.

Self-Reflection

Allow time for self-reflection for projects where students write and explain how they met the project criteria and what they learned. This reflection could be the entire project grade and may be especially helpful for more complex coding projects or independent projects. Having students explain in writing how they met the criteria and worked through challenges is a time-efficient way to gather insight into the projects, hold students accountable, and can be very beneficial with additional skill development.

Self-Reflection Question.

1. What did you learn about _____while working on the project?
2. What code worked and what didn't work?
3. What major challenges did you face and how did you overcome these challenges?
4. What did you learn through reviewing your partner's project?

Presentation

Have your students present their projects. During the presentation, check for 3-4 essential components. Students not only look forward to seeing each other's projects, but they learn ideas from other students' projects.

Here you also have an opportunity to build confidence in your students while also addressing social-emotional learning competencies such as instilling an appreciation for all ideas and different problem-solving strategies and showing support for classmates.

Source: https://www.codelicious.com/blog/how-to-grade-computer-science-coding-lessons

Scratch Coding Design Project Interactive Workbook Guide for Group/Individual Project:

This digital interactive workbook guides students through the design process while producing a Scratch project. It is complete with a cover sheet detailing the assignment, a reflection task and marking rubric. This will help students document their progress through the design process while coding an interactive project.

The marking rubric leans heavily on the Design aspects of creating an interactive project. Guiding students through the steps: Think, Make, Share, Test, Refine, and Reflect.

Design Project

We have been looking at different ways of combining blocks in scratch to create interactive project. You must have utilized the following blocks to sense different inputs and produce different outputs.

TASK: Create an interactive scratch project that utilizes some of the above block, it may also utilize variables, operators and broadcasting blocks (below).

You will need to:

1. Complete the sections as applicable.
2. Share your Scratch project and include a link to it when you submit it.

What will I learn?	**You will learn to work through the design process and about communication by breaking down concept into algorithms.**
Why does it matter?	**Programming skills and computational thinking are of growing importance in our world. Conceptualizing an idea then working to produce, troubleshoot and improve that products are variable skills that can be applied to most areas.**
What is the task?	**To create, test and improve interactive Scratch project whilst documenting the process.**
What will I produce?	**A program that allows a user to interact with it, as well as a digital workbook documenting the development of the program through the design process.**

Rubric and Feedback

Rubric categories	Excellent	High	Satisfactory	Partial	Limited
Block-based coding and computational thinking	**Develops code that successfully utilizes multiple variables, as well as, operator and broadcasting blocks, to create logically organized interactive project.**	**Develop code that successfully utilizes variables and operator or broad casting blocks to create an interactive project.**	**Develop code that successfully utilize 5+ of the block types shown on the cover page to create an interactive project**	**Develop or explain step by step algorithms. These may be in a scratch project initiated by "when" blocks**	**Has not demonstrated their ability to create or explained block-based code.**
Design process	**Evidence of complete design process from initial concept through build, test and refinement of their own Scratch.**	**Evidence of planning, building, testing and progress at refining their own Scratch.**	**Evidence of planning, building and testing their own Scratch project.**	**Some evidence of planning or building a scratch project**	**No evidence of the design process**
Communication	**"High" is satisfied and the concepts explained include variables, operators and / or broadcasting**	**The Scratch project is labelled with comments explaining some of the codes.**	**The Scratch project is labelled with comments explaining some of the codes.**	**Can explain some of the codes when prompted**	**No attempt at explaining their code.**
Planning and reflection	**Communicates clearly in the digital workbook. Answers are detailed and show constructive reflection on their learning and process.**	**Digital workbook and easy to follow. Answer show depth and some reflection on the project.**	**Digital workbook completed but some answers are brief and may not show reflection on their learning and project**	**Digital workbook is sparse and answer lack depth**	**Minimal attempt at the digital workbook.**

Comments:

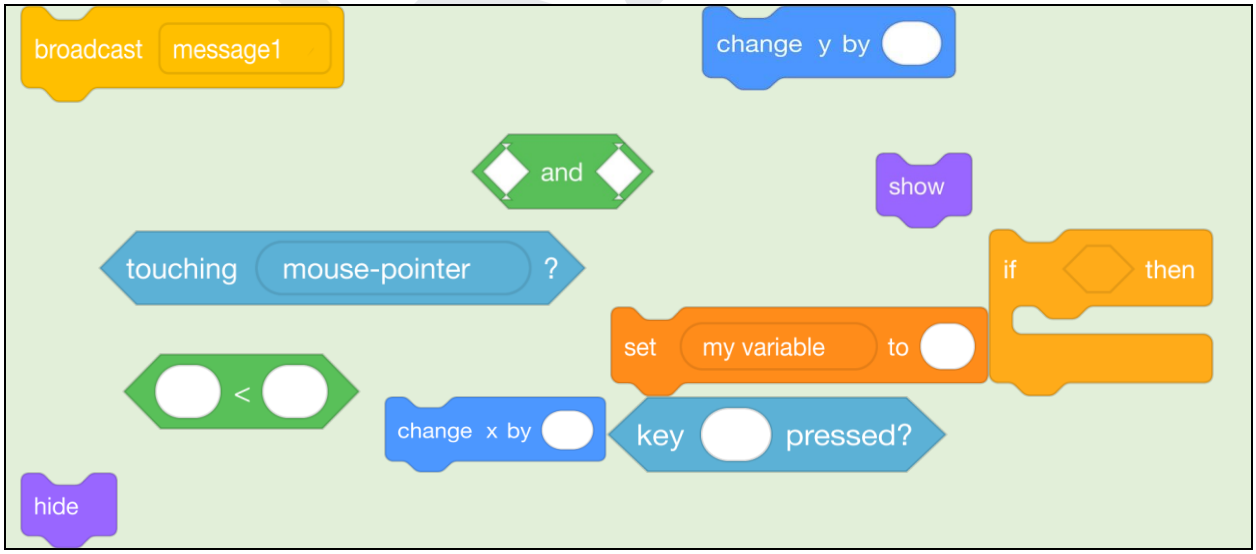
PLAN YOUR DESIGN

1. What will the aim of your interactive project be? What is the user trying to achieve?

2. How will user interact with your project? What are the controls? How will they work?

3. What will the basic look of the project be? How will the stages and sprites be laid out?

4. Pick three from the blocks from the box that you think you will use in your project. Explain why they will be useful and how will you use them.



Scratch Block	Explain why it will be useful in your project?

Start making your Project on Scratch!

Skills checklist.

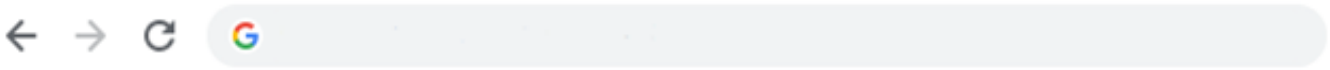
5. Mark the things you **already know how to do** in Scratch and circle the things you **need to know** to complete your project.

Ideally you should have one thing you need to know that you don't yet know how to do.

• **Resize a sprite**	• **Make a sprite move forward when clicked**
• **Make the back drop change**	• **Make a sprite change costume**
• **Make a sound play when sprite is clicked**	• **Make a sprite disappear when clicked**
• **Move a sprite in all directions with the keyboard keys**	• **Have a sprite ask and repeat your name**
• **Have the sprite draw a square or other shape**	• **Use variables to keep score**
• **Make a sprite look like it is walking**	• **Make it so when two sprites touch something happens**
• **Create a timer**	• **Use the clothing feature to create a simple version of "Little Big Snake"**
• **Use operators to "collect" a number of objects before a door appears.**	• **Create a scrolling backdrop**
• **Broadcast a message to make all sprites disappear when the time hits zero**	• **Use lists to store information in order**
• **Make a sprite jump and fall in a realistic way**	• **Make walls and platforms that sprites can't move through**

Your Project So Far!

Click the share button for your project and paste its URL link below.



PROBLEM SOLVING

Tell me about the problem you have encountered so far in this project, and what you have tried to overcome it. This could be as simple as accidentally using the wrong block as complex having to learn about new concepts.

Problem	
What have you tried?	

Beta-Testing

Get two people to test your project and give you feedback.
They must find:

- A **positive** that they like about the project so far.
- A thing they would like to see **improved**/fixed.
- Something they would be **interested** in seeing added.

Name of the Beta-tester		
Positive	**Improve**	**Add**

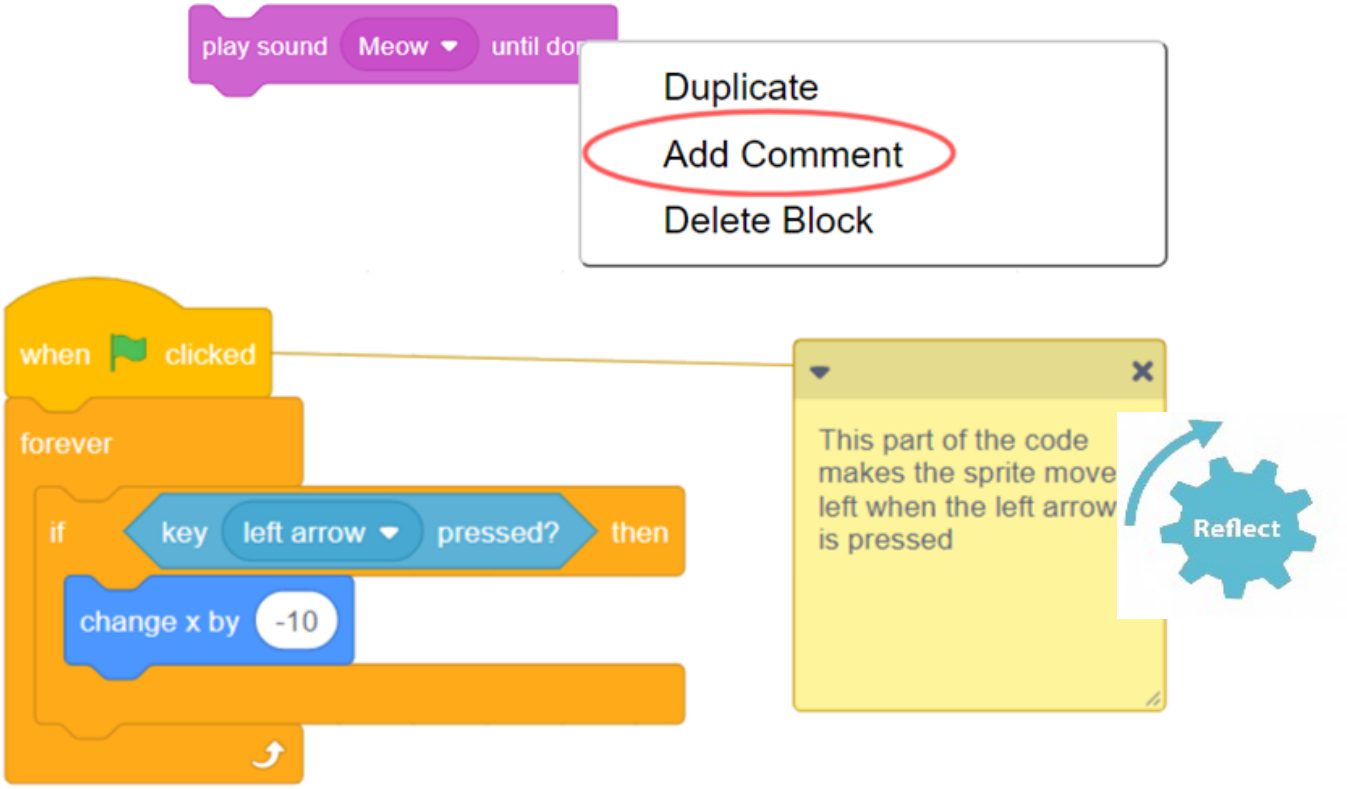
Name of the Beta-tester		
Positive	**Improve**	**Add**

Based on the feedback above, pick one thing to refine about your project before submitting it.
What are you planning to change and how?

Make refinement to your project!

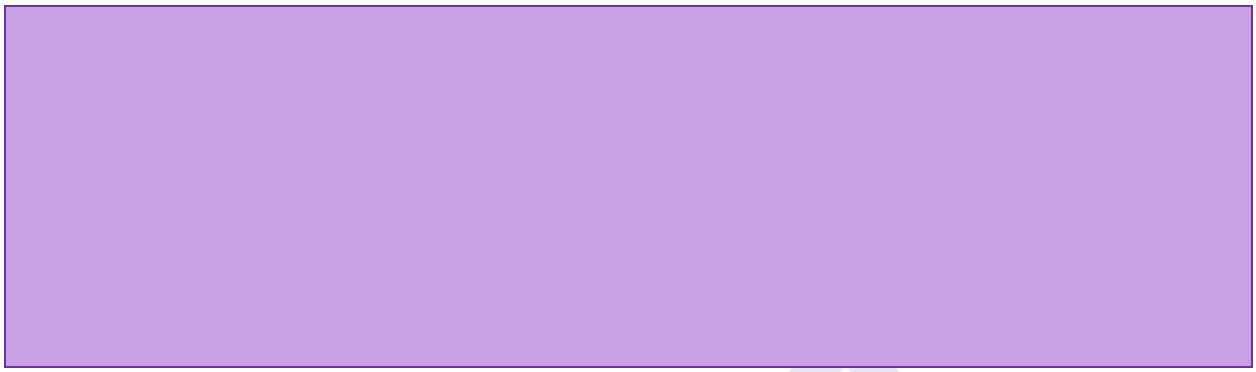
Explaining Your Code

Left click on the parts of your code to leave a comment explaining it. Do this for each piece of code? If you have a lot of code you only have to leave a comment for each concept.



Review Your Work

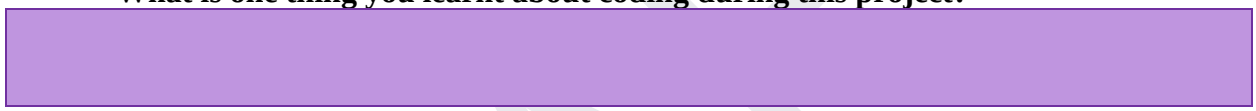
Return to the rubric and mark where you think your project sits after comparing what you produced to the criteria.



