

Neurons

1. Which of the following carries an impulse towards a nerve cell body?

A Dendrite
B Axon
C Myelin
D Myosin

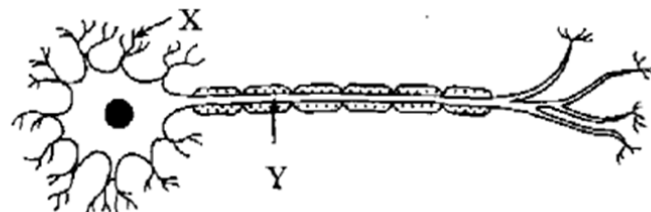
2. Which of the following shows the direction of a nerve impulse in a neurone?

A Axon → cell body → dendrite
B Cell body → dendrite → axon
C Cell body → axon → dendrite
D Dendrite → cell body → axon

3. A function of glial cells is the production of

A axons
B myelin
C dopamine
D noradrenaline.

4. The diagram below shows a motor neurone.



Which line of the table identifies correctly the labelled parts and the direction of impulse?

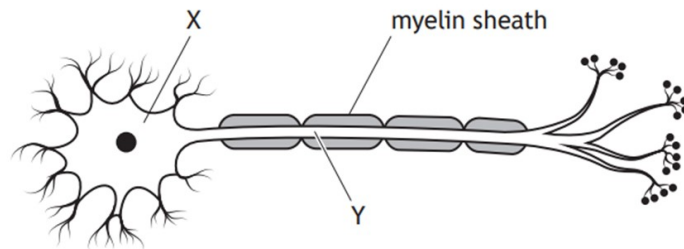
	X	Y	Direction
A	dendrite	axon	X → Y
B	dendrite	axon	Y → X
C	axon	dendrite	X → Y
D	axon	dendrite	Y → X

5. The speed of impulse transmission along an axon is promoted by

A diffusion of neurotransmitters
B converging neural pathways
C diverging neural pathways
D myelination of fibres.

Neurons

1. The diagram shows a neuron.



(a) Name the parts labelled X and Y.

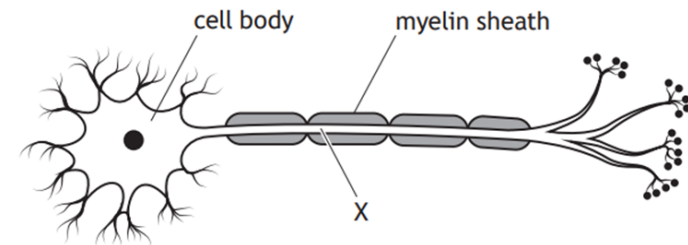
X _____

Y _____

b) (i) State the function of the myelin sheath.

(ii) Name the type of cells that produce myelin.

2. The diagram shows a motor neuron from an adult.



(a) (i) Name structure X.

(ii) State why it is important that structure X is insulated by the myelin sheath.

(iii) Name the type of cell that produces the myelin sheath.

(b) Explain how the structure of motor neurons causes a one year old child to be less coordinated than an adult.

1

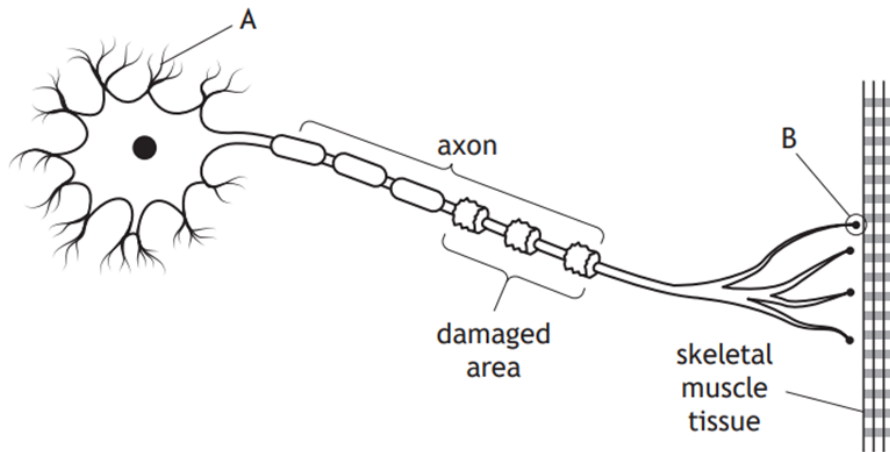
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1

