Grade 10 Computer Science

Term 1 - 62 complete lesson plans

Ready to teach, in the KICD lesson-plan format | 40-minute lessons | PDF and editable Word

ABOUT THIS PACK

62 complete, ready-to-teach Grade 10 Computer Science lesson plans for Term 1, covering evolution of computers, computer architecture, input/Output (I/O) devices, computer storage, central processing unit (CPU), operating system (OS), computer setup and data communication.

TOPICS IN THIS PACK

Topic	Name	Lessons
1.1	Evolution of Computers	6
1.2	Computer Architecture	4
1.3	Input/Output (I/O) Devices	12
1.4	Computer storage	6
1.5	Central Processing Unit (CPU)	6
1.6	Operating System (OS)	12
1.7	Computer setup	10
2.1	Data communication	6

INSIDE EVERY LESSON PLAN

- The specific learning outcomes, key inquiry question, core competencies, values and PCIs, and the resources needed.
- A timed lesson flow: what the teacher does and what the learners do, from introduction to summary.
- The key content (a worked example, notes or a practical with its expected results), then four practice questions with the answers for the teacher.
- The common mistake to watch for, and ideas for learners who need support and for those ready for more.
- A four-level CBC assessment rubric (EE, ME, AE, BE), homework, and a blank reflection space to fill in after teaching.

You also receive this pack as an editable Word file, so you can change any lesson to suit your class before you print it. Lessons follow the order of the KICD curriculum design.

CONTENTS

No.	Lesson	Topic	Page
1	Early computing devices before electronic computers	1.1 Evolution of Computers	5
2	From mechanical devices to electronic computers	1.1 Evolution of Computers	9
3	Generations of computers I: first and second generation	1.1 Evolution of Computers	13
4	Generations of computers II: third and fourth generation	1.1 Evolution of Computers	17
5	Fifth generation computers and matching technology to generation	1.1 Evolution of Computers	21
6	Appreciating the pace of change: Moore's Law and reflection	1.1 Evolution of Computers	25
7	The von Neumann architecture: main components	1.2 Computer Architecture	29
8	How the parts of the CPU and buses work together	1.2 Computer Architecture	33
9	Practical: modelling the von Neumann architecture	1.2 Computer Architecture	36
10	Number systems: binary, octal and hexadecimal	1.2 Computer Architecture	40
11	Input devices I: keyboard and pointing devices	1.3 Input/Output (I/O) Devices	44
12	Input devices II: capturing images, sound and codes	1.3 Input/Output (I/O) Devices	48
13	Output devices I: monitors and projectors	1.3 Input/Output (I/O) Devices	52
14	Output devices II: printers and speakers	1.3 Input/Output (I/O) Devices	56
15	Criteria for selecting input and output devices	1.3 Input/Output (I/O) Devices	60
16	Practical: using input and output devices to perform a task	1.3 Input/Output (I/O) Devices	64
17	Specialised input devices	1.3 Input/Output (I/O) Devices	68
18	Specialised output devices	1.3 Input/Output (I/O) Devices	72
19	Practical: comparing and selecting devices for a scenario	1.3 Input/Output (I/O) Devices	76
20	Advancement in input devices	1.3 Input/Output (I/O) Devices	80
21	Advancement in output devices	1.3 Input/Output (I/O) Devices	84
22	Input and output devices: review and appreciation	1.3 Input/Output (I/O) Devices	88
23	Types of computer storage: primary and secondary	1.4 Computer storage	92
24	Categorising storage by technology and connection	1.4 Computer storage	96
25	Practical: reading data from computer storage	1.4 Computer storage	100
26	Practical: writing data to computer storage	1.4 Computer storage	104
27	Criteria for selecting computer storage	1.4 Computer storage	108
28	Data safety in computer storage	1.4 Computer storage	112
29	Structural elements of the CPU	1.5 Central Processing Unit (CPU)	116
30	How the CPU's elements work together	1.5 Central Processing Unit (CPU)	120
31	Clock speed, cores and CPU performance	1.5 Central Processing Unit (CPU)	124
32	Types of CPUs I: architecture and device category	1.5 Central Processing Unit (CPU)	128