Reflect on how you tackled this project?

Reflection

- **What is one thing you learnt about coding during this project?**

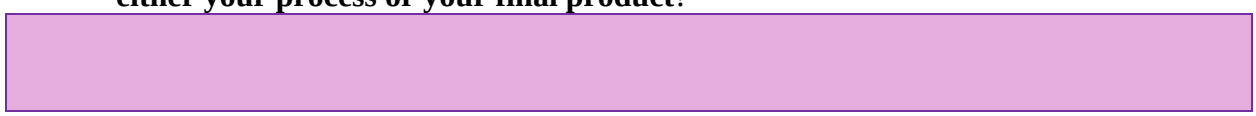


- **What was one problem you encountered during this project? How did you try to overcome it?**

- **What was one thing you found satisfying about either in the process or your final product?**

- **What was one thing you found frustrating about either the process or your final product?**

- **If you had a chance to do this project over again, what would you change about either your process or your final product**?



- **In what ways have you improved at this kind of work?**

- **In what ways do you think you could still improve at this kind of work?**

Adapted from: https://www.teacherspayteachers.com/Product/Scratch-Coding-Design-Project-Python-JavaScript-programming-STEM-PBL-5663443?st=1b459a353576d94c7d9bfd06bf1ca86a

The assessment in the group project can be done at two levels – the whole group presentation and an individual student performance within the project. Rubrics for both levels are given below.

Multimedia Project and Performance Rubrics (Group Performance)

Criteria	Exceeds Expectations (24 points, 4 for each criterion)	Meets Expectations (18 points, 3 for each criteria)	Almost Meets Expectations (12 points, 2 for each criterion)	Does Not Meet Expectation (6 points 1 for each criterion)
Organisation	**Students present information in a logical and creative sequence that the audience can follow.**	**Students present information in a logical sequence that the audience can follow.**	**Audience has difficulty following presentation because student does not consistently use a logical sequence.**	**Audience cannot understand presentation because there is no sequence of information.**
Subject Knowledge	**Students demonstrate complete knowledge by answering all questions with explanations and elaborations.**	**Students are at ease and provide expected answers to all questions but do not provide elaborations.**	**Students are uncomfortable with information and are able to answer only rudimentary questions.**	**Students do not have a grasp of information and are not able to answer many questions.**
Graphics	**Students' graphics explain and reinforce screen text and presentation.**	**Students' graphics relate to text and presentations.**	**Students occasionally use graphics that rarely support text and presentation.**	**Student uses superficial graphics or no graphics.**
Mechanics	**Presentation has no misspellings or grammatical errors.**	**Presentation has no more than two misspellings or grammatical errors.**	**Presentation has three misspellings or grammatical errors.**	**Presentation has four misspellings or grammatical errors.**
Eye Contact	**Students maintain eye contact with**	**Students maintain eye contact most of**	**Students occasionally use eye contact but still**	**Students read all of the report with no eye contact.**

	audience, seldom returning to notes.	**the time, but frequently return to notes.**	**read most of the report.**	
Elocution	**Student uses a clear voice and correct, precise pronunciation of words.**	**Students' voice is clear and most of the words are pronounced correctly.**	**Students' voice is not very clear, and they incorrectly pronounce most of the words.**	**Students mumble, incorrectly pronounce words and speak in a low tone.**

From: Fisher and Frey (2007)

Group Project: Rubric on Group Work Performance (Affective Domain)

(Can serve for self-assessment as well as peer assessment as a group)

Name of group members: _____

CATEGORY	Exemplary	Proficient	Partially Proficient	Unsatisfactory	POINTS
Focus on the Task	**3 points**	**2 points**	**1 point**	**0 points**	**___/3**
	Stays on task all of the time without reminders.	**Stays on task most of the time. Group members can count on each other.**	**Stays on task some of the time. Group members must sometimes remind this person to do the work.**	**Hardly ever stays on task. Let others do the work.**	
Work Habits	**3 points**	**2 points**	**1 point**	**0 points**	**___/3**
	Members are on time for meetings, turns in all work when it is due. **Completes assigned tasks and does not depend on others to do the work.**	**Members are usually on time for meetings, turns in most work when it is due.** **Completes most assigned tasks.**	**Members are sometimes late for meetings, often turns in work late.** **Does not follow through on most tasks and sometimes counts on others to do the work**	**Members are late for all or most meetings, and late turning in work.** **Does not complete tasks. Depends on others to do all of the work.**	

Listening, Questioning and Discussing	**3 points**	**2 points**	**1 point**	**0 points**	**___/3**
	Members respectfully listen, discuss, ask questions and help direct the group in solving problems.	**Members respectfully listen, discuss and ask questions.**	**Members have trouble listening with respect, and take over discussions without letting other people have a turn.**	**Members do not listen with respect, argue with teammates, and do not consider other's ideas. Blocks group from reaching agreement.**	
Research and Information-Sharing	**3 points**	**2 points**	**1 point**	**0 points**	**___/3**
	Members gather information and share useful ideas for discussions. All information fits the group's goals	**Members usually provide useful information and ideas for discussion.**	**Members sometimes provide useful information and ideas for discussion.**	**Members almost never provide useful information or ideas for discussion.**	
Group/Partner	**3 points**	**2 points**	**1 point**	**0 points**	**___/3**

Teamwork	**Works to complete all group goals.** **Always has a positive attitude about the task(s) and the work of others** **All team members contributed equally to the finished project.** **Performed all duties of the assigned team role and contributed knowledge, opinions, and skills to share with the team. Always did the assigned work.**	**Usually helps to complete group goals.** **Usually has a positive attitude about the task(s) and the work of others.** **Assisted group/partner in the finished project.** **Performed nearly all duties of the assigned team role and contributed knowledge, opinions, and skills to share with the team. Completed most of the assigned work.**	**Occasionally helps to complete group goals.** **Sometimes makes fun of the task(s) or the work of other group members.** **Finished individual task but did not assist group/partner during the project.** **Performed a few duties of the assigned team role and contributed a small amount of knowledge, opinions, and skills to share with the team. Completed some of the assigned work.**	**Does not work well with others and shows no interest in completing group goals.** **Often makes fun of others' work and has a negative attitude.** **Contributed little to the group effort during the project.** **Did not perform any duties of the assigned team role and did not contribute knowledge, opinions or skills to share with the team. Relied on others to do the work.**	

Group Project: Rubric on Individual Performance (Affective Domain)

(Can serve for self-assessment as well as peer assessment in group work)

Name of student: _____

Goal	4	3	2	1
Equal Work	**Did a full share of work or more**	**Did an equal share of work**	**Did almost as much work as**	**Did little or no work**

			others	
Cooperation	**Took an initiative in helping the group get organized**	**Worked agreeably with partners**	**Could be persuaded to cooperate**	**Did not cooperate**
Participation	**Provided many ideas**	**Participated in discussions and made some suggestions**	**Listened to others but offered few suggestions**	**Seemed bored with the discussions and offered no suggestions**
Support	**Assisted other partners**	**Offered encouragement to other partners**	**Seemed preoccupied with own work**	**Took little interest in others' work**
Communication	**Clearly communicated ideas**	**Usually, shared ideas**	**Rarely expressed ideas**	**Never expressed any ideas**

Source: https://www.pinterest.com/pin/371969250449103194/

Other comments:

Rubric for Assessing Collaboration Fluency (Individual)

Criteria	Phase 1	Phase 2	Phase 3	Phase 4

	(Awareness, connection, remembering) (4 points)	(Understanding , applying) (8 points)	(Analysing, evaluating) (12 points)	(Evaluating, creating) (16 points)
Interacts with others to generate ideas and develop products	**Listens to others' input and occasionally combines his or her own and peers' concepts to produce an understandin g of the task, problem, or issue.**	**Frequently, listens to others' input and occasionally combines his or her own and peers' concepts to produce an understanding of the task, problem, or issue. Attempts to make sure team members contribute.**	**Listens to others' input and combines his or her own and peers' concepts to produce an understanding of the task, problem, or issue. Uses techniques to make sure team members contribute. Explains the task to the team members.**	**Listens to others' input and effectively combines his or her own and peers' concepts to produce an understanding of the task, problem, or issue. Uses suitable techniques to make sure all team members contribute. Uses effective probing questioning to develop a realistic understanding of the task.**
Develops and implements effective plans	**Shows an awareness of the process and the current stage of development.**	**Uses checkpoints to measure progress in the project. Describes problems and develops some solutions.**	**Uses regular checkpoints to measure progress in the project. Defines each person's tasks within the process.**	**Manages progress on the assigned task using regular checkpoints. Clearly defines each person's roles and responsibilities within each element of the process. Discusses problems and develops suitable solutions.**
Works collaborativel y toward a common, shared goal or objective	**Sometimes works with peers. Is sometimes on task when working collaborativel y.**	**Works with peers collaboratively or individually to achieve the group's goal.**	**Works with peers collaboratively or individually to achieve the group's goal. Analyses individual or group progress against the goals and objectives and sometimes offers appropriate critique.**	**Works with peers collaboratively and economically or individually to achieve the group's goal. Analyses individual or group progress against the goals and objectives and offers appropriate critique or undertakes suitable actions as required.**
Revisits, reflects and revises group	**Sometimes reflects on overall**	**Reflects on overall progress.**	**Reflects on overall progress and analyses his**	**Reflects on overall progress evaluating his or her contribution and**

process	**progress. Struggles to accept feedback.**	**Often accept feedback. Sometimes offer useful reflection.**	**or her performance. Accept feedback, sometimes modifies behaviour. Sometimes offer useful reflection.**	**that of peers fairly. Accept feedback, modifying tasks, action and behaviours based on this. Offers critical reflection that are task focussed and appropriate, enabling growth and development.**

Source: Adapted from Crockett and Churches (2017)

Summative Assessment for Measurement and Evaluation – Frequently Use Examples

This framework is proposing two teaching terms of four months in a year. There will be a school wide summative assessment at the end of each semester. The key purpose of two summative assessments is to obtain valid and accurate information for evaluating each student's performance. This evaluation is the basis of a student's academic progression.

Measurement accuracy is determined by *what* is being measured and the *instrument* used to make the measurements. For example, a teacher can obtain a more precise measurement of a students' knowledge of programming skills rather than his or her creative ability.

In addition, the instrument used to make the measurements also determines measurement accuracy. Teacher made tests are the most common form of measurement instruments used at the school level. In the subsequent sections, the framework provides examples of the two most common types of test questions - Multiple Choice Questions (MCQs) from selected response and short quizzes and mini projects from the constructed response category.

Selected Response - Multiple Choice (Objective Test Item)

Multiple Choice is the most common type of objective test question (Linn & Miller, 2005). They are easy to administer and analyse. Multiple choice questions consist of a stem (question or statement) with several answer choices (distracters).

The table below gives four guidelines of developing multiple choice items with an example and a non-example. These have been adopted from Classroom Assessment course (2018) at https://fcit.usf.edu/assessment/selected/response.html

Guideline One - **All answer choices should be plausible and homogeneous.**	
Example	**Non-Example**
Which device is used to forward data from one network to another and selects best route? **A. Network switch** **B. Router** **C. Bluetooth** **D. Wireless Access Point**	**Which device is used to forward data from one network to another and selects best route?** **A. Modem** **B. Network Switch** **C. Router** **D. Digital Subscriber Line DSL**
Guideline Two - **Answer choices should be similar in length and grammatical form.**	
Example	**Non-Example**
Threatening or targeting a person with the use of digital technology is known as: **A. Cyber security** **B. Online activity** **C. Cyber bullying** **D. Cyber ethics**	**Threatening or targeting a person with the use of digital technology is known as:** **A. Cyber security** **B. Online activity** **C. Cyber bullying** **D. Plagiarism**
Guideline Three – **List answer choices in logical (alphabetical or numerical) order**	
Example	**Non-Example**
Which of the following stores more data? **A. Blu-ray Disc** **B. CD** **C. DVD** **D. Hard disk**	**Which of the following stores more data?** **A. DVD** **B. CD** **C. Hard disk** **D. Blu-ray Disc**
Guideline Four – **Avoid using "All of the Above" options**	
Example	**Non-Example**
Which of the following is NOT safe while using the internet? **A. Homework research**	**Which of the following is NOT safe while using the internet?** **A. Homework research**

B. Online shopping **C. Arranging to meet a stranger** **D. Chatting with school friends**	**B. Online shopping** **C. Arranging to meet a stranger** **D. All of the above.**

In addition, a checklist for reviewing one best MCQ is also given

One-Best MCQ Review Checklist

#	Overall	Yes	No
1	Is appropriate for the level of the learner		
2	Is aligned to the Student Learning Outcome and its number is referenced		
3	Exam specification number is referenced		
4	Concept to be tested is stated appropriately/ Item is aligned with the concept being assessed		
5	The item is conceptually correct		
6	The cognitive level of the item is identified appropriately		
7	The difficulty level of the item is identified appropriately		
8	Assesses an essential (Must Know) or an important (Good to Know) item		
9	Can be answered with the options covered (Cover Test)		
10	Cannot be answered with the stem/ case covered (Test for Cognitive Level)		
11	Item author's name is mentioned		
12	An authentic reference is mentioned		
13	There are no spelling or grammar mistakes		
14	Task can be completed by the students in the assigned time		
	Stem/ Case		
1	Clearly defined with no ambiguities		
2	Is contextual and relevant		
3	Contains all essential information; however, avoids irrelevant information		
4	Avoids abbreviations, uncommon terminologies and brand names		
	Lead-in		
1	Focuses on one feature or concept		
2	Avoids negative phrases such as 'Except' and 'Not'		
3	Is clearly understandable at the level of the students		
	Options		
1	Congruent with the lead-in		
2	Aligned with the lead-in in grammar		
3	Are of similar length		
4	Homogenous in content		
5	Distractors are plausible		
6	Listed in an alphabetical order		

7	**Use generic and common terms**		
8	**Mutually exclusive (non-overlapping)**		
9	**Avoid phrases like 'all of the above' and 'none of the above'**		
10	**Avoid vague terms such as 'usually' and 'frequently'**		
11	**Avoids key terms from the stem or lead-in**		
12	**The key is clearly the best/ correct option for the level of the learners**		
13	**The key/ correct answer is identified**		

Source: Aga Khan University Examination Board.