1

Neurons

3. The diagram represents a neuron from an individual who has an autoimmune disease.

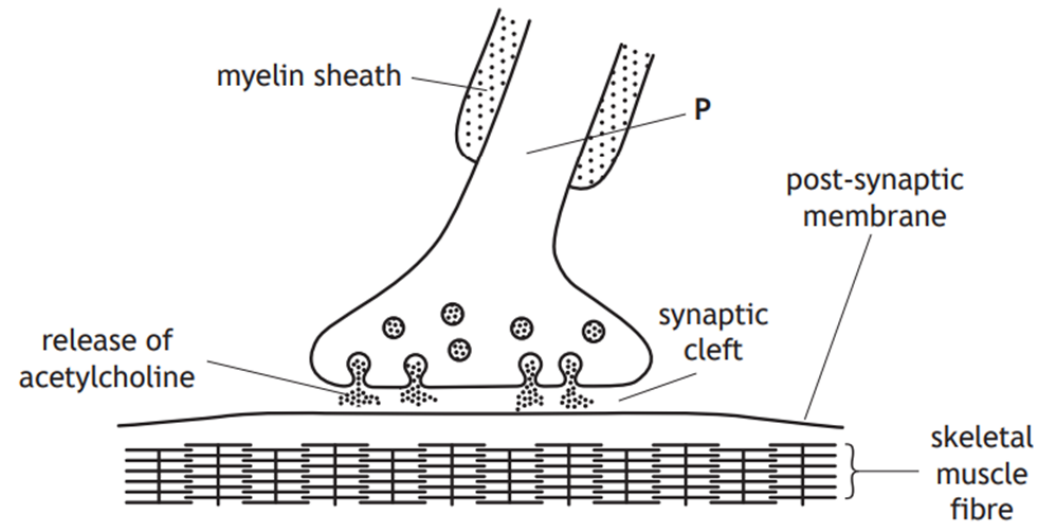


- (a) Name A and B.

A _____

B _____

- 4.



Name the part of the motor neuron labelled P.

- b) Explain why this individual has a loss of muscle coordination.

1

Neurons Answers

1. A
2. D
3. B
4. A
5. D

1 a (i) X = cell body Y = axon

b (i) to speed up transmission of nerve impulses/insulates the axons (ii) glial

2. a (i) x = axon (ii) to speed up transmission of nerve impulses/insulates the axon (iii) glial

B Less myelin (1 mark) Impulses travel slower (1 mark)

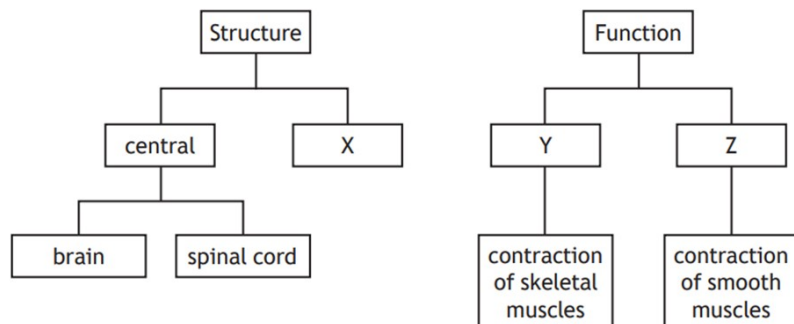
3. a) A = dendrite B = synapse

b) less myelin, reduce speed of transmission

4. myelin

Nervous System

1



Which row in the table identifies X, Y and Z?