33	Types of CPUs II: single-core, multi-core, and reading real CPU specifications	1.5 Central Processing Unit (CPU)	132
34	The CPU and the human brain, and appreciating its role	1.5 Central Processing Unit (CPU)	136
35	What an operating system is and why every computer needs one	1.6 Operating System (OS)	140
36	Functions of an operating system I: managing hardware and resources	1.6 Operating System (OS)	144
37	Functions of an operating system II: file management and the user interface	1.6 Operating System (OS)	148
38	Classifying operating systems by user interface and number of users	1.6 Operating System (OS)	152
39	Classifying operating systems by licensing: open-source and proprietary	1.6 Operating System (OS)	156
40	Practical: exploring and comparing operating system interfaces	1.6 Operating System (OS)	160
41	Practical: installing an operating system I, preparing and starting the installation	1.6 Operating System (OS)	164
42	Practical: installing an operating system II, completing setup and installing drivers	1.6 Operating System (OS)	168
43	Practical: using the operating system to manage files and folders	1.6 Operating System (OS)	172
44	Practical: managing running programs and system settings	1.6 Operating System (OS)	176
45	Appreciating the importance of operating systems	1.6 Operating System (OS)	180
46	Operating systems: review and appreciation	1.6 Operating System (OS)	184
47	Common ports and cables I: USB, HDMI and VGA	1.7 Computer setup	188
48	Common ports and cables II: power, audio and networking	1.7 Computer setup	192
49	Matching cables to their correct ports	1.7 Computer setup	195
50	Practical: identifying ports and cables on a real computer	1.7 Computer setup	199
51	Setting up a computer I: placement and connecting peripherals safely	1.7 Computer setup	203
52	Setting up a computer II: power, network, and first power-on	1.7 Computer setup	207
53	Practical: setting up a computer from start to finish	1.7 Computer setup	211
54	Safety practices when setting up computers	1.7 Computer setup	215
55	Troubleshooting basic computer set-up problems	1.7 Computer setup	219
56	Computer setup: appreciating the correct procedure	1.7 Computer setup	223
57	Basic data communication concepts	2.1 Data communication	227
58	Characteristics of good data communication	2.1 Data communication	231
59	Components of a data communication system	2.1 Data communication	235
60	Practical: analysing real-life communication scenarios	2.1 Data communication	239
61	Modes of data flow: simplex, half-duplex and full-duplex	2.1 Data communication	243

62	Evolution and significance of data communication systems	2.1 Data communication	247

Early computing devices before electronic computers

Strand 1.0 Foundation of Computer Science (56 Lessons) > Sub-strand 1.1 Evolution of Computers | Lesson 1 of 6 | 40 minutes

SCHOOL	TEACHER	DATE
CLASS / STREAM	TIME	ROLL (B / G)

SPECIFIC LEARNING OUTCOME(S)

By the end of the lesson, the learner should be able to: a) name early computing devices used before electronic computers; b) explain what each early device was used for

KEY INQUIRY QUESTION(S)

- What is the importance of principles and technologies in the development of computers?
- How have computers evolved over the generations?

CORE COMPETENCIES, VALUES AND PCIS IN THIS LESSON

COMPETENCY	**Communication and collaboration**	Learners explain their thinking to a partner and report their findings to the group.
COMPETENCY	**Self-efficacy**	Learners attempt each task with confidence and see that effort improves results.
COMPETENCY	**Digital literacy**	Learners use a phone, tablet or the class computer to explore or check the idea.
VALUE	**Unity**	Learners share materials fairly and work as one team.
VALUE	**Responsibility**	Learners look after shared materials and finish every task.
VALUE	**Respect**	Learners listen while others explain and accept correction politely.
PCI	**Citizenship education**	Learners connect the work to their rights and duties in the community.
PCI	**Life skills**	Learners practise decision making and working with others.

LEARNING RESOURCES

Pictures or a chart of early computing devices (abacus, Pascaline, Jacquard loom) | A timeline chart of computer generations | Manila paper and marker pens | Digital devices or print materials for research (where available) | Notebooks and pencils

ORGANISATION OF LEARNING

Pairs for discussion and timeline work; groups of four for research and presentations; whole class for the review; individual notes throughout.

KEY WORDS

abacus | Pascaline | Jacquard loom | Analytical Engine | vacuum tube | transistor | integrated circuit | microprocessor | generation | Moore's Law

THE LESSON AT A GLANCE

Introduction	Teacher models	Guided practice	On their own	Wrap-up
6 min	9 min	10 min	9 min	6 min

Inside this plan: the step-by-step lesson flow with what the teacher and learners do, the key content, practice questions with answers, a common mistake to watch for, an assessment rubric on the four CBC levels, support and extension ideas, homework and a reflection page.