Constructed Response - (Subjective Test Item)

Constructed-response questions are assessment items that ask students to apply knowledge, skills, and critical thinking abilities to real-world, standards-driven performance tasks. Sometimes called "open-response" items, constructed-response questions are so named because there is often more than one way to correctly answer the question, and they require students to "construct" or develop their own answers without the benefit of any suggestions or choices. Therefore, constructed response assessments are suitable for higher level thinking skills. Constructed response assessments may include short quizzes, essays, art projects, personal communication, etc.

Sample CRQ

a. Differentiate between a flowchart and an algorithm.
b. Draw a flowchart for a child getting ready for school.
c. Draw a flowchart shows the process of ordering a burger.
d. Write an algorithm to make a cup of tea.

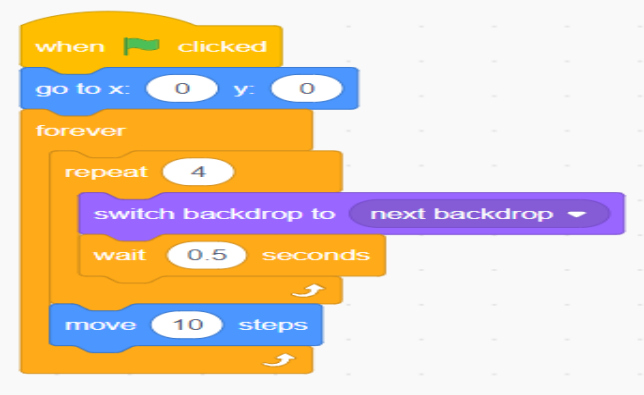
Some useful instructions:

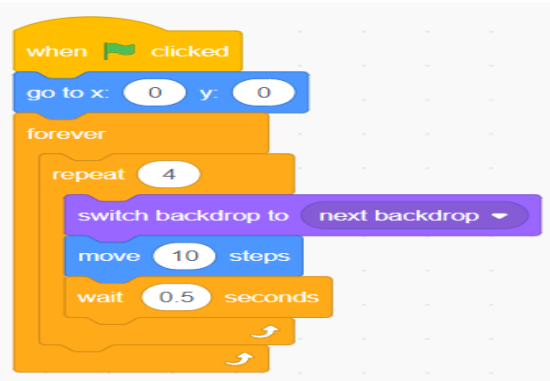
- Do not forget to show the **brainstorming**.
- There should be a clear start, a series of steps, a clear direction of flow and a clear end or finish point.

Sample CRQ 02

a. What is the purpose of deleting a file and where is deleted file stored before it is permanently remove?
b. Differentiate between animation and transition effects of MS power point.
c. Write down the steps to apply animation to your power point presentation.
d. What are the advantages/applications of cloning? Why can we not just duplicate the same sprite and code it differently?
e. Differentiate repeat and forever control commands. Give one example of problem for each where they can be used.

f. What is the difference in outputs of the following code blocks, having 4 backdrops?





Sample CRQ

Create an interactive scratch game, which include 2 or more interactive sprites. The game should keep score, indicate when you win or lose. When the green flag is clicked, the game must reset to 0 and the game must include "surprises".

Name _____Class _____

Type of Game? (Circle one)

Maze Story	**Platform**	**Combo**	**Maze/Platform**	**Animated**

Game Theme _____

- How will I control (move the Sprites)?

  _____

- How do I score points?

  _____

- How do I win the game?

  _____

- How will I "lose" the game?

  _____

- What are your obstacles? (You should have 3 to earn the highest rating)

1._____ 2. _____3. _____

- Will you have more than one level? YES _____ NO_____

- _____Teacher Approval of Plan

Please study the rubric for the game requirements. In order to receive a 100, you need to score 70 out of the possible 70 points shown on the rubric.

Begin with your stage creation. Be creative! You must make your own!! Spend some time on this step. The more you plan ahead, the better your game will be. Once you have created your stage and at least 1 sprite, then add your code (scripts).

Hint: You can use the "tips" and "Block Help" in Scratch as well!

Rubric for game

Points Earned ____/70 Possible Points_____ Grade_____

Criteria	Meets Expectations 10 pts	Almost meets Expectations 8 pts	Below expectations 6 pts	Poor 4 pts
*Start of Game *End of Game	Green flag starts/resets game to correct player position and background, time, and score. Sprites that should be hidden are. All codes stop running at win or lose.	Green flag starts/resets game to correct player position background incorrect. Some sprites are still visible. All codes stop running at win or lose.	Green flag starts/resets game to correct player position background incorrect. Some sprites are still visible. Code does not stop running at win or lose.	Green Flag does not reset the player position, background, or hidden sprites. Code continues to run at end of game.
Programming * Directions	Directions at start of game give a clear explanation on how to operate the game & when to use each key. The layout is neat and easy to follow. Contains no spelling errors. Directions are a separate sprite.	Directions at start of game gives mostly clear explanation on how to operate the game & when to use each key. The layout is fairly neat and easy to follow. Contains 1-2 spelling errors	Directions at start of game give an unclear explanation on how to operate the game & when to use each key. The layout is messy and hard to follow. Contains several spelling errors.	Directions are missing. The layout is so hard to follow the game cannot be played.

Programming * Challenges	**3 challenges were used to make the game play more difficult**	**2 challenges were used to make the game play more difficult**	**1 challenge was used to make the game play more difficult.**	**Game works but has no challenges.**
Programming *Animations and *Sound Effects	**Both animation and Sound effects used effectively with Sprites to enhance game play.**	**Both animation and sound effects used but did not make sense or enhance game play**	**Used just sound or animation.**	**NO animation or sound used in the game.**
Programming	**Project shows advanced understanding of blocks and procedures. (Broadcasting is used.) Uses a variety of programming techniques. Is particularly well organized and debugged. Player is able to win and lose the game**	**Project shows understanding of blocks and how they work together to meet a goal. Is organized logical and may have a bug or two.**	**Project shows little understanding of blocks and how they work together. Has some organization and logic. May have a few bugs.**	**Project shows poor understandin g of blocks and how they work together. Lacks organization and logic. Has several bugs.**
Project design	**Project is very creative using your own sprites and backgrounds. Game idea clearly demonstrates unique ideas. More than 2 levels used**	**Project is unique. You have used your own sprites and background. 2 levels used.**	**Project not original. Some of the project design is the same as those we have created in class. Project is just one level.**	**Used standard backdrops from library. One level. Project incomplete.**
Process	**Student completed the entire project plan. Used project time constructively. Project shows initiative beyond what was taught in class. If finished early, student added more to the game to make it more challenging or creative. Student successfully used**	**Student completed the entire project plan. Used project time constructively. Student successfully used resources to solve ALL problems.**	**Student completed the entire project plan. Used project time constructively. Student used resources to solve MOST problems**	**No plan evident. Student relied on teacher to solve the problems.**

	their own resources to solve ALL problems.			

Source:https://www.bscsd.org/cms/lib/NY02211965/Centricity/domain/344/scratch/Scratch%20Original%20Game%20Activity.pdf

Create a PowerPoint presentation on how we use Robots in different fields.

- Use the internet to search for suitable information
- Apply the criteria of a good presentation mentioned before
- Suitable media (pictures, audio and video) files
- Take a screenshot showing the transition you added
- Take a screenshot showing the animation you added
- Print your presentation (4 slides per page)
- Print your screenshots
- Apply the copyrights rules, cite your references (citation)

Your presentation must contain:

- Transitions
- Animations
- Hyperlinks

Grading Rubric for Power Point Project

Criteria/Skills	5	4	3	2	1
Content	**Content is accurate and all required information is presented in a logical order.**	**Content is accurate but some required information is missing and/or not presented in a logical order but is still generally easy to follow.**	**Content is accurate but some required information is missing and/or not presented in a logical order, making it difficult to follow.**	**Content is questionable. Information is not presented in a logical order, making it difficult to follow.**	**Content is inaccurate. Information is not presented in a logical order, making it difficult to follow.**
Use of Time	**Student uses their time to work**	**Student uses most of their time to**	**Student uses some of their time to work**	**Student uses less of their time to**	**Student does not use their time to**

	productively and Efficiently.	**work productively and efficiently.**	**productively and efficiently.**	**work productively and efficiently.**	**work productively and efficiently. Student is frequently off task.**
Slide Creation	**Presentation flows well and logically. Presentation reflects extensive use of tools in a creative way.**	**Presentation flows well. Tools are used correctly. Overall presentation is interesting.**	**Presentation flows well. Some tools are used to show acceptable understanding.**	**Presentation is unorganized. Tools are not used in a relevant manner.**	**Presentation has no flow. No tools used.**
Slide Transitions	**Transitions are smooth. Transitions enhance the presentation.**	**Smooth transitions are used on most slides.**	**Smooth transitions are used on some slides**	**Very few transitions are used and/or they distract from the presentation.**	**No transitions are used.**
Visual Clarity and Appeal	**The project has an excellent design and layout. It is neat and easy to understand the content.**	**The project has a nice design and layout. It is neat and easy to read.**	**The project has a fair design and layout. It is neat and easy to read.**	**The project needs improvement in design, layout or neatness.**	**The project needs significant improvement in design, layout and neatness.**
Pictures, Clip Art Background	**Images are appropriate. Layout is pleasing to the eye.**	**Images are appropriate. Layout is cluttered.**	**Most images are appropriate**	**Images are inappropriate.**	**No images**
Mechanics	**No spelling errors. No grammar errors. Text is in authors'**	**Few spelling errors. Few grammar errors. Text is in authors'**	**Some spelling errors. Some grammar errors. Text is in**	**Some spelling errors. Some grammar errors. Most**	**Many spelling and or grammar errors. Text is copied.**

	own words.	own words.	authors' own words.	of text is in authors' own words.	
Presentation Skills	Well-rehearsed. No pronunciation errors or other mistakes.	General level of rehearsal. Few pronunciation errors or other mistakes.	Acceptable level of rehearsal. Some pronunciation errors or other mistakes.	Low level of rehearsal. Numerous pronunciation errors or other mistakes.	No rehearsal indicated. Too many pronunciation errors or other mistakes.

Rubric for Assessing Programming Skills (SCRATCH PROJECT RUBRIC)

Category	Beginning	Developing	Proficient	Exceptional
Content area concepts	Does not include ideas about the subject area or ideas are incorrect	Includes a few ideas about the subject, shows some understanding	Focuses on and understands important concepts about the subject matter	Makes important connections between subject area concepts, shows in-depth understanding
Project design	Did not try to make own artwork. No clear purpose of project or organization.	Project uses artwork of others with some effort to change. Has some sense of purpose and	Project uses original artwork or reuses imported images creatively. Has clear purpose, makes sense, has	Project artwork and creativity significantly support the content. Has multiple layers or complex

	Does not provide a way for other people to interact with program.	**structure. Includes way for user to interact with program, may need to be clearer or fit program's purpose better.**	**structure. Includes way for user to interact with program and clear instructions.**	**design. User interface fits content well, is complex; instructions are well-written and integrated into design.**
Programming	**Project shows little understanding of blocks and how they work together. Lacks organization and logic. Has several bugs**	**Project shows some understanding of blocks and how they work together. Has some organization and logic. May have a couple bugs**	**Project shows understanding of blocks and how they work together to meet a goal. Is organized, logical, and debugged**	**Project shows advanced understanding of blocks and procedures. Uses additional programming techniques. Is particularly well organized, logical, and debugged**
Process	**Student did not get involved in design process. Did not use project time well and did not meet deadlines. Did not collaborate**	**Student tried out the design process. Used project time well sometimes and met some deadlines. Collaborated at times**	**Student used design process (stated problem, came up with ideas, chose solution, built and tested, presented results) Used project time constructively, met deadlines Collaborated appropriately**	**Student made significant use of the design process Used project time constructively, finished early or added additional elements Found ways to collaborate beyond class structure**

Sample Computer Science Test Paper

Grade VI

Max Marks: 60 **Max Time: 2 Hours**

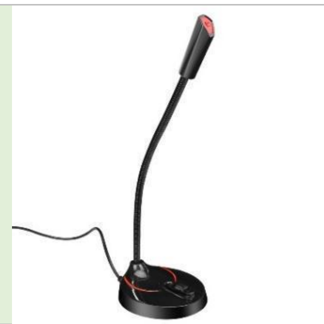
Name: _____ Section: _____ Roll no: _____ Date: _____

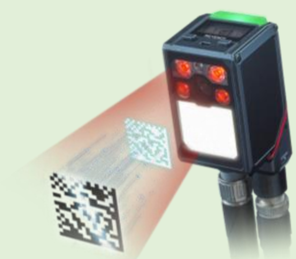
Instructions:

- Read the paper carefully.
- Attempt all the questions.
- Do question nos. 2, 5, 7 & 7 on the answer sheet

Q1. Write the name and type of each device. **[9]**

Input, Output or Communication?