Nervous System			
	X	Y	Z
A	peripheral	somatic	autonomic
B	somatic	autonomic	peripheral
C	autonomic	peripheral	somatic
D	peripheral	autonomic	somatic

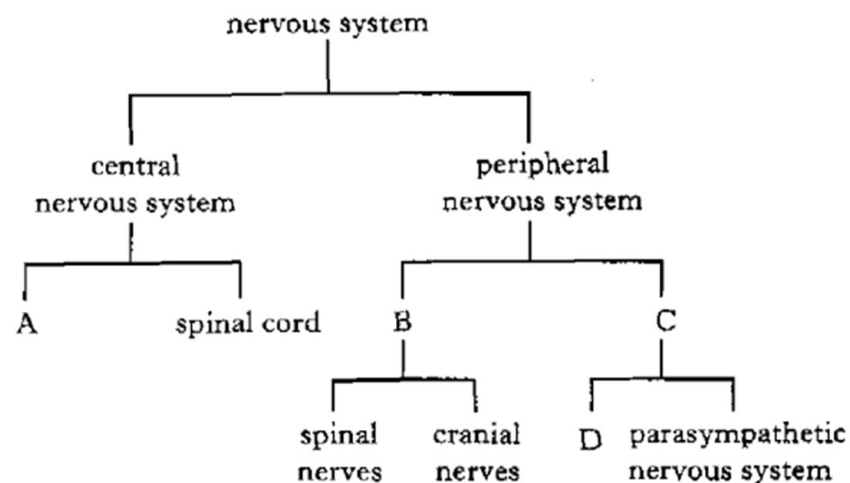
2

	Central nervous system		Peripheral nervous system	
A	spinal cord	brain	somatic	medulla
B	brain	spinal cord	sympathetic	somatic
C	parasympathetic	brain	spinal cord	sympathetic
D	sympathetic	parasympathetic	brain	spinal cord

3 The peripheral nervous system contains the

- A brain and spinal cord
- B brain and somatic system
- C spinal cord and autonomic system
- D somatic system and autonomic system.

4 The flow chart shows the sub-divisions of the human nervous system. Which letter represents the autonomic nervous system?



Nervous System

5 . Which of the following statements about diverging neural pathways is correct?

- A They accelerate the transmission of sensory impulses.
- B They suppress the transmission of sensory impulses.
- C They decrease the degree of fine motor control.
- D They increase the degree of fine motor control.

6 A neural pathway in which neurons later in the pathway link with earlier neurons is a

- A diverging pathway
- B converging pathway
- C summation pathway
- D reverberating pathway.

7 The increase in an athlete's heart rate and breathing rate during a race involves:

- A sympathetic neurons of the autonomic nervous system
- B parasympathetic neurons of the somatic nervous system
- C sympathetic neurons of the somatic nervous system
- D parasympathetic neurons of the autonomic nervous system.

8 The following are types of neural pathways.

- 1 Diverging
- 2 Converging
- 3 Reverberating

Which of these pathways involve nerve impulses being sent back through a circuit of neurons?

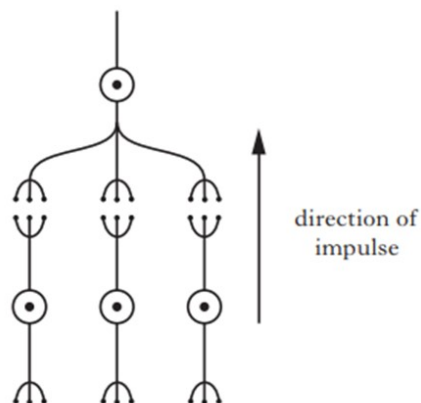
- A 3 only
- B 1 and 2 only
- C 1 and 3 only
- D 1, 2 and 3

9 . Which line in the table below identifies correctly a pair of antagonistic actions of the autonomic nervous system?

	<i>Sympathetic action</i>	<i>Parasympathetic action</i>
A	decreased secretion of digestive enzymes	increased secretion of digestive enzymes
B	decreased heart rate	increased heart rate
C	increased peristalsis	decreased peristalsis
D	decreased breathing rate	increased breathing rate

Neuronal Pathways

- 10 The following diagram represents four neurones in a nervous pathway.



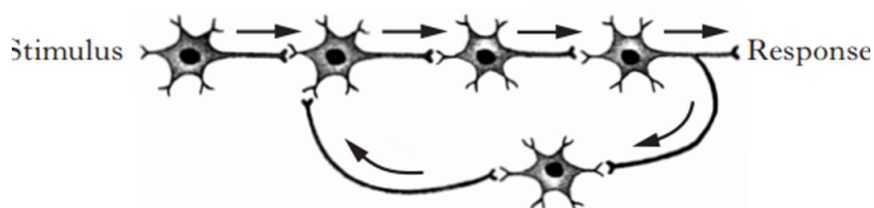
Which line in the table below describes the pathway correctly?

