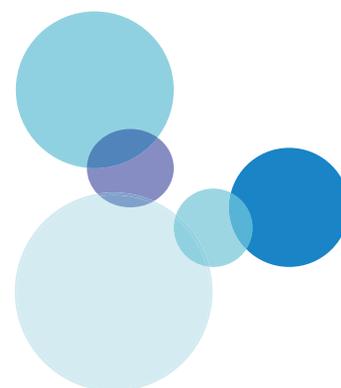


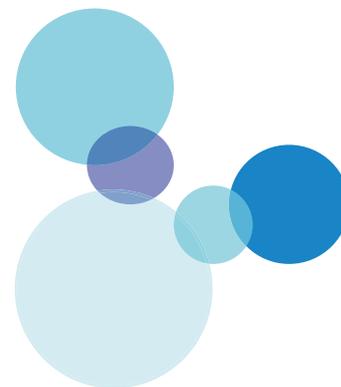
# The need for RAM

## Teacher's Notes

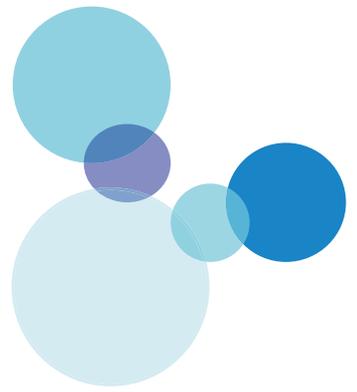


## Lesson Plan

Length	60 mins	Specification Link	212/i	
Learning objective	Candidates should be able to: (i) describe the purpose of RAM in a computer system			
Time (min)	Activity	Further Notes		
10	<p><b>Props:</b> A hard disk drive, CPU and some RAM chips.</p> <p>Show the students the CPU and, as revision, ask them to state its function in the computer.</p> <p>Ask the students where the programs and data are stored when the computer is switched off.</p> <p>Show the students the hard disk drive and ask why it is referred to as a 'secondary storage device'.</p> <p>Show the students the RAM chips and reinforce that program instructions and data being accessed by the CPU are stored here for quick access.</p> <p>Using a projector, display the <b>Interactive Starter Activity</b>.</p>	<p>Processes data according to the instructions provided by the program.</p> <p>The hard disk drive.</p> <p>It is a secondary storage device as programs and data currently being accessed by the CPU are stored in RAM.</p>		
10	Watch the video, pausing to discuss the content.			
5	<p>Discuss the video to assess learning. Ask questions such as:</p> <ul style="list-style-type: none"> <li>• Why is RAM said to be volatile?</li> <li>• Why is it referred to as 'random' access memory?</li> <li>• How is <b>dynamic</b> RAM different to <b>static</b> RAM?</li> </ul>	<p>Answers:</p> <p>Because it loses the data when the power is turned off.</p> <p>Because data stored in RAM can be accessed in any order – does not have to start at the first address and go through in a serial search.</p> <p>Dynamic RAM has to be continuously recharged or refreshed or it loses the data. To store a '1' the memory location has to be charged with electrons. But in dynamic RAM the memory locations are 'leaky' and lose electrons, so could empty and therefore represent a '0'. Therefore thousands of times a second the CPU has to read each memory location and reset it to '1'.</p> <p>Static RAM does not need continuously recharging and is therefore much quicker – data can be accessed by the CPU more rapidly.</p> <p>Static RAM, however, is far more expensive.</p>		



Time (min)	Activity	Further Notes
15	<p><b>Worksheet 1</b></p> <p>Students to complete Worksheet 1 either on paper or on the computer. They may need access to the Internet to research some of the questions.</p> <p>Ask individual students for their answers and discuss with the class so that all students will 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 <b>Interactive Activity 1</b> .	
	<p><b>Extension Challenge/Homework</b></p> <p>Students to complete and submit <b>Worksheet 2</b> for homework.</p> <p>They should also complete any questions remaining from Worksheet 1.</p>	
10	<p><b>Plenary – Class challenge</b></p> <p>Use the <b>Interactive Plenary Activity</b> to assess learning.</p> <p>The class should be quickly divided into two teams, which have to alternately answer the questions displayed.</p>	



## WORKSHEET 1 ANSWERS

**1** The term 'RAM' is an acronym.

State what the initials RAM stand for.

Random Access Memory

**2** Explain why this type of memory is called 'random access' and how this affects the speed at which data can be retrieved from it.

It is said to be 'random access' because each memory location (cell) can be accessed in any order if you know the 'address' of that location.

This speeds up data retrieval as the CPU can go to any location and does not have to start each time at the first location and go through them in order until it finds the correct one. That method is called 'serial access'.

**3** What is the main function of RAM in a computer?

The main function of RAM is to act as a temporary store of data and program instructions so that they can be retrieved quickly by the CPU when they are required.

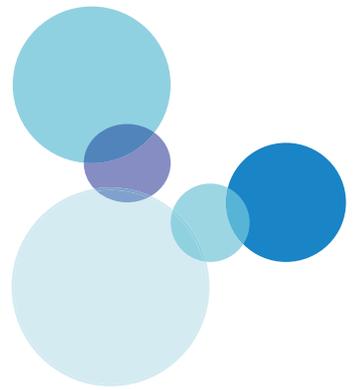
If they were stored on the hard disk drive, it would take longer to retrieve them when they were required and so slow down the processing speed of the CPU.

**4** (a) In what form is data saved in RAM?

Binary

(b) How much data can be saved in each memory location?

1 byte or 8 bits



5

(a) The main RAM in a computer is made up of dynamic RAM or DRAM.

**Why is it referred to as dynamic?**

It has to be recharged or refreshed constantly or it will lose the data it is storing.

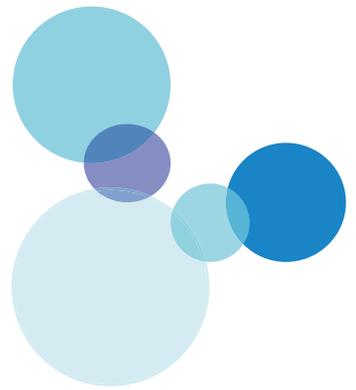
(b) List the differences between dynamic RAM and static RAM.

Static RAM does not have to be refreshed.

To store a '1' the memory location has to be charged with electrons. In dynamic RAM the memory locations are 'leaky' and lose electrons, so could empty and therefore represent a '0'. Therefore thousands of times a second the CPU has to read each memory location and reset it to '1'.

Static RAM is therefore 'quicker' – it can supply data to the CPU more rapidly.

Static RAM is more expensive.



## WORKSHEET 2 ANSWERS

In both parts to this question there are two marks for each advantage and therefore two points must be made for each – a statement and an explanation of why it is an advantage.

- 1** Describe the purpose of RAM in a computer system. (2)
- It stores parts of the operating system **currently being used** by the computer.
- It stores program instructions **currently running** on the computer.
- It stores data **currently being used** by the computer.
- (MUST state items bold and underlined).

- 2** (a) What makes dynamic RAM different from static RAM? (1)
- It must be constantly recharged or refreshed or it will lose its data.
- (b) Dynamic RAM is said to be volatile. Explain what this means. (1)
- It is said to be volatile because if there is no electrical power then the RAM will lose all of its data.