		
Device:	**Device:**	**Device:**
Type:	**Type:**	**Type:**

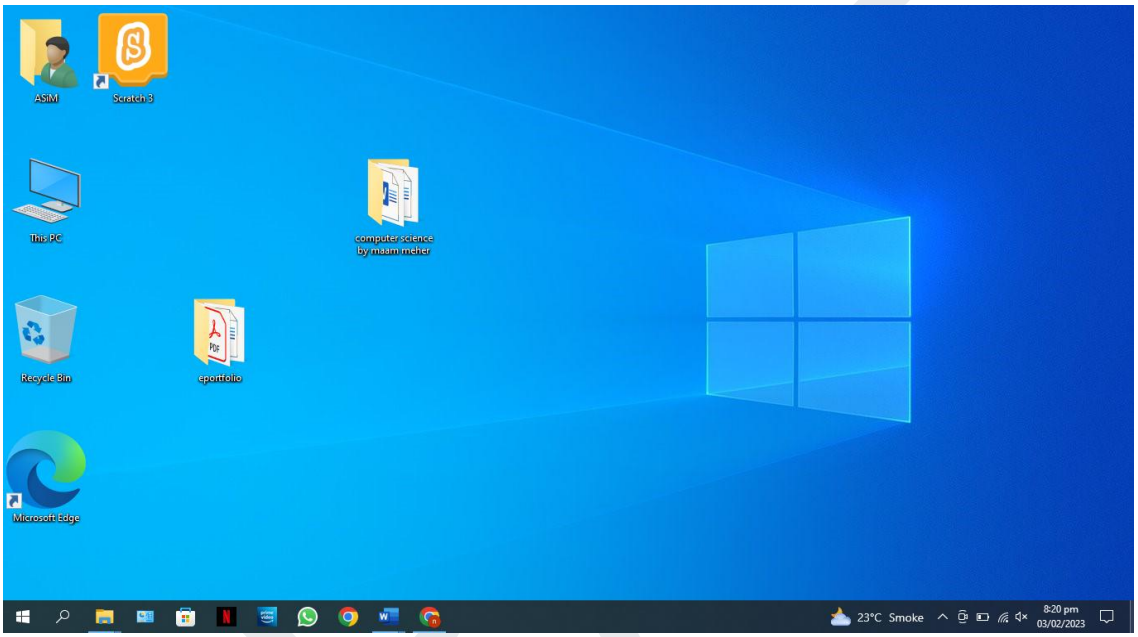
		
Device:	**Device:**	**Device:**
Type:	**Type:**	**Type:**

		
Device:	**Device:**	**Device:**
Type:	**Type:**	**Type:**

Q2. Define Operating system. List different examples of operating system. **[5]**

Q3. Fill in the gaps with appropriate words: **[5]**

Shortcut – Recycle bin – Folder – Task bar – Start menu



Q4. Put if the sentence is correct and if sentence is incorrect **[6]**

1. Biometric is used for authentication	☐

2. Display screen is also known as VDU.	☐
3. Algorithmic steps are to be followed in random order	☐
4. The act of doing one thing again and again refers to sequence	☐
5. Antivirus is an example of application software	☐
6. The stage is the space where results of the selected code can be seen	☐
7. In one form you can detect only one kind of mouse event	☐
8. An event is an action from the user	☐
9. Program is written at planning time	☐
10. Algorithm is created at design time	☐
11. Copying someone else's work and presenting it as your own is known as copyright	☐
12. Innovator is a type of entrepreneur.	☐

Q5. Define **[10]**

1) Block palette

_____

2) Sprite

_____

3) The stage

_____

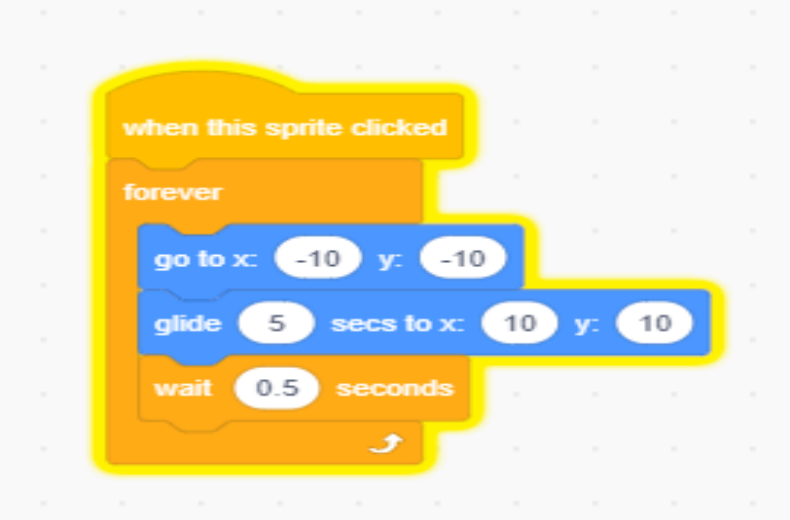
4) Event

_____

5) Variable

_____

Q6. What is the output of the following block-of-code? **[4]**



Q7. Differentiate between traditional entrepreneurship and digital entrepreneurship. [6]

Q8. Write the tips in correct group [15]

Give out personal information to anyone online	Create fake accounts	Always log out	Post hurtful comments	Report inappropriate posts		
Click on any pop ups that may destroy the computer or take me to a bad site	**Give out user name or password to anyone but parents**	**Meet someone that I've met online without parent permission**	**Respond to the strangers online**	**Send pictures of yourself to strangers**		
Respond to troubling email	**Open emails, file, web pages from unknown sources**	**Share your movement plans or location on social network**	**Always check with your teacher or parent before downloading any information or app**	**Save personal information on public devices**		

Safe/What to do	Unsafe/What not to do

Tests need to be constructed carefully. National Curriculum Computer Science Grade VI-VIII 2020 gives clear guidelines on test construction and marking in section 5.3 p. 70 with continuous assessment detailed guidelines and division of marks and chapter wise weightage of theory and practical periods.

Assessment Validity

The assessment must be valid, that is, it should actually measure what it is supposed to measure. There are three kinds of validity evidence considered during assessment. These are:

- Criterion
- Construct
- Content

Criterion and construct validity measures are beyond the scope of a class teacher's work. They should best be done by assessment experts. For purposeful assessment, content validity is extremely important and can be controlled by teachers.

Content Validity

As the name suggests, a valid assessment covers the content completed in the class. This means that a valid assessment covers all relevant parts of a subject. If any part, covered in the subject, is left out or if any irrelevant part, not covered, in the subject is included then it is not a valid assessment. The entire purpose of developing a list of codes and tables of specification and aligning them with the assessment strategies was to ensure content validity of the assessment. The assessment should be written at the level of difficulty required by the standards and student learning outcomes covered in the term. The assessment must also be in a format that allows students to demonstrate the particular ability being assessed. For example, if a teacher wishes to assess how a student has improved her digital skills and programming then MCQ is not the best option.

Ways to Improve Content Validity

Clearly defined objectives. Student learning outcomes should be clearly defined and operationalized.

Alignment. Assessment measures must be matched with student learning outcomes.

Review by Subject Matter Experts (SMEs). Subject experts may be asked to rate each question on a scale from very relevant/very essential to not relevant/not essential at all. The more SMEs agree that items are essential, the higher the content validity.

Objective Review. The test/assessment question/instrument can be reviewed by faculty at other schools to obtain feedback from an outside party who has not been involved in the instrument development.

Item Analysis. Item analysis is helpful in analysing student responses to individual test/exam questions with the intention of evaluating test/exam quality.

Review and update tests frequently. Many tests that were valid two years ago, are not valid today. It is important to review and update or retire questions that are no longer relevant.

Item Bank. An item bank facility is important to manage and update questions.

CHAPTER FOUR

SUPPORTING RESPONSIVE TEACHING AND LEARNING THROUGH FEEDBACK

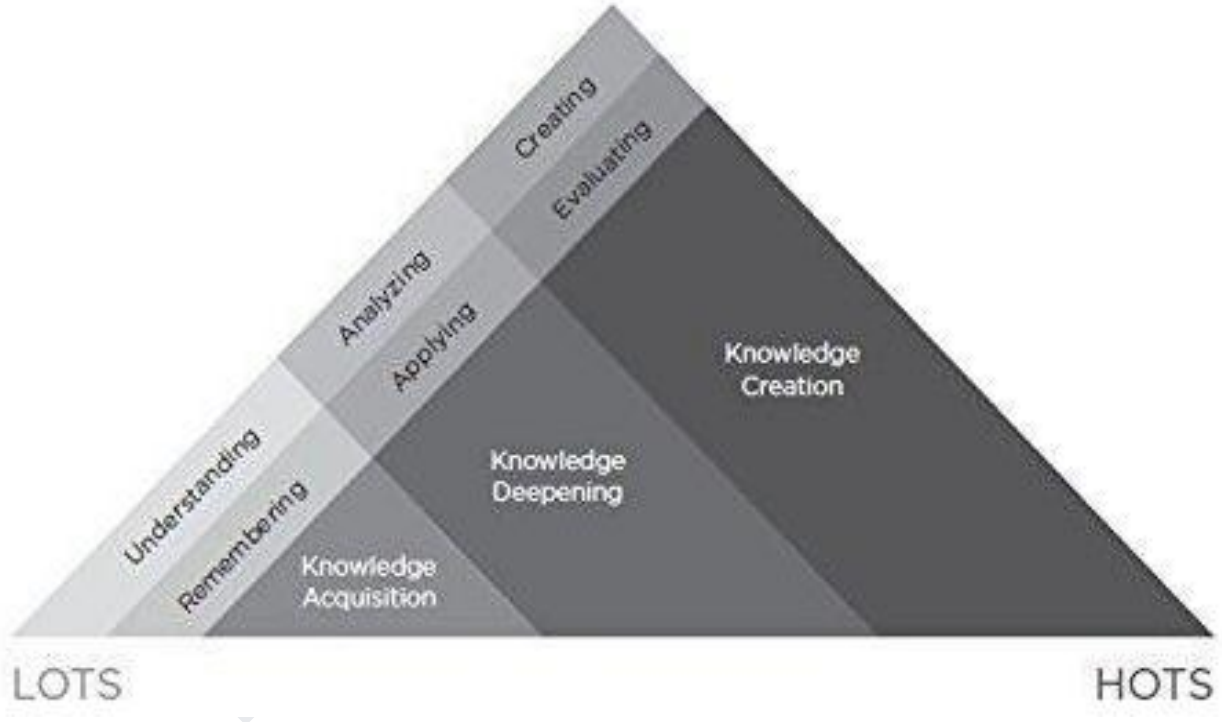
Chapter Four

Supporting Responsive Teaching and Learning through Feedback

Feedback to Students

In order to help students, succeed in the 21st century world, teachers must see their teaching as a response to learning, rather than seeing learning as an outcome of teaching (Crockett & Churches, 2017). This calls for the integration of classroom assessment processes into teaching in ways that enhances students' achievement and their motivation to learn.

Formative feedback is individual and personalized. This is because each child is at different level of achievement. It is the teachers' responsibility to help the learner to know where he or she is now in terms of high-quality work and where he or she ought to be. This gap analysis facilitates learners' progression from Bloom's lower-order thinking skills (LOTS) which focuses on knowledge acquisition to higher-order thinking skills (HOTS) where the learners are able to create knowledge.



Source: Crockett & Churches (2017)

Hattie's (2012) findings from his meta-analysis of hundreds of education papers indicate that providing formative evaluation and feedback has some of the largest effects on student learning. For an assessment to be formative, students must be receptive to the feedback and use it to adjust their learning. "Without feedback, assessment is not a learning activity; it is a compliance task." (Crockett & Churches, 2017, p. 21)

Churches (n.d.) outlines five characteristics of high-quality feedback. These are:

Timely: The end of the task is too late. Feedback must be provided often and in detail during the process.

Appropriate and reflective: Feedback must reflect the students' ability, maturity and age. It must be understandable.

Honest and supportive: Receiving a critique that identifies weaknesses of one's work can be very disheartening. The feedback must provide encouragement to continue and guidance on how to achieve the desired goals.

Focused on learning: The feedback should provide information which allows the learner to close the gap between the current and desired performance. The clarity and descriptive nature of the feedback the teacher presents are major influences on students' achievement (Hattie, 2012).

Enabling: Receiving feedback without the opportunity to act on it is frustrating, limiting, and counterproductive. Students must be able to learn from the formative assessments and apply the feedback and corrections.

One of the best models of feedback is developed by Dr Jodie Nyquist (Crocket & Churches, 2017). This model of effective feedback has five stages going from weakest to strongest.

The teacher who provides feedback at the KCR+e and a specific action or ideally KCR+e and an immediate activity gives the learners opportunity to maximise their learning. Based on the above model, three specific criteria for good and bad feedback can be developed.

Criteria for Good and Bad Feedback

Good Feedback	Bad Feedback
▪ Being positive ▪ Even when criticizing, being constructive ▪ Making suggestions (not prescriptions or pronouncements)	▪ Finding fault ▪ Describing what is wrong and offering no suggestions about what to do. ▪ Punishing or denigrating students for poor work

Examples of Good and Bad Feedback

Feedback	Good or Bad?
Your answer is the best one in the class.	This is an example of bad feedback. It does not tell the student what is good about the answer.
	This is an example of good feedback. It confirms for the students that the work meets one of the targets (strong supporting details) and connects the success to students' effort (the student researched to find out facts, and the teacher noticed).
Your answer was the shortest in the class. You didn't put enough in it.	This is an example of bad feedback. It implies that the student is competing with others (as opposed to aiming for a learning target) and the reason the work is poor is that the student "did something bad." The student ends up feeling judged and not motivated to improve.
The answer probably would not convince a reader who did not already agree we should recycle. I would want to know more about the effects on the environment and the cost of recycling.	This is an example of good feedback for a student who the teacher believes does not know what is missing in his or her answer. It suggests what the student could do to improve the answer.
Your report is late. What is the matter with you?	This is an example of bad feedback. It may not inspire the student to complete his or her work and turn it in for assessment.
[Name], I do not have your answer sheet. Can you tell me what happened?	This is a better example than the previous one of feedback to deliver the message that the work is late.

Feedback to Parents

The most common form of communicating grades to parents is the report card. Education in the 21st Century focuses on not just academic learning but holistic development (Hare, 2006; Miller, 2019). Therefore, report cards at the elementary/middle school level should also provide information on satisfactory or unsatisfactory performance in other dimensions.

A report card is only one way of sharing feedback to parents about their students' performance. A written report is another way of communicating with students. The reports should be visually accessible and comprehensible and written in a positive, direct and easy to understand manner.

The most effective way of communicating with parents is through a conference, generally known as parent-teacher meeting, which allows the parent to ask questions and the teachers to provide explanations. Conferences provide avenues to teachers to learn about students' home environment and to parents to be more involved in their children's learning.