	<i>Type of pathway</i>	
A	motor	divergent
B	motor	convergent
C	sensory	divergent
D	sensory	convergent

- 11 The somatic nervous system controls the

- A skeletal muscles
- B heart and blood vessels
- C pituitary gland
- D muscular wall of the gut.

- 12 The diagram below represents a neural pathway.



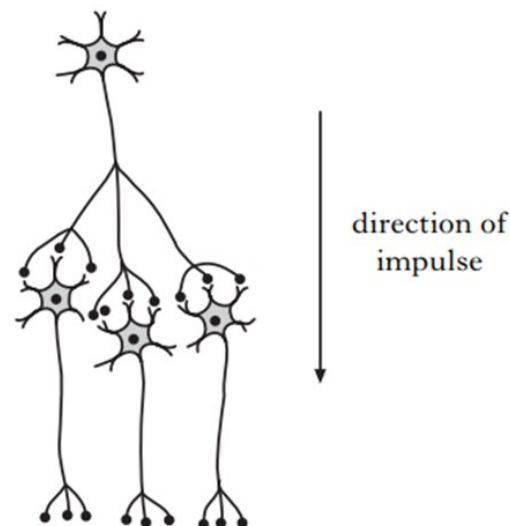
The type of pathway shown is a

- A diverging neural pathway
- B converging neural pathway
- C sensory neural pathway
- D reverberating neural pathway.

- 13 Vision in dim light is improved by the rods having

- A diverging neural pathways
- B converging neural pathways
- C reflex neural pathways
- D peripheral neural pathways.

- 14 The following diagram represents four neurones in a neural pathway.

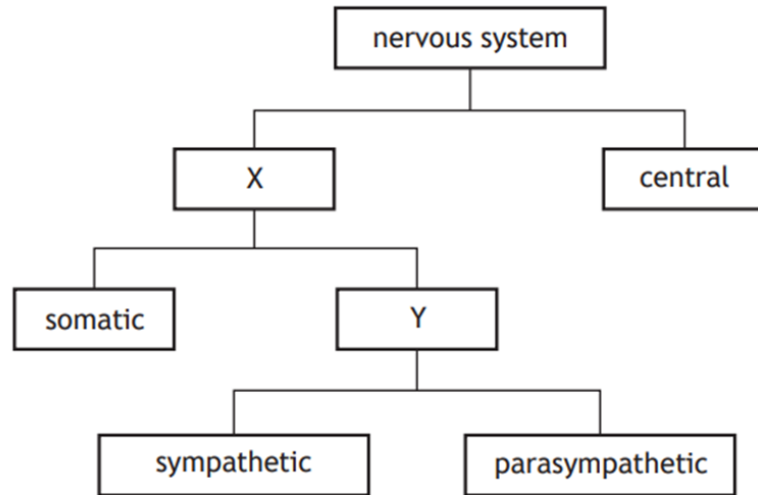


Which line in the table describes the pathway correctly?

	<i>Type of pathway</i>	
A	motor	divergent
B	motor	convergent
C	sensory	divergent
D	sensory	convergent

Nervous System

1 The diagram shows divisions of the nervous system.



(a) Name the divisions of the nervous system labelled X and Y.

X _____

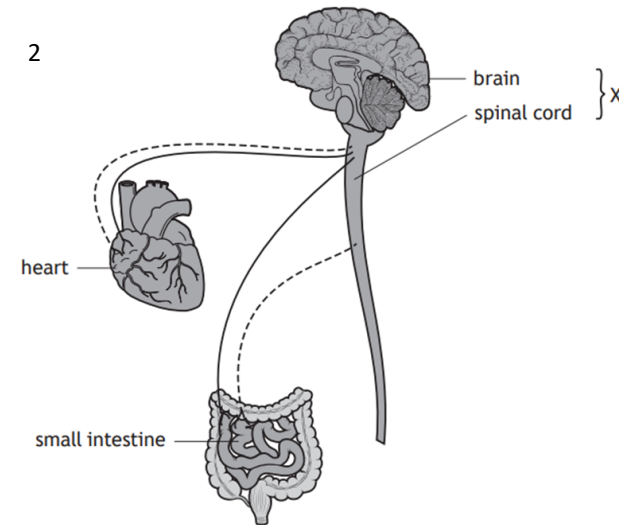
Y _____

(c) Describe an effect of the parasympathetic nervous system on breathing and the digestive system.

