Nerves and the central nervous system

Student activity • observation and reasoning

YEAR 11 / LESSON 74 / BIOLOGY + SCIENCE (DOUBLE AWARD)

The question

How does sensory information lead to a rapid response?

Use the supplied examples, record your reasoning and correct it using evidence.

Equipment

- Student booklet, paper models, pencil and ruler

Paper, modelling and written reasoning only. No chemicals or biological samples are handled.

Course coverage: Shared Biology / Double Award: 2.87–2.88. CNS and nerve impulses.

Plan, model or apparatus sketch

Draw and label the apparatus or biological model; identify one limitation.

Method and reasoning

Read the whole sequence before starting

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1. Label brain and spinal cord as the central nervous system.

2. Distinguish a neurone from a nerve, which contains bundles of nerve fibres.

3. Trace information from a sense-organ receptor along a sensory neurone into the CNS.

4. Trace an outgoing motor pathway to a muscle or gland.

5. Explain that an electrical impulse along a neurone is a biological signal, not electrons flowing through a metal wire.

6. Apply the pathway to a visible stimulus and a voluntary movement, distinguishing detection, processing and response.

Cleanup

- Return models and keep the corrected work.

Record your evidence

Blank spaces are for your own work

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Reference and task data

The CNS consists of brain and spinal cord. Peripheral nerves connect receptors and effectors with it. Sensory pathways carry information towards the CNS; motor pathways carry signals towards effectors. Diagrams are simplified and may omit intermediate neurones.

Example / trial	Observation / evidence	Explanation / limit
Evidence / comparison		
Explanation		
Limit / correction		

Show your calculations, labelled model or correction here.

Explain and evaluate

Use evidence and show calculation steps where relevant

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1. Name the two CNS parts.

2. What does a sensory neurone carry?

3. What does a motor neurone carry?

4. Is a nerve one cell?

5. Name an effector.

6. Why is the wire analogy limited?