(Front Page)

School's Name

School's Logo

Annual Report Card

[Month] 2023 – [Month] 2023

(First inside Leaflet)

Name: ABC_____ Term One: _____ Date: _____

Class: _____

 Rarely  Sometimes  Most of the times  Always

Your child as a learner				
				
Interested in learning				
Listens carefully				
Works well independently				
Keeps trying even when tasks are difficult				
Teachers' Comment:				

Your child's social and personal development				
				
Happy at school				

Behaves well in the class				
Mixes well with other children				
Behaves well in the playground				
Manages and expresses own feelings well				
Teachers' Comments:				

(Second inside Leaflet – Sample for Grade VI-VIII

Key Competencies		**Child's Performance**					
		Term I Marks			**Term II Marks**		
		Formative	**Summative**	**Total**	**Formative**	**Summative**	**Total**
1	**Domain A: ICT Fundamentals**	**06 Marks**	**04 Marks**	**10 Marks**	**12 Marks**	**08 Marks**	**20 Marks**
2	**Domain B: Digital Skills**	**18 Marks**	**12 Marks**	**30 Marks**	**18 Marks**	**12 Marks**	**30 Marks**

3	**Domain C: Algorithmic Thinking and Problem Solving**	**06 Marks**	**04 Marks**	**10 Marks**	**18 Marks**	**12 Marks**	**30 Marks**
4	**Domain D: Programming**	**12 Marks**	**08 Marks**	**20 Marks**	**12 Marks**	**08 Marks**	**25 Marks**
5	**Domain E: Digital Citizenship**	**12 Marks**	**08 Marks**	**20 Marks**			
6	**Domain F: Entrepreneurship in Digital Age**	**06 Marks**	**04 Marks**	**10 Marks**			
Total Marks Obtained							
Out of Total Marks		**60 Marks**	**40 Marks**	**100 Marks**	**60 Marks**	**40 Marks**	**100 Marks**
Teacher's Comments (Term I):							
Teacher's Comments (Term II):							

[Same types of tables will be prepared for all the subjects)

(Last inside Leaflet)

Students' Comment (My Learning in School)

Parents' Comments (How can you further support your child's learning?)

Teacher's Overall Comment:	
Attendance	**Punctuality**

Teacher's Signature: _____ **Date: _____**

Principal's Signature: _____ **Date: _____**

Parent's Signature: _____ **Date: _____**

CHAPTER FIVE

POST ASSESSMENT: REDEFINED GOALS/CURRICULUM

Chapter Five

Post Assessment: Redefined Goals/Curriculum

Completing the Assessment Loop

This framework brings forth the philosophy, the principles, the policy and the practice of purposeful assessment for evaluating teaching and learning targets at the classroom level, the school and national level. However, unless the evaluation is constructively utilised to inform changes to curriculum, learning targets and teaching methodology in a balanced manner, its real purpose will not be achieved.

Balanced Assessment System

The success of any assessment system will depend on how formative and summative assessments are balanced to meet the needs of all stakeholders. The tables below summarizes the use of the two types of assessments across three levels – the classroom, school and district/province.

Elements of a Balanced Assessment System

Level of Assessment	Purpose of Assessment	User of Information	Types of Assessment
Classroom assessment	**To measure the level of student achievement on learning targets taught.** **To diagnose student strengths and areas needing further work.**	**Teacher** **Teacher** **student**	**Summative: To determine grades for reporting purposes.** **Formative: To revise teaching plans for next year/semester.** **Formative: To plan further instruction.** **Formative: To provide feedback to students.** **Formative: To self-assess and set goals for the next steps(s).**
School based exam	**To measure the level of student achievement on pre-set content standards.**	**Teacher** **School Leadership** **District Education Office**	**Summative: To evaluate the achievement level of each student and summarise across students.** **Summative: To determine programme or curriculum effectiveness.** **Formative: To identify programme or curriculum needs.**
District, provincial or national large-scale assessments	**To measure the level of student achievement toward content standards and/or international standards.** **To identify students and/or portions of the curriculum needing additional/ different instruction.**	**Teacher** **School Leadership** **District Education Office**	**Summative: To evaluate programme effectiveness.** **Formative: To identify standards in need of more effective programmes.** **Formative: To plan interventions for groups or individuals.**

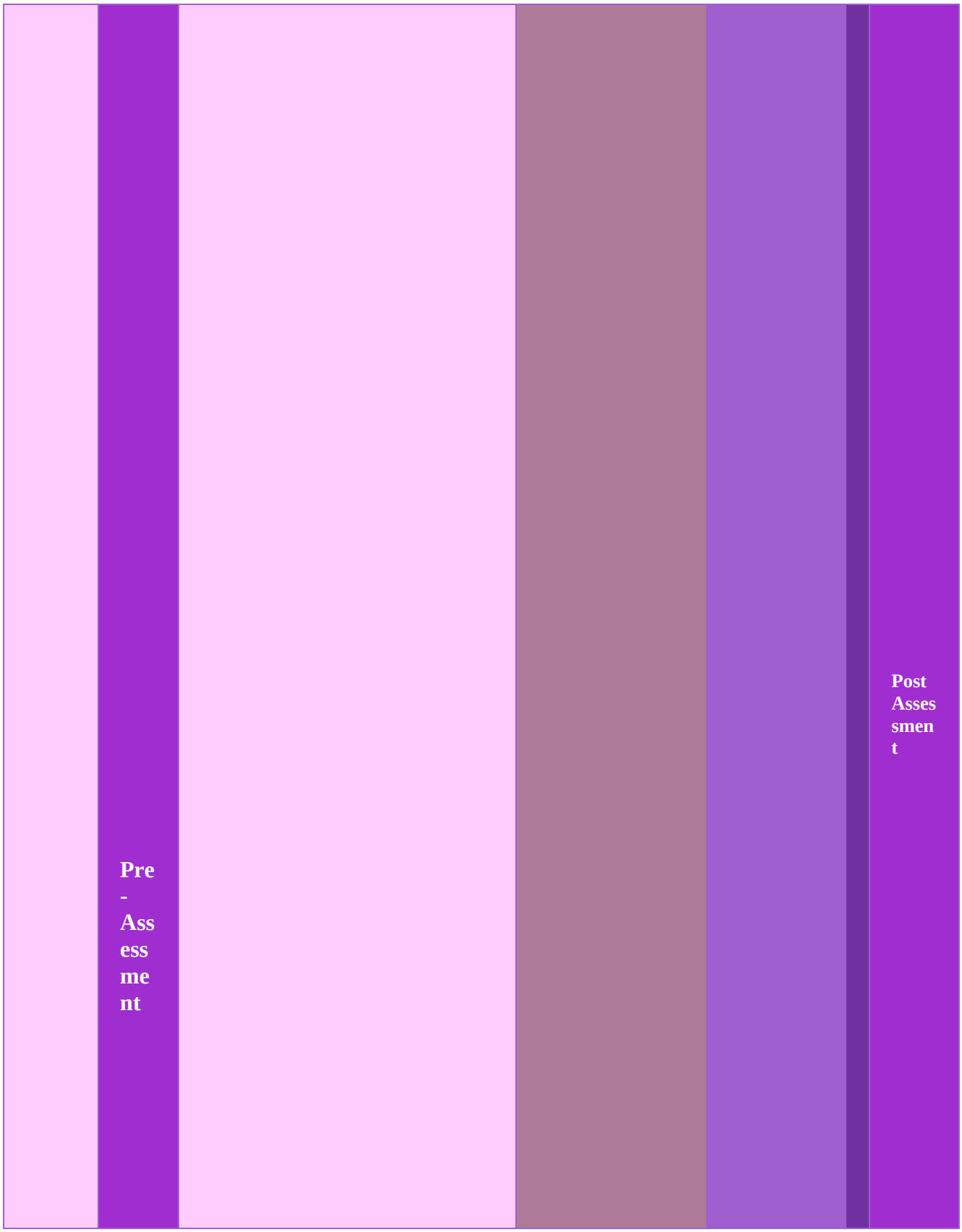
Source: Chappuis & Stiggins, 2017

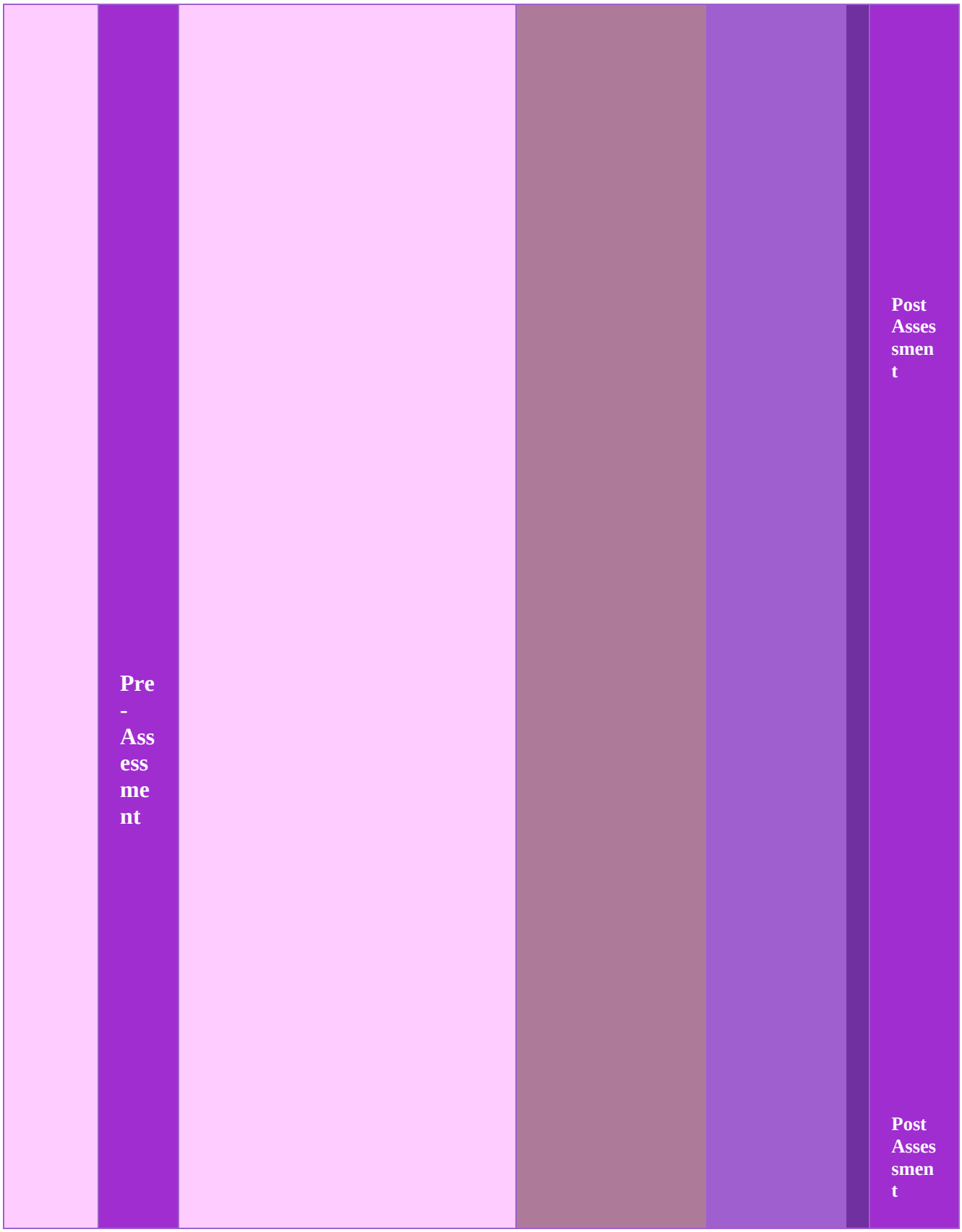
Implicit within this balanced assessment system is the cyclic approach to assessment, which emerges as a response to teaching and learning and further informs teaching and learning.

The following section presents schedules of assessment for grades I to V to illustrate how the three streams or levels of assessment can be employed in a balanced manner during an academic year. The schedule is also aligned with the SLOs.

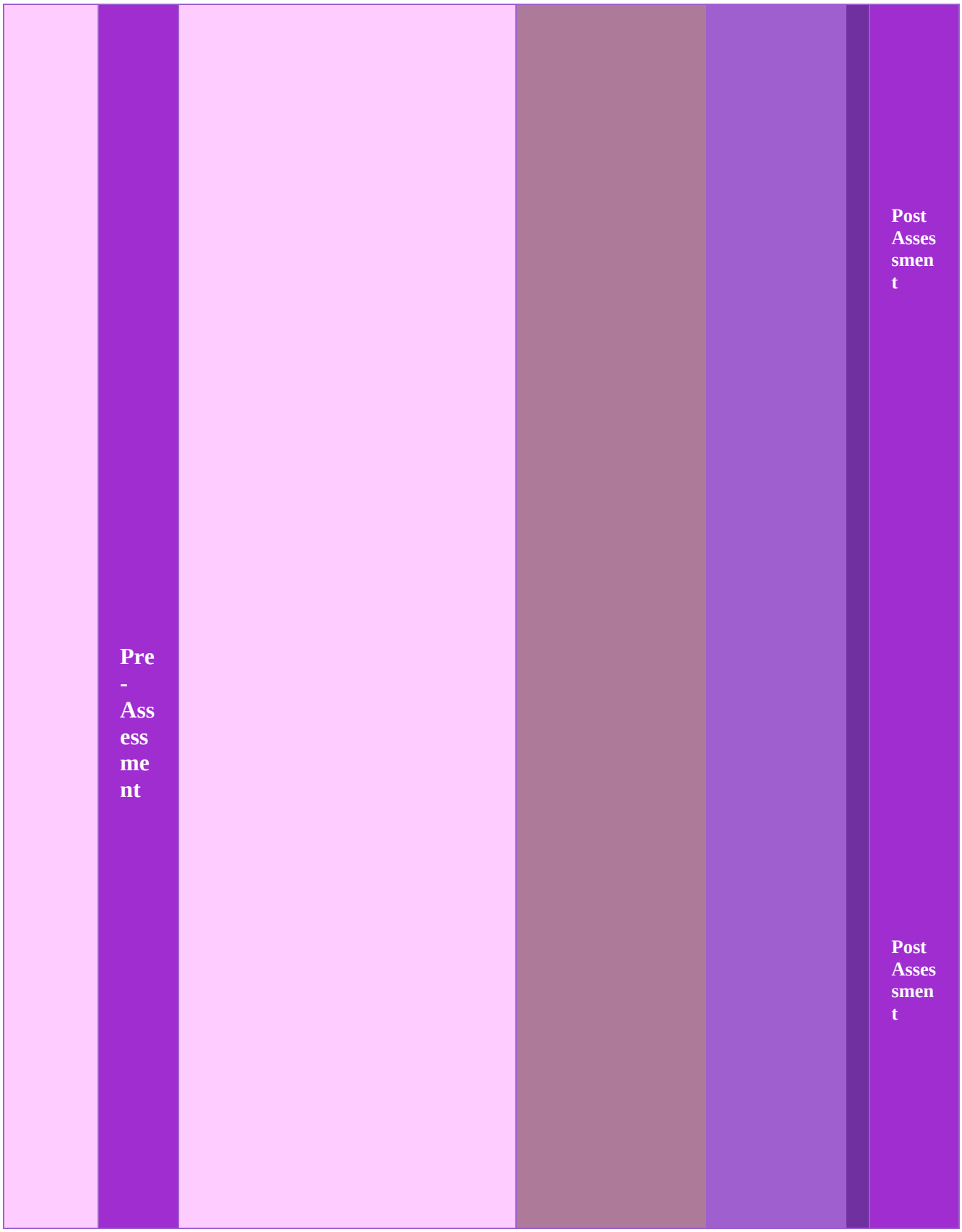
Balanced Assessment Schedule for Grades VI- VIII