Breathing _____

Digestive system _____

2



(a) Name the system identified by X.

1

(b) (i) State the term that describes the opposing effect of the sympathetic and parasympathetic nervous systems on body organs.

1

(ii) During exercise, stimulation by sympathetic neurons increases heart rate and causes vasoconstriction of arteries in the small intestine.

Explain the importance of increased heart rate and vasoconstriction of arteries in the small intestine during exercise.

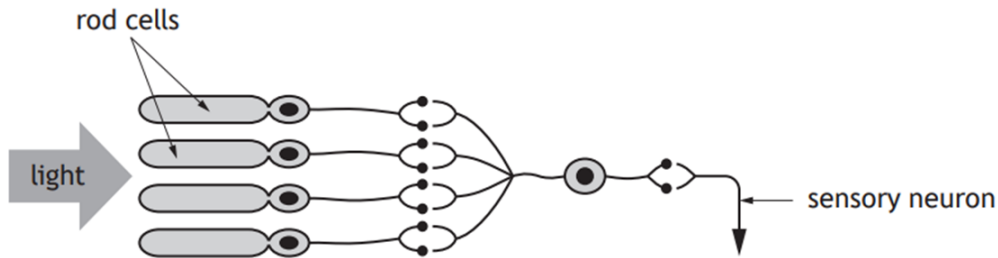
2

Increased heart rate _____

Vasoconstriction of arteries in small intestine _____

Nervous System

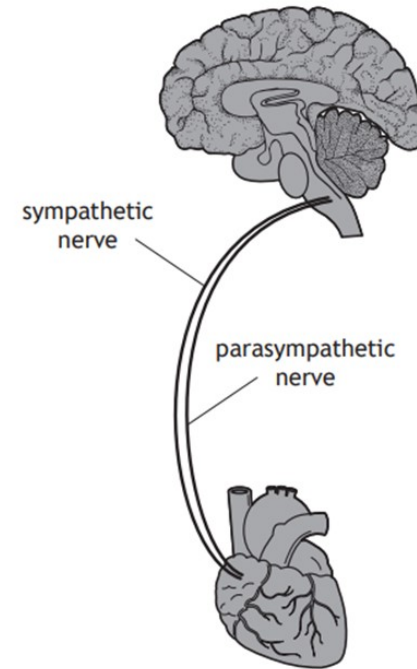
3. The retina in the eye contains specialised receptor cells called rods, that can detect light. These are connected to sensory neurons, which carry impulses out of the eye. The diagram represents part of a neural pathway in the retina.



- (a) Describe the function of sensory neurons.

- b) Motor neurons are often part of diverging neural pathways.
State one advantage of neurons being arranged in a diverging pathway.

4.



1

- (a) Name the parts of the brain and heart which are linked by the nerves shown in the diagram.

