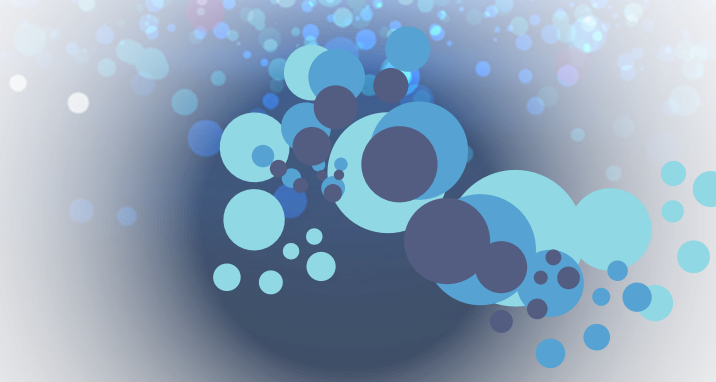


Purpose and function of the CPU

Teacher's Notes

Lesson Plan

Length	60 mins	Specification Link	212/a_b	
Learning objective	Candidates should be able to: (a) state the purpose of the CPU (b) describe the function of the CPU as fetching and executing instructions stored in memory			
Time (min)	Activity	Further Notes		
10	<p>Props: Motherboard or displayed picture of one.</p> <ul style="list-style-type: none"> Show the students the location components such as the memory, video and sound cards etc. Indicate the microprocessor and heat sink and explain that this is responsible for controlling all of the functions of the computer. Show students the link to the specification. Explain the purpose and objectives of the lesson. 			
15	Watch the set of videos, pausing to discuss the content.			
5	<p>Discuss the videos to assess learning. Ask questions such as:</p> <ul style="list-style-type: none"> Why is a heat sink required? 	<p>The microprocessor carries out its millions of calculations per second and gets very hot. The heat sink absorbs the heat from the microprocessor before it damages it and the fan on top blows air onto it to move the heat away. A fan on the case then blows the hot air out of the computer.</p>		
	<ul style="list-style-type: none"> List three components of the CPU. List the stages involved in processing data according to instructions provided by the program. 	<p>Control unit, arithmetic and logic unit (ALU), registers.</p> <p>Fetch, decode, execute.</p>		
10	<p>Worksheet 1</p> <p>Pupils to complete Worksheet 1 either on paper or on computer.</p> <p>Ask individual students for their answers and discuss with the class so that all students have the correct answers.</p>	<p>Answers provided.</p> <p>Ask students with the correct responses to explain to the class how they arrived at their answers.</p>		
10	The students use the Interactive Activity 1 .			



Time (min)	Activity	Further Notes
	<p>Extension Challenge/Homework</p> <p>Students to complete and submit any remaining sections of Worksheet 1 and Worksheet 2 for homework.</p>	
10	<p>Plenary</p> <p>Using a projector display Interactive Activity 2.</p> <p>Use the first page to review the stages of the fetch-decode-execute cycle. This can be paused for explanations or questions and resumed. It can also be run as many times as required.</p> <p>The second page has an activity to assess the students' learning regarding this cycle.</p>	



WORKSHEET 1 ANSWERS

1 (a) In a computer, what covers the microprocessor?
A heat sink.

(b) Why is this needed?

The microprocessor carries out its millions of calculations per second and gets very hot. The heat sink absorbs the heat from the microprocessor before it damages it and the fan on top blows air onto it to move the heat away.

A fan on the case then blows the hot air out of the computer.

2 The microprocessor contains integrated circuits that make up the CPU.

(a) What do the initials CPU stand for?

Central Processing Unit.

(b) Describe the functions of these components of the CPU.

(i) The control unit

The control unit is responsible for controlling much of the operation of the rest of the processor. It does this by issuing control signals to the other areas of the processor, instructing them on what should be performed next.

The decoder and the clock are elements of the control unit.

(ii) The Arithmetic and logic unit (ALU)

The ALU carries out mathematical and logical computations.

For example:

- Addition and subtraction
- Multiplication and division
- Logical tests
- Comparisons

(iii) Registers

Registers are memory locations within the CPU itself for storing data and instructions. They are designed to be quickly accessed for fast data retrieval.



WORKSHEET 1 ANSWERS

3

List and describe the stages of the fetch-decode-execute cycle.

Fetch

In the Fetch stage, the program counter provides the memory address of the next instruction. This is transferred through the **address bus** to the memory and the instruction is transferred to the **instruction register** of the CPU through the **data bus**.

Decode

The **decoder** in the **control unit** works out what the instruction means.

Execute

The control unit instructs the ALU to perform the computations required and the result is stored in one of the registers.

4

List *three* common household devices, other than computers, which contain microprocessors.

e.g.

washing machines

microwaves

televisions

set-top boxes

central heating systems

cameras

DVD players

WORKSHEET 2 ANSWERS

1 (a) The central processing unit of a computer consists of several functional units. Describe the functions of the following:

(i) The control unit (2)

Controls the operation of the rest of the CPU. (1)

It does this by issuing control signals to the other areas of the processor, instructing them on what should be performed next. (1)

(ii) The arithmetic logic unit (ALU) (2)

The ALU carries out mathematical and logical computations. (1)

One from:

Addition and subtraction

Multiplication and division

Logical tests

Comparisons (1)

(b) (i) The fetch stage

Instructions and memory are transferred from the memory to the CPU. (1)

(ii) The decode stage

The CPU works out what the instructions mean/what has to be done. (1)

(iii) The execute stage

The mathematical or logical computations are carried out and the result is stored in a register. (1)