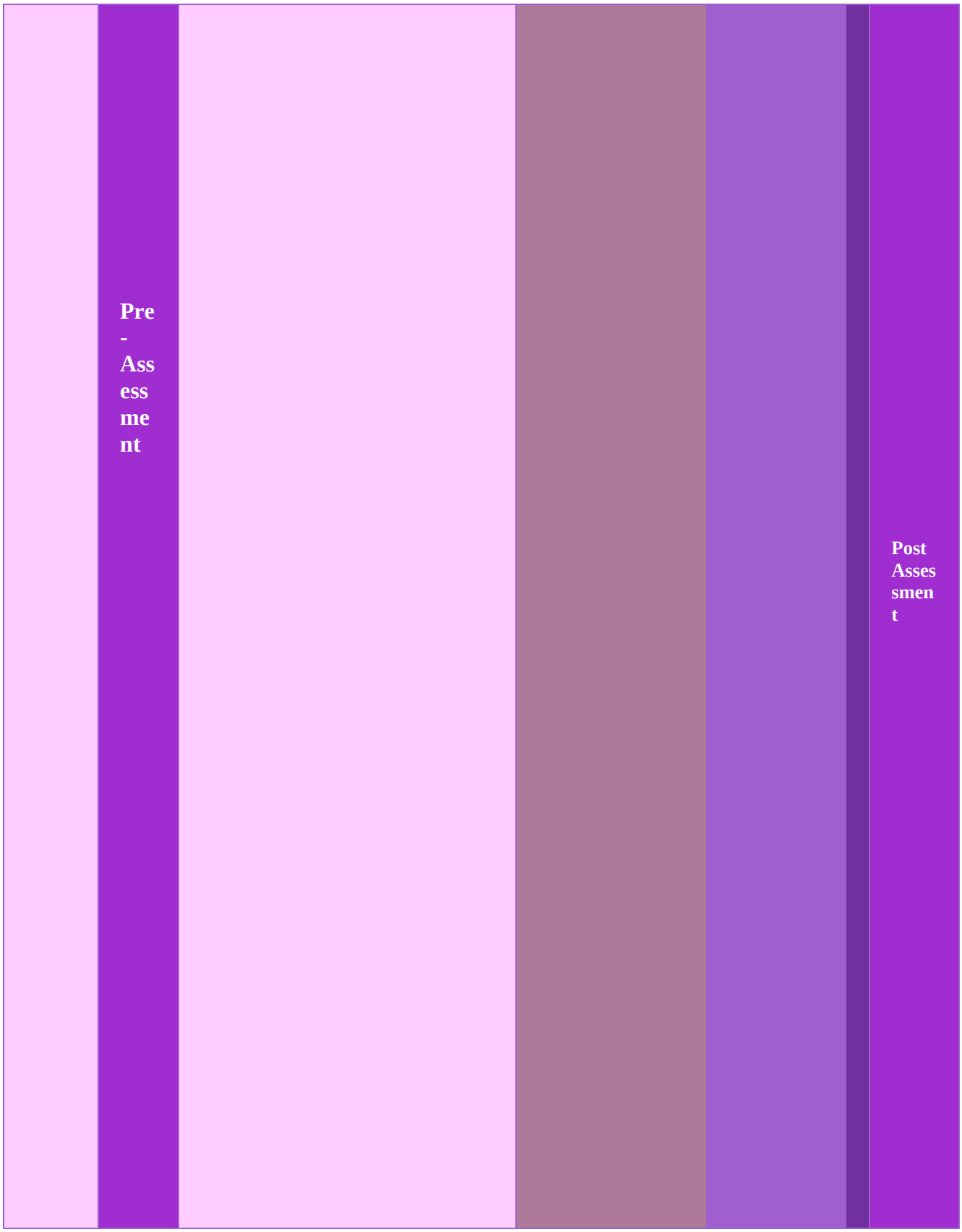
<table>
<tr><th>Overall Domain Code*</th><th colspan="6">Assessment Schedule</th></tr>
<tr><td></td><td>One Month</td><td>Term I (4 Months)</td><td>One Month</td><td>Term II (4 Months)</td><td>One Month</td><td>One Month</td></tr>
<tr><td>CRC
CRP
CUC
CAP
CANC
AR
ARE
PP</td><td rowspan="2">Pre-Assessment</td><td rowspan="2">Formative Assessment (40% Marks based on Ongoing)</td><td rowspan="2">School based Summative Assessment (60% Marks)</td><td colspan="2" rowspan="2"></td><td rowspan="2"></td><td rowspan="2">Post Assessment - One Month After Term II</td></tr>
<tr><td>CEC
CCP
AV
PS
PGR
PM</td><td colspan="2"></td><td>Formative Assessment (40% Marks based on Ongoing)</td><td>School based Summative Assessment (60% Marks) And/or Large scale assessments wherever required.</td><td></td><td>Post Assessment</td></tr>
</table>

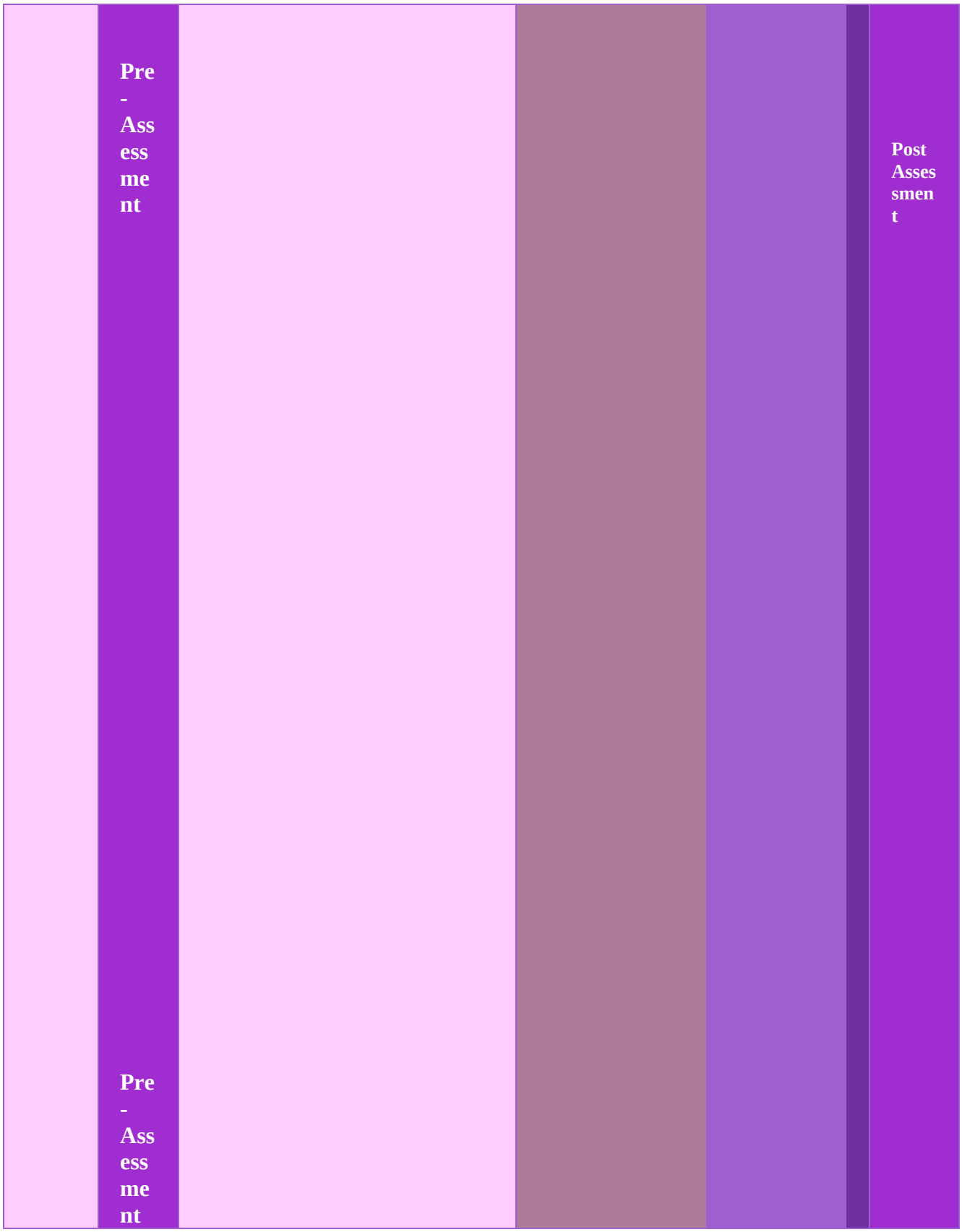

Pre - Assessment
Post Assessment


Pre-Assessment
Post Assessment
Post Assessment

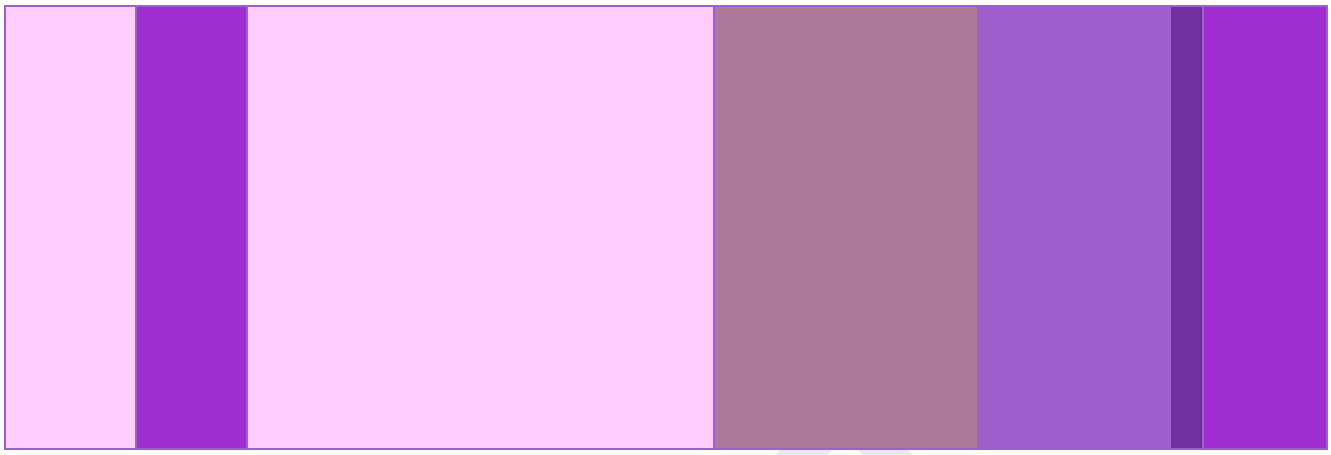
	Pre-Assessment - One Month Prior to Term I **Pre-Assessment**					**Post Assessment**


Pre-Assessment
Post Assesmen t
Post Assesmen t


Pre-Assessment
Post Assessment


Pre-Assessment
Post Assesmen t
Pre-Assessment

Pre-Assessment



* This includes all the SLOs contained within the Domain Code

Concluding Remarks – Exit to the Next Cycle

The framework can be considered a blueprint of an assessment programme at the primary school level. It provides the broad overview of policy guidelines for assessment framework 2021 while guiding the alignment of student learning outcomes with assessment strategies. It identifies the learning targets, the deep learning approaches, and the strategies for assessing the same. In doing this, it ensures that the assessments are interconnected and purposeful.

While the blueprint is necessary as an overarching guide, its enactment will require professional judgement. Its real purpose will be realized when teachers use it at the classroom level to modify their teaching to match students' learning needs, when school leaders use it to accomplish their goals more effectively by replacing some programmes or practices with better ones (Fullan, 2001) and when the public education departments use it to invest in practices that yield positive results. The education practices, redefined in this manner, are again put to the test and the process of ongoing purposeful assessment continues.