2

Brain _____

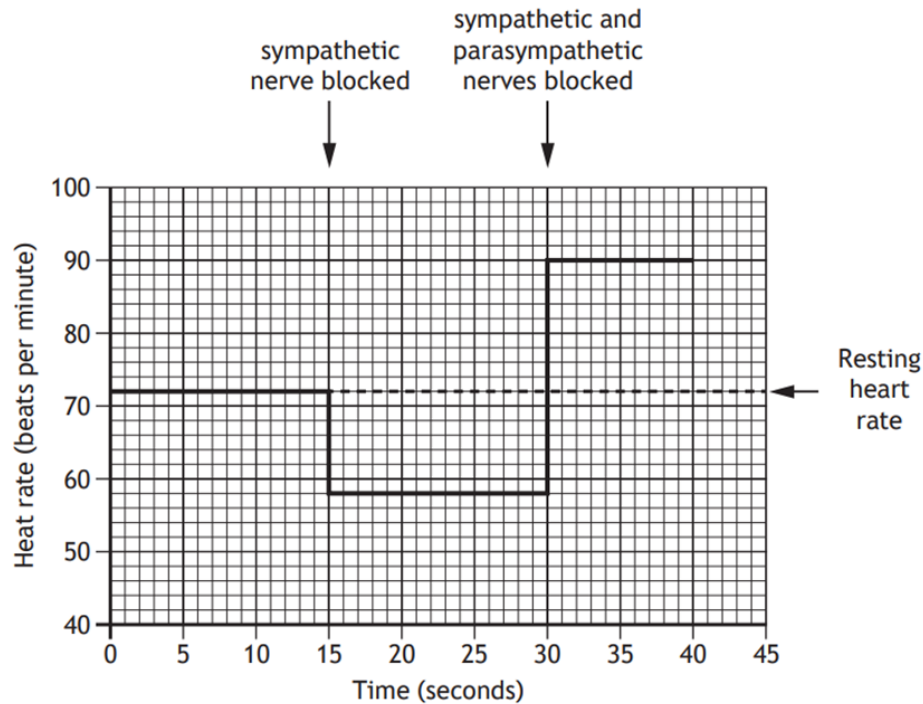
Heart _____

- (b) Explain how the sympathetic and parasympathetic nerves control heart rate.

2

Nervous System

5



Sympathetic and parasympathetic nerves regulate heart rate.

(a) Name the part of the brain that regulates the heart rate.

(b) The sympathetic and parasympathetic nerves work antagonistically.
Explain what this statement means.

c) Explain why the heart continues to contract when both nerves are blocked.

1

d) State **one** other effect the sympathetic nervous system has on the body.

1

e) The somatic nervous system contains sensory neurons.
Describe the function of sensory neurons.

1

Nervous System Answers

1. A
2. B
3. D
4. C
5. D
6. D
7. A
8. A
9. A
10. D
11. A
12. D
13. B
14. A

3. a) take information from receptors in sense organs to CNS

b) fine motor control/more than 1 muscle stimulated

4a) medulla

B) SAN

C) sympathetic nerves—increase heart rate with noradrenaline

Parasympathetic nerves—decrease heart rate with acetylcholine

5a) medulla

b) have opposing actions

c) due to autorthymic SAN/pacemaker in the heart itself

d) increased breathing rate OR lower peristalsis/digestive enzyme secretions

e)) take information from receptors in sense organs to CNS

1. a) X = peripheral y= autonomic

b) (i) lowered breathing rate increased peristalsis/digestive enzyme secretions

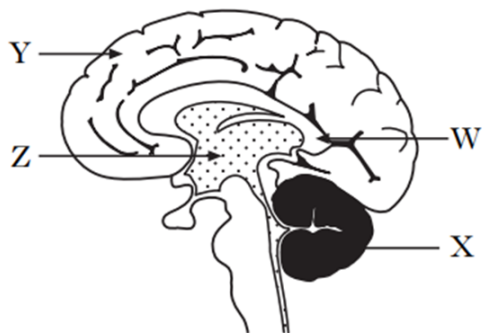
2 a Central nervous system

B ry h' r4(i) antagonistic

(ii) increases oxygen/glucose for respiration blood diverted to skeletal muscles

Brain

1. The diagram below shows the main parts of the brain as seen in vertical section.



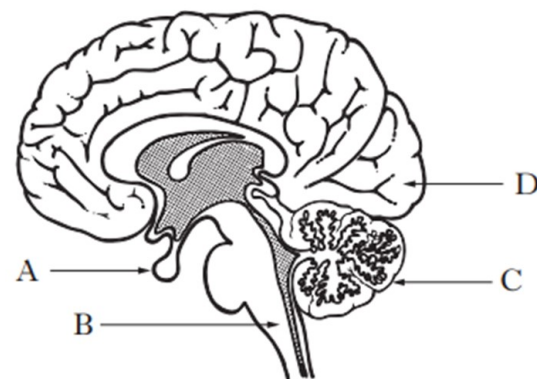
Which line in the table below correctly identifies the functions of two areas of the brain?

	<i>Communication between hemispheres</i>	<i>Reasoning</i>
A	W	X
B	X	Y
C	W	Y
D	Z	W

2. Transfer of information between cerebral hemispheres occurs through the

- A medulla
- B glial cells
- C myelin sheath
- D corpus callosum.

3. The diagram below represents a section through the brain.



Which letter indicates the part of the brain which controls breathing?

