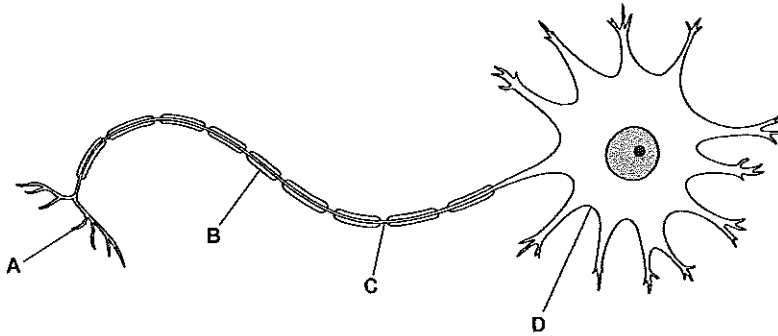


1. Jo is learning about the nervous system.

(a) She looks at this diagram of a neuron.



(i) Which of the parts A, B, C or D is the axon?

answer .....

[1]

(ii) Which of the parts A, B, C or D is the fatty sheath?

answer .....

[1]

(b) How does a message travel along a neuron?

Put a tick (✓) in the box next to the correct answer.

as a light ray

as a sound wave

as an electrical impulse

[1]

(c) The nervous system coordinates an animal's reflex response to a stimulus.

The sentences show how Jo's eye responds to a bright light.

They are in the wrong order.

A A motor neuron carries a nerve impulse to the muscles in the iris.

B A sensory neuron carries a nerve impulse to the brain.

C Light enters the eye through the pupil.

D Muscles in the iris contract to make the pupil smaller.

Put the letters A, B, C and D in the correct order in the boxes. The first one has been done for you.

C			
---	--	--	--

[2]

(d) A reflex arc is made up of different parts.

Complete the sentences.

Use words from this list.

**an effector    an impulse    a motor    a receptor    a stimulus**

A change in the environment is detected by .....

A response to the change is produced by .....

[2]

[Total: 7]

2. Edward has Alzheimer's disease.



Sometimes he does not remember what day it is.

He can still remember the friends he had at school.

(a) Which of the sentences describe Edward's memory?

Put ticks (✓) in the boxes next to the **two** correct sentences.

Edward's short term memory has been damaged.

Edward's long term memory has been damaged.

Remembering today's date is a long term memory.

Remembering his school friends is a long term memory.

Edward now has no memory at all.

[2]

(b) Which part of the nervous system is concerned with memory?

Put a tick (✓) in the correct box.

reflex arc

spinal cord

cerebral cortex

peripheral nervous system

[1]

[Total: 3]

3. The human nervous system can be divided into two parts.

- (a) Complete the table to show whether the **structures** are part of the **central nervous system** or the **peripheral nervous system** or **both**.

Put a tick (✓) in the correct box for each structure. You may decide to use all the columns or only some of them.

<b>structures</b>	<b>only central nervous system</b>	<b>only peripheral nervous system</b>	<b>both central and peripheral nervous system</b>
brain			
motor neuron			
sensory neuron			
spinal cord			

[2]

- (b) The nervous system coordinates an animal's reflex response to a stimulus.

The sentences show how the eye responds to a bright light.

They are in the wrong order.

- A A motor neuron carries a nerve impulse to the muscles in the iris.
- B A sensory neuron carries a nerve impulse to the brain.
- C Light enters the eye through the pupil.
- D Muscles in the iris contract to make the pupil smaller.

Put the letters **A**, **B**, **C** and **D** in the correct order in the boxes. The first one has been done for you.

<b>C</b>			
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[2]

[Total: 4]

4. Sam is ironing and accidentally touches the hot plate of the iron.  
He pulls his hand away very quickly.

(a) Which sentences describe his reaction?

Put a tick (✓) in the box next to each of the correct phrases.

His response is ...

... learned.

... deliberate.

... involuntary.

... a simple reflex.

... a conditioned reflex.

[1]

(b) Which parts of the nervous system are involved in Sam's reaction?

Put a **ring** around each correct part.

**brain**

**consciousness**

**intelligence**

**memory**

**motor neuron**

**sensory neuron**

**spinal cord**

**synapse**

[2]

(c) Later, Sam prepares a meal. He picks up a hot dish but does **not** drop it.

Why is his response different?

Put a tick (✓) in the box next to the **best** answer.

The receptors in his hand have become less sensitive.

His brain has modified his reflex response.

The smell of the food is a secondary stimulus.

His brain does not have conscious control of his response.

[1]  
[Total: 4]

5. Scientists have studied the brain and its functions by a variety of methods.

(a) Which of these methods, **A**, **B**, **C** or **D**, requires physical contact with the brain?

