The fetch-execute cycle

Teacher's Notes

Lesson Plan

Length	60 mins	Specification Link	212/b	Units
Learning objective		Candidates should be able to: (a) describe the function of the CPU as fetching and executing instructions stored in memory		

Time (min)	Activity	Further Notes
10	*Some of the content of this video/lesson was covered in the previous video (7. Purpose and function of the CPU) and the activities can be revisited in addition to the new ones for this lesson.* In order to assess learning from the previous videos and students' knowledge if the CPU ask some questions e.g. • What do the initials CPU stand for?	Central processing unit
	• List three components of the CPU?	Control unit, ALU, registers
	• What is the purpose of the CPU?	To control all aspects of the functioning of a computer or device containing a microprocessor.
15	Watch the set of videos, pausing to discuss the content.	
5	Discuss the videos to assess learning. Ask questions such as: • What is the basic function of the CPU?	It controls the activities of the computer by executing (carrying out) instructions that it fetches (gets) from memory.
	• What is the program counter?	This is a register in the CPU which stores the memory address of the next instruction to be fetched.
	• What happens when that address has been used?	The program counter is incremented by 1 so that it now has the address of the next instruction.
	• What is the function of the ALU?	The ALU executes (carries out) the instruction.
	Worksheet 1 Pupils to complete Worksheet 1 either on paper or on computer. Ask individual students for their answers and discuss with the class so that all students have the correct answers.	Answers provided. Ask students with the correct responses to explain to the class how they arrived at their answers.

Time (min)	Activity	Further Notes
10	The students use the **Interactive Activity 1**.	
	Extension Challenge/Homework Students to complete and submit Worksheet 2 for homework.	
5	**Plenary – Peer testing** Ask the students to work in pairs. On paper, each student should quickly draw a labelled diagram to show the fetch-execute cycle. They then compare their diagrams to check accuracy and which student has provided the most detailed information.	

WORKSHEET 1 ANSWERS

1

(a) What do the initials CPU stand for?

Central Processing Unit

(b) List three components of the CPU.

Control unit

Arithmetic and logic unit

Registers

(c) In relation to computer architecture, what are buses?

Communication systems that transfer data between components inside a computer.

2

Describe the function of the following in the fetch-execute cycle.

(a) Program counter

This is a register in the CPU which contains the memory address of the next instruction to be processed.

(b) The address bus

The memory address of the instruction to be fetched is transmitted from the program counter to the RAM through the address bus.

(c) The data bus

The data is transmitted from RAM back to the instruction register in the CPU through the data bus.

(d) The decoder

The decoder in the control unit works out what the instruction means – what has to be done to the data.

(e) The Arithmetic and Logic unit

The control unit instructs the ALU to carry out or execute the instruction.

WORKSHEET 2 ANSWERS

1 **Describe the stages of the fetch-execute cycle, stating the components involved and their functions in the cycle. (6)**

Points to include:

Program counter contains address of next instruction

Transmitted to the memory through the address bus

Instruction returned to the instruction register…
…through the data bus

Decoder in the control unit works out what the instruction means/what has to be done

The ALU executes/carries out the instruction