4. Which of the following parts of the brain is important in transferring information between the two cerebral hemispheres?

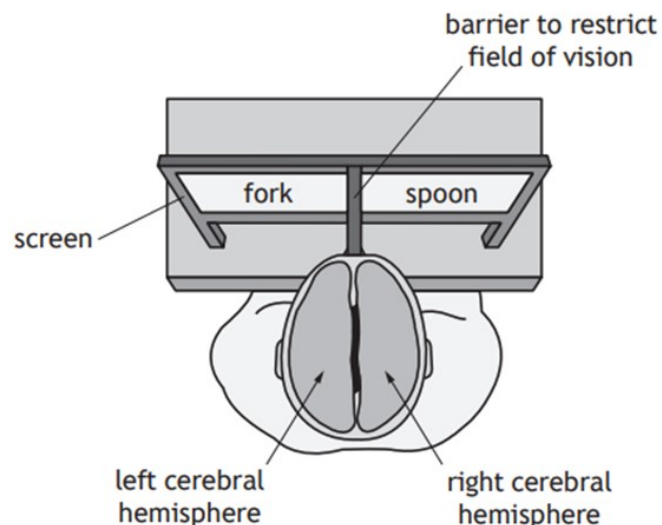
- A Hypothalamus
- B Corpus callosum
- C Cerebellum
- D Medulla oblongata

Split Brain Experiment

5. The left cerebral hemisphere controls speech production and processes information from the right eye while the right cerebral hemisphere processes information from the left eye.

An individual whose corpus callosum had been cut for medical reasons took part in a study. They had to press their forehead against a barrier so that their left eye could only see to the left of the barrier and their right eye to the right of the barrier.

The diagram shows the setup of the study.

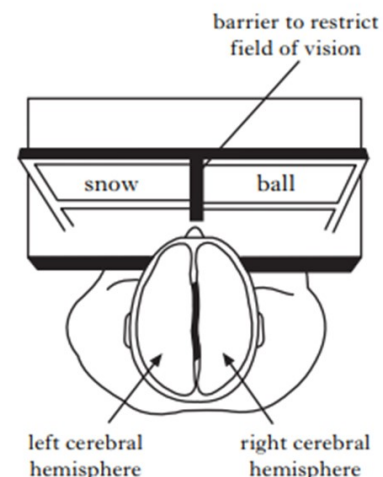


The individual was asked to look straight ahead and then the words 'fork' and 'spoon' appeared briefly on the screen as shown. The individual was then asked to say what they had just seen.

The individual would be most likely to say

- A fork only
- B spoon only
- C nothing
- D fork and spoon.

6. The diagram below shows a test on a man who had a damaged corpus callosum. This meant that he could no longer transfer information between his right and left cerebral hemispheres.



Some of the functions of each hemisphere are described in the table below.

<i>Left cerebral hemisphere</i>	<i>Right cerebral hemisphere</i>
processes information from right eye	processes information from left eye
controls language production	controls spatial task co-ordination

The man was asked to look straight ahead and then the words "snow" and "ball" were flashed briefly on the screen as shown.

What would the man say that he had just seen?

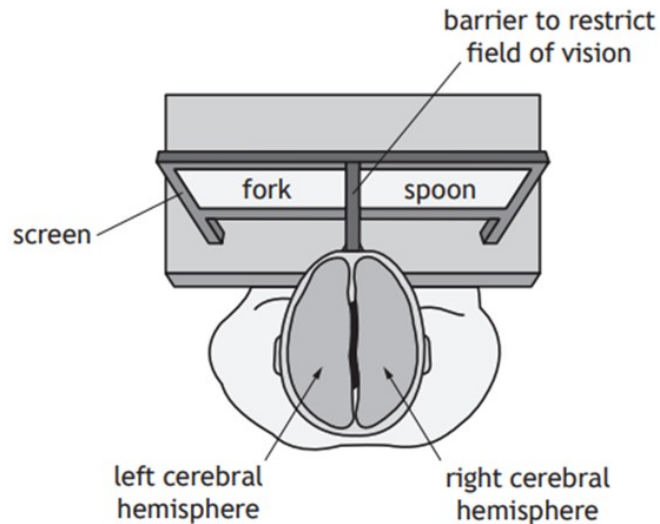
- A Ball
- B Snow
- C Snowball
- D Nothing