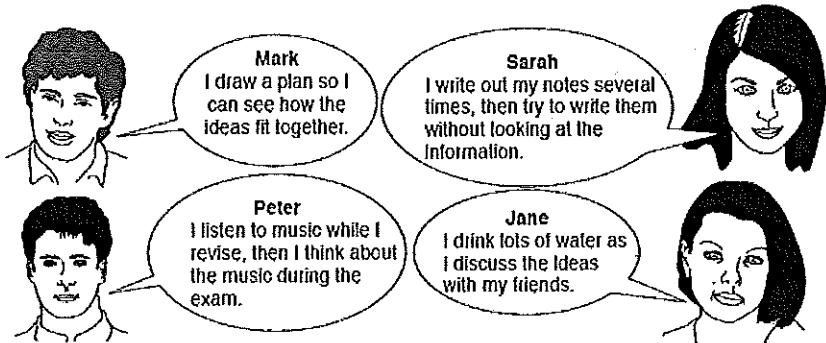
- A MRI scans of the brain
- B X-ray photographs of the brain
- C electrical stimulation of the brain
- D interviews of patients with brain damage

method .....

[1]

(b) Four friends are revising for their exams.

They talk about the methods they use.



(i) Who is remembering by repetition?

answer .....

[1]

(ii) Who is using a stimulus to help them remember?

answer .....

[1]

(c) What is memory?

Put a tick (✓) in the box next to each of the **two** phrases that **best** describe memory.

giving information

storing information

inputting information

retrieving information

processing information

{1}

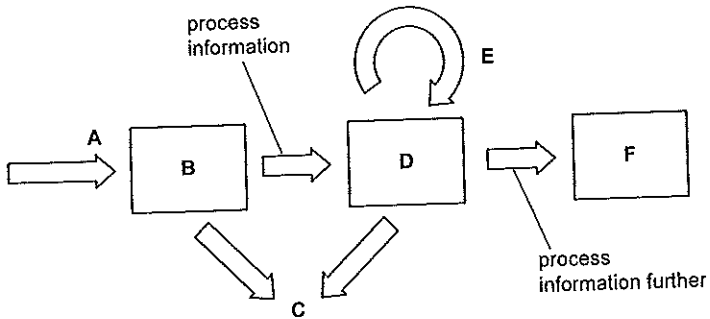
[Total: 4]



6. Humans can store and retrieve information. This is called memory.

(a) Scientists have created models for memory.

The diagram shows one example, the multi-store model.



There are several stages in this process.

Write the correct letter, A, B, C, D, E or F, in the box next to each stage.

stage in the model	letter
environmental stimuli are received	
information is lost	
long term memory	
sensory memory store	
information is rehearsed	
short term memory	

(b) Remembering information is an important part of our lives.

Finish the sentences. Choose words from this list.

Each word may only be used once.

**memory      pattern      repetition      shape      smell**

We are more likely to remember information if it has a .....

It also helps if the information is associated with a stimulus, such as

.....

Memory is reinforced when there is ..... of the information.

[3]

(c) Where do we process memories?


Put a **ring** around the correct answer.

**cerebral cortex      hypothalamus      pituitary gland      spinal cord**


[1]

(d) Three people were asked to describe the way in which neuron pathways operate to retain memory.


**Josh**  
Certain neuron pathways become more likely to transmit impulses than others.



**Bess**  
New pathways are formed as a result of changes in the environment.



**Xena**  
Some pathways stop working because the neurons no longer function.



Who gave the **wrong** description of the retention of memory?

answer .....

[1]  
[Total: 7]

7. Andy is sitting an examination.  
He has stored information in his memory.  
He retrieves this information during the examination.



(a) Where is memory stored?

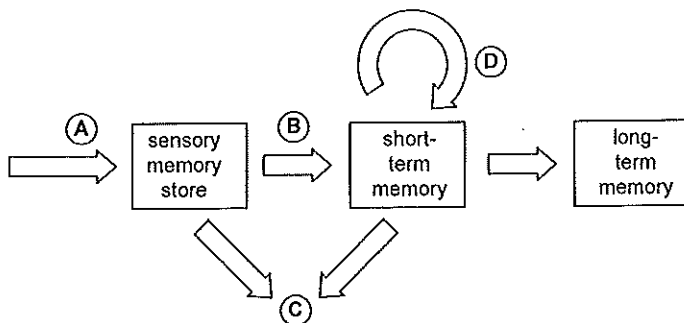
Put a **ring** around the correct answer.

**cerebral cortex    ear    eye    motor nerve    sensory nerve**

[1]

(b) For many years, scientists have tried to model the link between short-term and long-term memory.

One model which explains this link is shown in the diagram. It is called the multi-store model.



The diagram has four stages in the model labelled **A**, **B**, **C** and **D**.