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Appendices

Appendix A

Bloom's Revised Taxonomy Model – Cognitive Domain

Cognitive Dimension	The Knowledge Dimension			
Remember Recall or retrieve previous learned information from long-term memory	**Factual** The basic elements a student must know to be acquainted with a discipline or solve problems in it.	**Conceptual** The interrelationships among the basic elements within a larger structure that enable them to function together.	**Procedural** How to do something, methods of inquiry, and criteria for using skills, algorithms, techniques, and methods.	**Metacognitive** Knowledge of cognition in general as well as awareness and knowledge of one's own cognition
	List primary and secondary colours.	Recognize action words.	Recall how to perform a sum based on four operations.	Identify strategies for retaining information
Key Words (Verbs)	Labels, lists, names, outlines, states	Defines, describes, identifies, and knows.	Recalls, recognizes, matches.	Reproduces, selects.
Sample Assessment	MCQs, fill in the blanks, tables, rules.	Comprehension passage, CRQs, problem solving.	Solving maths sums, using words in sentences, performing experiments, hands on activities.	Retelling stories, word problems.
Understand Construct meaning from instructional messages, including oral, written and graphic communication.	Summarize features of a new product.	Explain the main ideas of a play or piece of literature.	Explain in one's own words the steps for performing a complex task.	Predict one's response to a performance.
Key Words (Verbs)	*Summarizing* (abstracting, generalizing) *Explaining* (constructing models)	*Classifying* (categorizing, subsuming) *Exemplifying* (illustrating, instantiating)	*Interpreting* (clarifying, paraphrasing, representing, translating) *Comparing* (contrasting,	*Inferring* (concluding, extrapolating, interpolating, predicting)

			mapping, matching)	
Sample Assessment	**Write an essay**	**Group Work/Cooperative Learning**	**Project Work**	**Story telling**
Apply **Carry out or use a procedure in a given situation.**	**Respond to frequently asked questions.**	**Provide advice to juniors.**	**Divide one whole number by another whole number, both with multiple digits.**	**Use techniques that match one's strengths.** **Use class rules in situations in which it is appropriate.**
Key Words (Verbs)	**Demonstrates, discovers.**	**Constructs, relates.**	**Computes, demonstrates, manipulates, operates, prepares, produces, solves.**	**Changes, discovers, modifies, predicts and uses.**
Samples Assessment	**Responds to questions.**	**Match, complete sentences.**	**Solves sums; role play.**	**Create a blog.**
Analyse **Break material into its constituent parts & determine how the parts relate to-one another and to an overall structure or purpose.**	**Select the most complete list of activities.**	**Distinguish between relevant and irrelevant numbers in a mathematical word problem.**	**Compare and contrast four ways of serving foods made with apples and examine which ones have the highest health benefits.**	**Determine the point of view of the author of an essay.**
Key Words (Verbs)	**Focusing, selecting**	**Differentiating (discriminating, distinguishing).**	**Organizing (finding, coherence, integrating, outlining, structuring).**	**Attributing (deconstructing).**
Samples Assessment	**Library search.**	**Developing an argument; debating.**	**Summarizing data in the form of graphs, pictures, tables, etc.**	**Review of a written piece of work, oral discourse, story, movie, etc.**
Evaluate **Make judgments based on criteria**	**Select the most complete list of activities.**	**Determine which kinds of apples are best for baking a pie, and why.**	**Judge which of the two methods is the best way to solve a given problem.**	**Reflect on one's progress.**

and standards.				
Key Words (Verbs)	**Describes, explains.**	**Checking (coordinating, detecting, monitoring, testing).**	**Interprets, justifies, relates, summarizes and supports.**	**Critiquing (judging).**
Sample Assessment	**Group discussion.**	**Survey.**	**Interpreting a graph, a picture, etc.**	**Blogs; self-evaluation.**
Create **Put elements together to form a coherent or functional whole; reorganize elements into a new pattern or structure**	**Generate a log of daily activities.**	**Compose a story.**	**Design an efficient project workflow.**	**Inventing a product.**
Key Words (Verbs)	**Compiles, explains, reorganizes, summarizes,**	**Planning (designing).**	**Producing (construct).**	**Generating (hypothesizing).**
Sample Assessment	**Game; network with others.**	**Write a story.**	**Create a new model.**	**Create a learning portfolio.**

Bloom's Revised Taxonomy Model – Affective Domain

Affective Domain			
Dimension	**Examples**	**Key words/Verbs**	**Sample Assessment**
Receiving The lowest level. Awareness of feelings, emotions, ideas, material, and phenomenon, etc. Passively paying attention.	**Demonstrates a willingness to participate in the activity.**	**Asks, chooses, describes, follows, gives, holds, identifies, locates, names, points to, selects, replies, uses, acknowledges, attentive, courteous, dutiful, follows, listens, understands.**	**Listening exercises; Listen for and remember the name of newly introduced people; watch a movie or another student's presentation, and then write a summary.**
Responding The student actively participates in the learning process, not only attends to a stimulus; the student also reacts in some way.	**Shows interest in the objects, phenomena, or activity by seeking it out or pursuing it for pleasure.**	**Answers, assists, aids, complies, conforms, discusses, greets, helps, labels, performs, tells, practices, presents, reads, recites, reports, selects and writes.**	**Completion of class tasks/homework; participation in class/group discussion; presentation; response to questions; compliance with class rules and certain procedures.**
Valuing The worth or value a person attaches to a particular object, phenomenon, or behaviour. This ranges from simple acceptance to the more complex state of commitment.	**Simpler acceptance could be being part of the team; while a more complex level of commitment may include being responsible for the overall improvement of the team.**	**Appreciates, cherish, treasure, demonstrates, initiates, invites, joins, justifies, proposes, respect, shares. Completes, differentiates, explains, follows, forms, initiates, invites, joins, justifies, proposes, reads, reports, selects, studies, works.**	**Write an opinion piece on any issue, explaining one's own stance and reasons supporting that stance; seeking out information in popular media related to a particular topic; proposing a plan to improve team skills.**
Organizing Organizes values into priorities by contrasting different values, resolving conflicts between them, and creating a unique value system. The emphasis is on	**The student can put together different values, information, and ideas, and can accommodate them within his/her own schema; the student is comparing, relating and elaborating on what has been learned.**	**Compares, relates, synthesizes, adheres, alters, arranges, combines, completes, defends, explains, formulates, generalizes, identifies, integrates, modifies, orders, organizes, prepares.**	**Explains the role of systematic planning in solving problems. Accepts ethical standards. Spending more time studying than playing sports; organizes and compares different cultures, evaluating the**

comparing, relating, and synthesizing values.			**differences between them.**
Characterizing Highest level. Internalizing values. Student has a value system that controls his or her behaviour. The behaviour is pervasive, consistent, and predictable.	**Shows self-reliance when working independently; cooperates in group activities (displays teamwork); uses an objective approach in problem solving; follows rules and regulations on daily basis.**	**Acts, discriminates, displays, influences, modifies, performs, qualifies, questions, revises, serves, solves, verifies.**	**Group work and group project.**

Sources:

https://www.astate.edu/dotAsset/7a3b152c-b73a-45d6-b8a3-7ecf7f786f6a.pdf

https://teaching.uncc.edu/services-programs/teaching-guides/course-design/blooms-educational-objectives

https://uwaterloo.ca/centre-for-teaching-excellence/teaching-resources/teaching-tips/planning-courses-and-assignments/course-design/blooms-taxonomy

https://thepeakperformancecenter.com/educational-learning/learning/process/domains-of-learning/affective-domain/

Appendix C

Bloom's Revised Taxonomy Model – Psychomotor Domain

Affective Domain			
Dimension	**Examples**	**Key words/Verbs**	**Sample Assessment**
Perception (awareness) The ability to use sensory cues to guide motor activity. This ranges from sensory stimulation, through cue selection, to translation.	**Detects non-verbal communication cues. Estimate where a ball will land after it is thrown and then moving to the correct location to catch the ball.**	**Chooses, describes, detects, differentiates, distinguishes, identifies, isolates, relates, selects.**	**A game of dodgeball; reading expressions.**
Set Readiness to act. Mental, physical, and emotional dispositions that make one respond in a certain way to a situation.	**Knows and acts upon a sequence of steps in a process. Shows desire to learn a new process Attend project exhibition. Observe demonstrations through audio, videos, visuals. Set-up lab equipment for experiments.**	**Begins, displays, explains, moves, proceeds, reacts, shows, states and volunteers.**	**Pre-lab assessment; self-criteria; summary of demonstration and set-up process.**
Guided Response The early stages in learning a complex skill that includes imitation and trial and error. Adequacy of performance is achieved by practicing.	**Performs a mathematical equation as demonstrated. Follows instructions to build a model.**	**Copies, traces, follows, react, reproduce, responds.**	**Evaluate accuracy with criteria on standard performance. Run for 25 minutes steadily. Determine the density of a group of sample metals with regular and irregular shapes.**
Mechanism (basic proficiency) This is the intermediate stage in learning a complex skill. Learned responses have become habitual	**Use a personal computer. Repair a toy. Drive a bicycle. Holding a pencil.**	**Assembles, calibrates, constructs, dismantles, displays, fastens, fixes, grinds, heats, manipulates, measures, mends,**	**Performance test (performance indicators). Self-evaluation on performance (based on progress and confidence)**

and the movements can be performed with some confidence & proficiency.		**mixes, organizes and sketches.**	**Performance in a game (football, hockey).** **Solving a problem, using pre-set procedures.**
Complex Overt Response Performs task or objective in a confident, proficient, and habitual manner	**Control and use correct movements when playing instruments, drawing with pencil and painting proficiently.** **Operate and run machines (e.g., computer) efficiently.** **Use equipment with confidence.**	**Assembles, builds, calibrates, constructs, dismantles, displays, fastens, fixes, grinds, heats, manipulates, measures, mends, mixes, and organizes, sketches.** **NOTE: The Key Words are the same as Mechanism, but will have adverbs or adjectives that indicate that the performance is quicker, better, more accurate, etc.**	**Clinical exams.** **Final project (ex. Create project exhibition).** **Performance in a role play.**
Adaptation Skills are well developed, and the individual can modify movement patterns to fit special requirements.	**Use tools for situations outside typical discipline.** **Responds effectively to unexpected experiences.** **Modifies instruction to meet the needs of the learners.**	**Adapts, alters, changes, rearranges, reorganizes, revises and varies.**	**Field based tasks. Revise and improve procedures of movements, written responses.** **Portfolio.**
Origination Creating new movement patterns to fit a particular situation or specific problem. Learning outcomes emphasize creativity based upon highly developed skills.	**Constructs a new theory/story. Develops a new teamwork approach. Creates a new project; a new programme.**	**Arranges, builds, combines, composes, constructs, creates, designs, initiate, makes, originates.**	**Story writing; project work; models; work plans.**

Sources:
https://www.astate.edu/dotAsset/7a3b152c-b73a-45d6-b8a3-7ecf7f786f6a.pdf

https://teaching.uncc.edu/services-programs/teaching-guides/course-design/blooms-educational-objectives

https://uwaterloo.ca/centre-for-teaching-excellence/teaching-resources/teaching-tips/planning-courses-and-assignments/course-design/blooms-taxonomyhttp://www.nwlink.com/~donclark/hrd/Bloom/psychomotor_domain.html

Appendix D

Curriculum Mapping
Grade VI

COGNITIVE DOMAIN

Low Order Taxonomies (Cognitive)						High Order Taxonomies (Cognitive)						
Remember	**No**	**Understand**	**No**	**Apply**	**No**	**Analyse**	**No**	**Evaluate**	**No**	**Create**	**No**	**Total**
Domain A: ICT Fundamentals												
		[SLO: CS-06-A-01] Students will be able to recognize various ICT devices and their applications. (c)	**01**			**[SLO: CS-06-A-03] Students will be able to identify and analyse (basic) hardware components of a computing system (e.g., processor, memory and storage). (c)**	**01**					**02**
		[SLO: CS-06-A-02] Students will be able to define and differentiate between computer hardware and software(c)	**01**									**01**
Total Frequency			**02**				**01**					**03**
Domain B: Digital Skills												

[SLO: CS-06-B-01] Students will be able to navigate around an Operating System (e.g. Microsoft Windows, MAC OS, Linux, Ubuntu, Android, iOS, etc.)(p)	**01**			**[SLO: CS-06-B-02] Students will be able to develop and demonstrate image-processing skills (using various software tools e.g. Paint, 3D Paint, Tux, etc.), while efficiently using computer hardware (e.g. mouse, keyboard, etc.) (p)**	**01**							**02**
				[SLO: CS-06-B-03] Students will demonstrate how to navigate the internet to conduct a search query and arrive at an authentic result.(P)	**01**							**01**
Total Frequency	**01**				**02**							**03**
Domain C: Algorithmic Thinking and Problem Solving												
		[SLO: CS-06-C-01] Students will be able to identify, define and analyse a problem(c)	**1**	**[SLO: CS-06-C-02] Students will be able to apply basic algorithmic thinking to solve different types of problems(p)**	**01**							**02**
Total Frequency			**01**		**01**							**02**
Domain D: Programming												

		[SLO: CS-06-D-01] Students will be able to analyse the fundamentals of computer programming(c)	**01**							**[SLO: CS-06-D-02] Students will be able to analyse and apply basic programming constructs (e.g. sequence, selection, repetition, variables, inputs/events) ; by creating simple single-sprite, single-script programs using a visual programming tool.(p)**	**01**	**02**
										[SLO: CS-06-D-Add] Additional SLO: Students will be able to apply basic programming constructs (e.g., sequence, selection, repetition, variables, inputs/events) ; by creating simple single-	**01**	**01**

										sprite, single-script programs using textual programming tools(p)		
Total Frequency			**01**								**02**	**03**
Domain E: Digital Citizenship												
		[SLO: CS-06-E-01] Students will analyse the basics of information literacy and digital civility and appropriate uses of technology(c)	**01**									**01**
Total Frequency			**01**									**01**
Domain F: Entrepreneurship in Digital Age												
				[SLO: CS-06-F-01] Students will define and analyse entrepreneurship subtypes and summarize the entrepreneurship process(c)	**01**							**01**
Total Frequency												**01**
Overall Total	**01**		**05**		**04**		**01**		**-**		**02**	**13**

AFFECTIVE DOMAIN

From Lower Order Taxonomies to Higher Order Taxonomies										
Receiving	**No**	**Responding**	**No**	**Valuing**	**No**	**Organizing**	**No**	**Characterizing**	**No**	**Total**
Domain E: Digital Citizenship										
[SLO: CS-06-F-01] Students will define and analyse entrepreneurship subtypes and summarize the entrepreneurship process	**01**									**01**
Total Frequency	**01**									**01**
Domain F: Entrepreneurship in Digital Age										
		[SLO: CS-06-E-01] Students will analyse the basics of information literacy and digital civility and appropriate uses of technology	**01**							**01**
Total Frequency			**01**							**01**
Total overall	**01**		**01**							**02**