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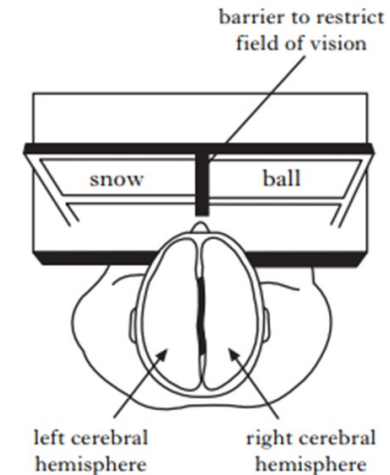


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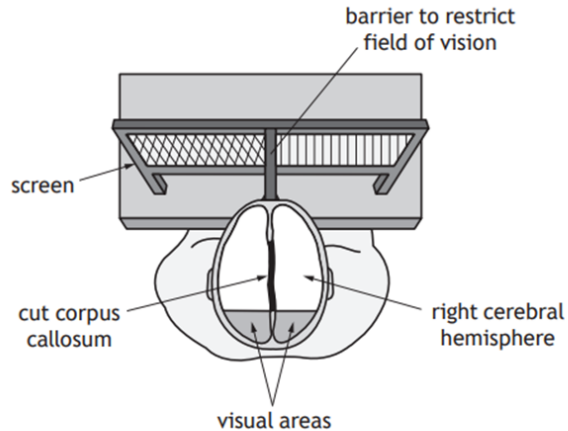
- A Ball
- B Snow
- C Snowball
- D Nothing

Split Brain Experiment

7. Split-brain patients cannot transfer information between the right and left hemispheres of the cerebral cortex because the corpus callosum has been cut during surgery.

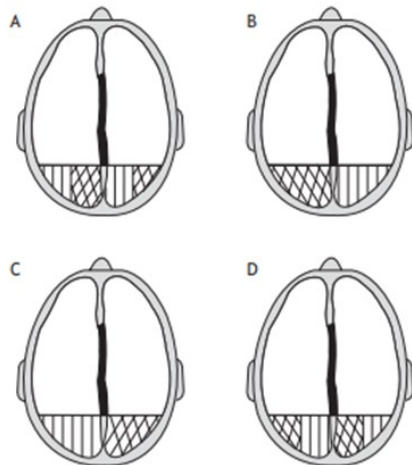
In a study a split-brain patient was asked to press their forehead against a barrier so that their left eye could only see to the left of the barrier and their right eye to the right of the barrier.

The diagram shows the setup of the study.

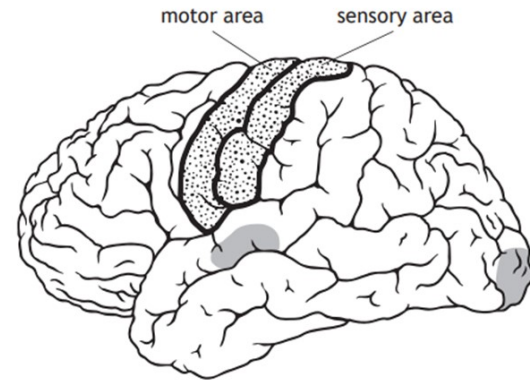


The patient was asked to look straight ahead and then two patterns were flashed briefly on the screen as shown.

Which of the following diagrams represents where the patterns are interpreted in the visual areas of this patient's cortex?



1. areas of high activity during the description of the task
 areas of high activity during the completion of the task



- (a) Name the part of the brain shown in the diagram. 1

- (b) Explain how the diagram supports the suggestion that there is localisation of function in the brain. 1

- (c) The student is storing a record of facts as she learns this information. State the part of the brain in which such memories are stored. 1

- (d) The task was to fold a piece of paper.

Explain why the diagram shows high levels of activity in the sensory and motor areas. 2

Sensory area _____

Motor area _____

Brain/Split Brain Experiment Answers

1. C

2. D

3. B

4. B

5. B

6. A

7. C

1a) cerebral cortex

b) different parts of the brain do different parts of the task

c) cerebral cortex

d) sensory: individual was touching the paper

Motor: individual was moving hands