LESSON FLOW

Stage	Minutes	The teacher	The learners
Introduction	6	Greet the class and ask: "Long before phones and laptops, how do you think early traders counted large numbers of goods or animals?" Take two or three answers, link them to earlier work, then state today's outcome.	Answer the starter question, recall what they already know and read the outcome aloud.
Step 1: Teacher models	9	Take learners through "Early computing devices" (key ideas on the next page), explaining as you go. Use pictures or a chart of early computing devices (abacus, Pascaline, Jacquard loom), a timeline chart of computer generations, manila paper and marker pens. Ask learners to predict what comes next before you show it.	Watch, predict the next step, ask questions and note the key steps in their exercise books.
Step 2: Guided practice	10	Give questions 1 and 2. Move round the groups, ask "How do you know?" and correct errors kindly on the spot.	Work in pairs or small groups, explain each step to a partner and check one another's answers.
Step 3: Independent practice	9	Set questions 3 and 4 for individual work. Mark as you walk round and note who needs help in the next lesson.	Work on their own, then swap books with a partner to check.
Summary and conclusion	6	Ask two or three learners to state the key idea in their own words. Give this exit question and check the answers: "Why is Ada Lovelace important in computing history?"	Say the key idea in their own words and answer the exit question in the exercise book.

KEY IDEAS

Early computing devices

The abacus is one of the oldest counting tools, used for thousands of years to add and subtract by sliding beads along rods. Napier's bones, invented by John Napier, were sets of numbered rods used to help with multiplication and division.

The Pascaline, built by Blaise Pascal in 1642, was a mechanical adding machine that used gears to add and subtract numbers. Gottfried Leibniz later built the Stepped Reckoner, which could also multiply and divide.

The Jacquard loom (1801) used punched cards to control the pattern a weaving machine produced — this idea of punched cards later inspired early computer input. Charles Babbage designed the Difference Engine and the Analytical Engine in the 1830s and 1840s; the Analytical Engine is considered the first design for a general-purpose computer, and Ada Lovelace wrote the first algorithm meant to run on it, making her the first computer programmer.

PRACTICE QUESTIONS - WITH ANSWERS FOR THE TEACHER

No.	Question	Answer
1	What was the abacus used for?	**Counting, adding and subtracting numbers by sliding beads along rods.**
2	Who built the Pascaline, and what could it do?	**Blaise Pascal; it could mechanically add and subtract numbers.**
3	What idea from the Jacquard loom was later used in early computers?	**Using punched cards to store and feed in instructions or patterns.**
4	Why is Ada Lovelace important in computing history?	**She wrote the first algorithm intended to run on a machine (Babbage's Analytical Engine), making her the first computer programmer.**

WATCH OUT FOR

Learners think "computer" always meant an electronic machine. The word originally meant a person who computed (calculated) by hand or with simple tools.

ASSESSMENT RUBRIC - THE FOUR CBC LEVELS

Level	What the learner can do
Exceeds expectations (EE)	Can name early computing devices used before electronic computers confidently and accurately, explain the method used, and apply the idea to new or unfamiliar problems.
Meets expectations (ME)	Can name early computing devices used before electronic computers accurately in familiar situations; notices and corrects slips without help.
Approaches expectations (AE)	Can partly name early computing devices used before electronic computers, or does so with prompts from the teacher or a partner; makes some errors.
Below expectations (BE)	Cannot yet name early computing devices used before electronic computers without direct help; needs the idea taught again with concrete objects.

SUPPORT AND EXTENSION

Learners who need support	Give a matching card set: device name to picture or description to what it was used for.
Learners ready for more	Why was Charles Babbage's Analytical Engine considered ahead of its time? (Answer: It was designed with ideas found in modern computers, such as a way to store data, a way to process it, and a way to be given different instructions, over a century before electronic computers were built)
Inclusion	Seat learners with low vision near the board and read aloud whatever you write; use large, clear, tactile materials; allow extra time; pair with a patient partner; use gestures or Kenyan Sign Language for the key words.

HOMEWORK AND FOLLOW-UP

Redo questions 3 and 4 neatly in the exercise book. Then tell someone at home what you learned about "early computing devices before electronic computers" and bring one question of your own to ask next lesson.

TEACHER SELF-CHECK

- Did every learner get a turn to handle materials or explain their thinking?
- Did most learners meet the outcome? Write down the names of those who did not.
- Was the pace right — did any step take too long or too short a time?
- Which competency and value did I see learners showing?
- What will I change the next time I teach this lesson?

REFLECTION ON THE LESSON / SELF-REMARKS

Write this after teaching - what worked, what to change, which learners need follow-up.