PSYCHOMOTOR DOMAIN

From Low Order Taxonomies to High Order Taxonomies

Perception	No	Set	No	Guided Response	No	Mechanism	No	Complex Overt Response	No	Adaptation	No	Origination	No
Domain B: Digital Skills													
				[SLO: CS-06-B-01] Students will be able to navigate around an Operating System (e.g., Microsoft Windows, MAC OS, Linux, Ubuntu, Android, iOS, etc.).	**01**								**01**
				[SLO: CS-06-B-02] Students will be able to develop and demonstrate image-processing skills (using various software tools e.g., Paint, 3D Paint, Tux, etc.), while efficiently using computer hardware (e.g., mouse, keyboard, etc.)	**01**								**01**
				[SLO: CS-06-B-03] Students will demonstrate	**01**								**01**

				how to navigate the internet to conduct a search query and arrive at an authentic result.									
Total Frequency					**03**								**03**
Domain C: Algorithmic Thinking and Problem Solving													
				[SLO: CS-06-C-02] Students will be able to apply basic algorithmic thinking to solve different types of problems.	**01**								**01**
Total Frequency					**01**								**01**
Domain D: Programming													
				[SLO: CS-06-D-02] Students will be able to analyse and apply basic programming constructs (e.g. sequence, selection, repetition, variables, inputs/events); by creating simple single-	**01**								**01**

				sprite, single-script programs using a visual programming tool.									
				[SLO: CS-06-D-Add] Additional SLO: Students will be able to apply basic programming constructs (e.g. sequence, selection, repetition, variables, and inputs/events); by creating simple single-sprite, single-script programs using textual programming tools.	**01**								**01**
Total Frequency					**02**								**02**
Domain E: Digital Citizenship													
		[SLO: CS-06-E-01] Students will analyse the basics of information literacy	**01**										**01**

		and digital civility and appropriate uses of technology.											
Total Frequency			**01**										**01**
Total overall			**01**		**06**								**07**

Appendix E

Curriculum Mapping

Grade VII

COGNITIVE DOMAIN

Low Order Taxonomies (Cognitive)						High Order Taxonomies (Cognitive)						
Remember	**No**	**Understand**	**No**	**Apply**	**No**	**Analyse**	**No**	**Evaluate**	**No**	**Create**	**No**	**Total**
Domain A: ICT Fundamentals												
		[SLO: CS-07-A01] Students will be able to identify the use of emerging technologies in various walks of life (e.g., artificial	**1**									

		intelligence, biometrics, robotics, computer-assisted translation, 3D and holographic imaging, virtual reality, Cloud Computing, and open-source software. (C)										
[SLO: CS-07-A-02] Students will be able to identify (advanced) hardware components of a computing system (e.g., different types of I/O ports, different types of peripherals, and	**01**											

networking components). (C)												
Total Frequency	**01**		**01**									**02**
Domain B: Digital Skills												
				[SLO: CS-07-B-01] Students will be able to develop and demonstrate word-processing and presentation skills (using various software tools e.g., MS Word, MS PowerPoint, Prezi, Canvas, Photo Story, Moviemaker, etc.) (P)	**01**							
				[SLO: CS-07-B-02] Students will get introduced to electronic mailing systems (email) and learn appropriate usage. (P)	**01**							
Total Frequency					**02**							**02**

Domain C: Algorithmic Thinking and Problem Solving												
				[SLO: CS-07-C-01] Students will be able to apply the concept of computational thinking to handle complex problems. (P)	**01**							
				[SLO: CS-07-C-02] Students will be able to apply concepts of conditional statements, finite and infinite loops to write different algorithms. (P)	**01**							
Total Frequency					**02**							**02**
Domain D: Programming												
		[SLO: CS-07-D-01] Students will be able to explain how computers encode and decode computer programs (i.e., identification of decimal to binary and vice versa, conversion of	**01**									

		texts, images and sounds in binary). (C)										
				[SLO: CS-07-D-02] Students will be able to apply fundamental programming constructs to create multi-sprite, multi-script programs using visual programming tools. (P)	**01**							
				[SLO: CS-07-D-Add] Additional SLO: Students will be able to apply fundamental programming constructs to create multi-script programs using textual programming tools. (P)	**01**							
Total Frequency			**01**		**02**							**03**
Domain E: Digital Citizenship												
								[SLO: CS-07-E-01] Students will identify ways to	**01**			

								protect against malicious activities or behaviors in the digital environment. (C)				
Total Frequency									**01**			**01**
Domain F: Entrepreneurship in Digital Age												
						[SLO: CS-07-F-01] Students will analyze the uses and benefits of design thinking for entrepreneurs. (C)	**01**					
Total Frequency							**01**					**01**
Overall Total	**01**		**02**		**06**		**01**		**01**			**11**

AFFECTIVE DOMAIN

From Lower Order Taxonomies to Higher Order Taxonomies										
Receiving	**No**	**Responding**	**No**	**Valuing**	**No**	**Organizing**	**No**	**Characterizing**	**No**	**Total**
Domain C: Algorithmic Thinking and Problem Solving										
		[SLO:CS-07-C-01] Students will be able to apply the concept of computational	**1**							

		thinking to handle complex problems.								
Total Frequency			**01**							**01**
Domain D: Programming										
		[SLO: CS-07-D-01] Students will be able to explain how computers encode and decode computer programs (i.e. identification of decimal to binary and vice versa, conversion of texts, images and sounds in binary).	**01**							
Total Frequency			**01**							**01**
Domain E: Digital Citizenship										
				[SLO:CS-07-E-01] Students will identify ways to protect against malicious activities or behaviours in the digital environment.	**01**					
Total Frequency					**01**					**01**
Total overall			**02**		**01**					**03**

PSYCHOMOTOR DOMAIN

From Low Order Taxonomies to High Order Taxonomies														
Perception	**No**	**Set**	**No**	**Guided Response**	**No**	**Mechanism**	**No**	**Complex Overt Response**	**No**	**Adaptation**	**No**	**Origination**	**No**	**Total**
Domain A: ICT Fundamentals														

[SLO: CS-07-A-02] Students will be able to identify (advanced) hardware components of a computing system (e.g. different types of I/O ports, different types of peripherals, and networking components).	**01**													
Total Frequency	**01**												**01**	**02**
Domain B: Digital Skills														
				[SLO: CS-07-B-01] Students will be able to develop and demonstrate word-processing and presentation skills (using various software tools e.g. MS Word, MS PowerPoint, Prezi, Canvas, Photo Story, Moviemaker, etc.)	**01**									

				[SLO: CS-07-B-02] Students will get introduced to electronic mailing systems (email) And learn appropriate usage.	**01**									
Total Frequency					**02**								**02**	**04**
Domain C: Algorithmic Thinking and Problem Solving														
				[SLO: CS-07-C-01] Students will be able to apply the concept of computational thinking to handle complex problems.	**01**									
				[SLO: CS-07-C-02] Students will be able to apply concepts of conditional statements, finite and infinite loops to Write different algorithms.	**01**									
Total Frequency					**02**								**02**	**04**
Domain D: Programming														
				[SLO: CS-07-D-02] Students will be able to apply fundamental programming	**1**									

				constructs to create multi-sprite, multi-script programs using visual programming tools.										
				[SLO: CS-07-D-Add] Additional SLO: Students will be able to apply fundamental programming constructs to create multi sprite, multi-script programs using textual programming tools.	**01**									
Total Frequency					**02**								**02**	**04**
Domain F: Entrepreneurship in Digital Age														
				[SLO: CS-07-F-01]Students will analyse the uses and benefits of design thinking for entrepreneurs.	**1**									
Total Frequency					**01**								**01**	**02**
Total overall	**01**				**07**								**08**	**16**

Appendix F

Curriculum Mapping

Grade VIII

COGNITIVE DOMAIN

Low Order Taxonomies (Cognitive)						High Order Taxonomies (Cognitive)						
Remember	**No**	**Understand**	**No**	**Apply**	**No**	**Analyse**	**No**	**Evaluate**	**No**	**Create**	**No**	**Total**
Domain A: ICT Fundamentals												
						[SLO:CS-08-A-01] Students will be able to analyse the usage of emerging technologies in various walks of life (e.g. artificial intelligence, 5G, robotics, computer-assisted	**01**					

						translation, 3D and holographic imaging, virtual reality, distributed applications, block chain, and Machine Learning.) (C)						
						[SLO: CS-08-A-02] Students will be able to identify and analyse a network and identify core networking components and their roles. (C)	**01**					
Total Frequency							**02**					**02**
Domain B: Digital Skills												
				[SLO: CS-08-B-01] Students will be able to develop and demonstrate data handling skills (using various software tools e.g. MS Excel, Google sheets, etc.) (P)	**1**							
				[SLO: CS-08-B-Add] Additional SLO Students will learn	**1**							

				how to research information from the internet for a report that answers a research question and communicates results and conclusions. (P)								
Total Frequency					**02**							**02**
Domain C: Algorithmic Thinking and Problem Solving												
				[SLO: CS-08-C-01] Students will be able to apply the concepts of computational thinking and problem-solving strategies to solve complex problems by identifying the most efficient algorithm. (P)	**01**							
				[SLO: CS-08-C-02] Students will be able to apply the concepts of nesting in algorithmic design thinking. (P)	**01**							
Total Frequency					**02**							**02**
Domain D: Programming												
										[SLO: CS-08-D-01] Students will be able to apply intermediate-	**01**	

										level programming constructs (e.g. functions, cloning, conditional movement); by creating mini-games using a visual programming tool. (P)		
										[SLO: CS-08-D-Add] Additional SLO: Students will be able to apply intermediate level programming constructs (e.g. functions, cloning, conditional movement); by creating mini-games using a textual programming tool. (P)	**01**	
						[SLO: CS-08-D-Add] Additional SLO Students will be able to analyse constructs and fundamentals	**01**					

						of textual (syntax-based) programming. (C)						
Total Frequency							**01**				**02**	**03**
Domain E: Digital Citizenship												
								[SLO: CS-08-E-01] Students will identify ways of protecting against cybercrimes. (C)	**01**			
Total Frequency									**01**			**01**
Domain F: Entrepreneurship in Digital Age												
										[SLO: CS-08-F-01] Students will develop an understanding of the basics of digital marketing platforms and social media marketing to develop a marketing plan for a business. (P)	**01**	
										[SLO: CS-08-F-02] Students	**01**	

										will be able to identify and create different components of a business plan i.e. market need, product design, costing, operations, and marketing. (P)		
Total Frequency											**02**	**02**
Overall Total	**0**		**0**		**4**		**3**		**1**		**4**	**12**

AFFECTIVE DOMAIN

From Lower Order Taxonomies to Higher Order Taxonomies										
Receiving	**No**	**Responding**	**No**	**Valuing**	**No**	**Organizing**	**No**	**Characterizing**	**No**	**Total**
Domain A: ICT Fundamentals										
		[SLO: CS-08-A-01] Students will be able to analyse the usage of emerging technologies in various walks of life (e.g. artificial intelligence, 5G, robotics, computer-assisted translation, 3D and	**01**							

		holographic imaging, virtual reality, distributed applications, block chain, and Machine Learning.)								
		[SLO: CS-08-A-02] Students will be able to identify and analyse a network and identify core networking components and their roles.	**1**							
Total Frequency			**02**							**02**
Domain B: Digital Skills										
Total Frequency										
Domain D: Programming										
		[SLO: CS-08-D-01] Students will be able to apply intermediate-level programming constructs (e.g. functions, cloning, conditional movement); by	**1**							

		creating mini-games using a visual programming tool.								
Total Frequency			**01**							**01**
Domain E: Digital Citizenship										
				[SLO: CS-08-E-01] Students will identify ways of protecting against cybercrimes.	**1**					
Total Frequency					**01**					**01**
Total overall			**03**		**01**					**04**

PSYCHOMOTOR DOMAIN

From Low Order Taxonomies to High Order Taxonomies														
Perception	**No**	**Set**	**No**	**Guided Response**	**No**	**Mechanism**	**No**	**Complex Overt Response**	**No**	**Adaptation**	**No**	**Origination**	**No**	**Total**
Domain A: ICT Fundamentals														
		[SLO: CS-08-A-01] Students will be able to analyse the usage of emerging technologies in various walks of life (e.g. artificial intelligence, 5G, robotics, computer-assisted translation, 3D and holographic imaging, virtual reality, distributed applications, block chain, and Machine Learning.)	**01**											

Total Frequency			**01**											**01**
Domain B: Digital Skills														
				[SLO: CS-08-B-01] Students will be able to develop and demonstrate data handling skills (Using various software tools e.g. MS Excel, Google sheets, etc.)	**01**									
				[SLO: CS-08-B-Add] Additional SLO Students will learn how to research information from the internet for a report that answers a research question and	**01**									

				communicates results and conclusions.										
Total Frequency					**02**									**02**
Domain C: Algorithmic Thinking and Problem Solving														
				[SLO: CS-08-C-01] Students will be able to apply the concepts of computational thinking and problem-solving strategies to solve complex problems by identifying the most efficient algorithm.	**01**									
				[SLO: CS-08-C-02] Students will be able to apply the concepts of nesting in algorithmic design thinking.	**01**									

Total Frequency					**02**									**02**
Domain D: Programming														
						[SLO: CS-08-D-01] Students will be able to apply intermediate-level programming constructs (e.g. functions, cloning, conditional movement); by creating mini-games using a visual programming tool.	**01**							
						[SLO: CS-08-D-Add] Additional SLO: Students will be able to apply intermediate-level programming constructs (e.g. functions, cloning, conditional movement); by creating mini-games using a textual programming tool.	**01**							
						[SLO: CS-08-D-	**0**							

						Add] Additional SLO Students will be able to analyse constructs and fundamentals of textual (syntax-based) programming	**1**							
Total Frequency							**03**							**03**
Domain F: Entrepreneurship in Digital Age														
				[SLO: CS-08-F-01] Students will develop an understanding of the basics of digital marketing platforms and social media marketing to develop a marketing plan for a business.	**01**									
				[SLO: CS-08-F-02] Students will be able to identify and create different components	**01**									

				of a business plan i.e. market need, product design, costing, operations, and marketing.										
Total Frequency					**02**									**02**
Total overall			**01**		**06**		**03**							**10**