Complete the table by writing the correct letter, **A**, **B**, **C** or **D**, in the box next to each stage.

stage in the model	letter
environmental stimuli received	
information lost	
processing of information	
rehearsing information	

[2]

- (c) Liz has Alzheimer's disease.  
She has lost her short-term memory.

Which of these things can she do?

Put ticks (✓) in the boxes next to the **two** correct answers.

remember her childhood

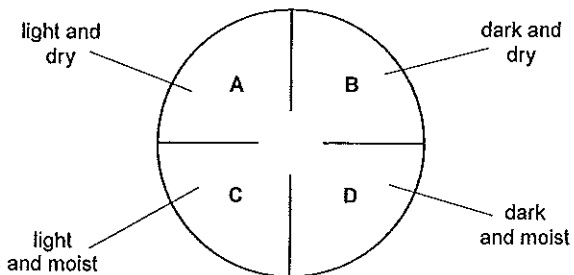
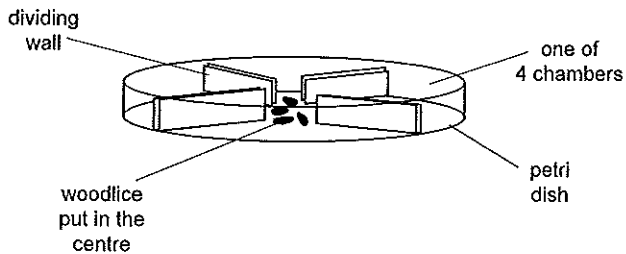
remember what happened yesterday

remember her mother's first name

[1]

[Total: 4]

8. Charlie carries out an experiment using woodlice.  
He puts 20 woodlice into the centre of a petri dish so that they can move freely into four chambers, A, B, C and D. Each chamber has different conditions.



After five minutes, Charlie counts the woodlice in each chamber.  
He records his results in a table.

chamber	chamber conditions	number of woodlice
A	light and dry	1
B	dark and dry	6
C	light and moist	4
D	dark and moist	9

- (a) What is the percentage of woodlice found in chamber D?

Put a **ring** around the correct answer.

9%      20%      45%      90%

[1]

- (b) Put a tick (✓) in the box next to each statement which could be used to explain the behaviour of the woodlice in the experiment.

Woodlice are attracted to light.

Woodlice are attracted to shade more than to moisture.

Woodlice avoid too much moisture.

Woodlice may dry out easily.

[2]

- (c) The behaviour pattern of the woodlice shown in this experiment is a reflex action. Finish the sentence. Choose a word from this list.

**complex                      involuntary                      voluntary**

Simple reflexes produce rapid ..... responses.

[1]

[Total: 4]

9. The Russian scientist Ivan Pavlov is famous for his work with learned behaviour in dogs.

His experiments included the following steps.

- A dog salivates when given food.
- A bell is rung each time the dog is fed.
- After some time, the bell is rung without giving the dog food.
- The dog salivates when it hears the bell.

- (a) What is the function of each step?  
Draw a straight line from each **step** to its correct **function**.

<b>step</b>	<b>function</b>
bell ringing	primary stimulus
food given	response
dog salivating	secondary stimulus

[1]

- (b) Which part of the dog's brain is involved in learned behaviour patterns?

Put a ring around the correct answer.

**hypothalamus                      pituitary gland                      medulla                      cerebral cortex**

[1]

(c) Which of the following types of behaviour are learned?

Put a tick (✓) in the box next to **each** correct answer.

Some bacteria can swim towards sources of food.

Some birds may avoid eating caterpillars with warning colours.

Houseflies fly rapidly away if they detect any sign of movement.

Snails draw into their shells if they detect any sign of movement.

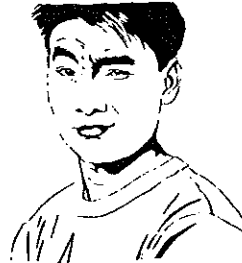
Goldfish may swim to the front of their tank when people walk up to feed them.

[2]

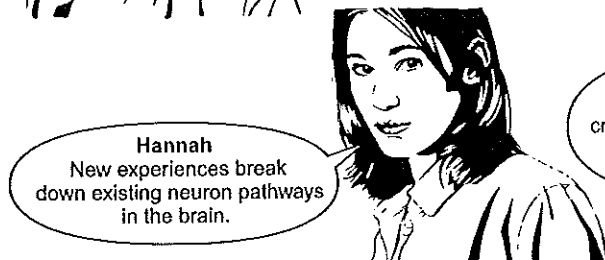
(d) Three friends discuss different ways of explaining what happens in the human brain when we learn.



**Jim**  
New experiences set up new neuron pathways in the brain.



**Harry**  
Repeated experiences create stronger connections between neurons in the brain.



**Hannah**  
New experiences break down existing neuron pathways in the brain.



Put a ring around the names of the two people with the best explanations.

**Jim**

**Hannah**

**Harry**

[1]

[Total: 6]





