

## Assessor Marking Guide

<b>Programme Name</b>	<b>Health and Fitness Coach (Personal Trainer) (Level 4)</b>	
<b>Assessment Number</b>	<b>Assessment 2 of 4</b>	
<b>Assessment Title</b>	<b>Nervous System Quiz</b>	
<b>Course Number</b>	<b>Course 1</b>	<b>Version 2 Level 4 Credit 10</b>
<b>Course Title</b>	<b>Anatomy and Physiology</b>	

*Internal feedback related to design of assessment tools should be submitted via the online Continuous Improvement Form (eCIF).*

**This assessment leads to the following graduate profile and learning outcomes.**

<b>NZQA GPO</b>	<b>Learning Outcome</b>	<b>Task #</b>
Apply knowledge of anatomy and physiology to adapt and deliver safe and effective exercise programmes to individuals. (15 credits)	<b>2.1</b> Identify and describe the structure and function of major systems of the human body and their physiological responses (acute and chronic) to exercise. (7 credits)	Tasks 1 – 3

<b>NZQF Level 4 Descriptors</b>	
<b>Knowledge</b>	<ul style="list-style-type: none"> <li>Broad operational and theoretical knowledge in a field of work or study</li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>Select and apply solutions to familiar and sometimes unfamiliar problems.</li> <li>Select and apply a range of standard and nonstandard processes relevant to the field of work or study.</li> </ul>
<b>Application</b>	<ul style="list-style-type: none"> <li>Self-management of learning and performance under broad guidance.</li> <li>Some responsibility for performance of others.</li> </ul>

### ADMINISTRATION

**Assessors are required to provide feedback to students:**

- Constructive feedback to the student must be documented within assessment evidence. Including where resubmission is required.
- Notes on demonstrated performance and application of skills, knowledge, attributes; future improvement/development planning e.g., task management, study skills; relationship to other programme content and use in career.

**Student evidence must be assessed against all specified criteria to meet learning outcomes.**

- Any adaption in assessment methods must be documented and attached to the assessment by the assessor (where deemed necessary to be fair and transparent in relation to student's specified needs).
- Assessment Pack Cover should be dated and signed by assessor when the student has received the final result.
- Assessment opportunities must be indicated accurately.  
Where any practical criteria are not achieved, an additional practical sheet must be used for reassessment for all practical outcomes and attached to this assessment pack. Refer to Assessment opportunities policy for additional detail.
- The student must sign the post-assessment agreement after receiving final result.

- It is the Assessors responsibility to ensure all relevant documentation is included in the assessment prior to reporting and filing.
- Samples of assessments will be forwarded to internal and/or external parties for moderation as required.

Where appropriate **sample answers and or exemplars** may be included: Sample answers are a guide only providing an example of the sufficiency of qualitative and quantitative evidence the assessor could expect to see.

<b>ASSESSMENT SCHEDULE</b>	
<i>Give feedback to student on successes, for N add a note to the student on here or on their assessment evidence (e.g. in Turnitin) about how to improve for resubmission.</i>	
<b>Task Evidence</b>	<b>Achievement Criteria / Judgement</b>
Task 1	<p>a) Boxes filled in correctly using the words provided.  <b>Students need to accurately fill out the boxes, answers are provided in the boxes below</b></p> <p>b) Path identified correctly and provided (50-100 words)  <b>Students' answers must clearly show the path in the correct order. Correct order is as follows: Receptors – Sensory neurons – Spinal cord – Brain – Spinal Cord – Motor neurons – effector muscles. Students can include interneurons within the spinal cord/brain.</b></p>
Task 2	<p>a) Accurate descriptions provided, must contain the definition and example.  <b>Answers need to be close to model answers provided, consisting of an accurate description with a realistic example.</b></p> <p>b) Accurate descriptions provided, must contain the definition.  <b>Answers need to be close to model answers provided, consisting of an accurate description.</b></p>
Task 3	<p>a) Accurate explanation provided. <b>TWO</b> examples provided.  <b>Answer can include increase HR, breathing rate, increase blood pressure, stimulate sweat glands, dilation, or constriction of blood vessels in different parts of the body.</b></p> <p>b) Accurate explanation provided. <b>(25-75 words)</b></p> <p>c) Accurate explanation provided consisting of the key chemicals involved and the process. (50-150 words)  <b>Answer must include the following words: action potential, Calcium, neurotransmitters, receptors, postsynaptic membrane, positive charge</b></p>

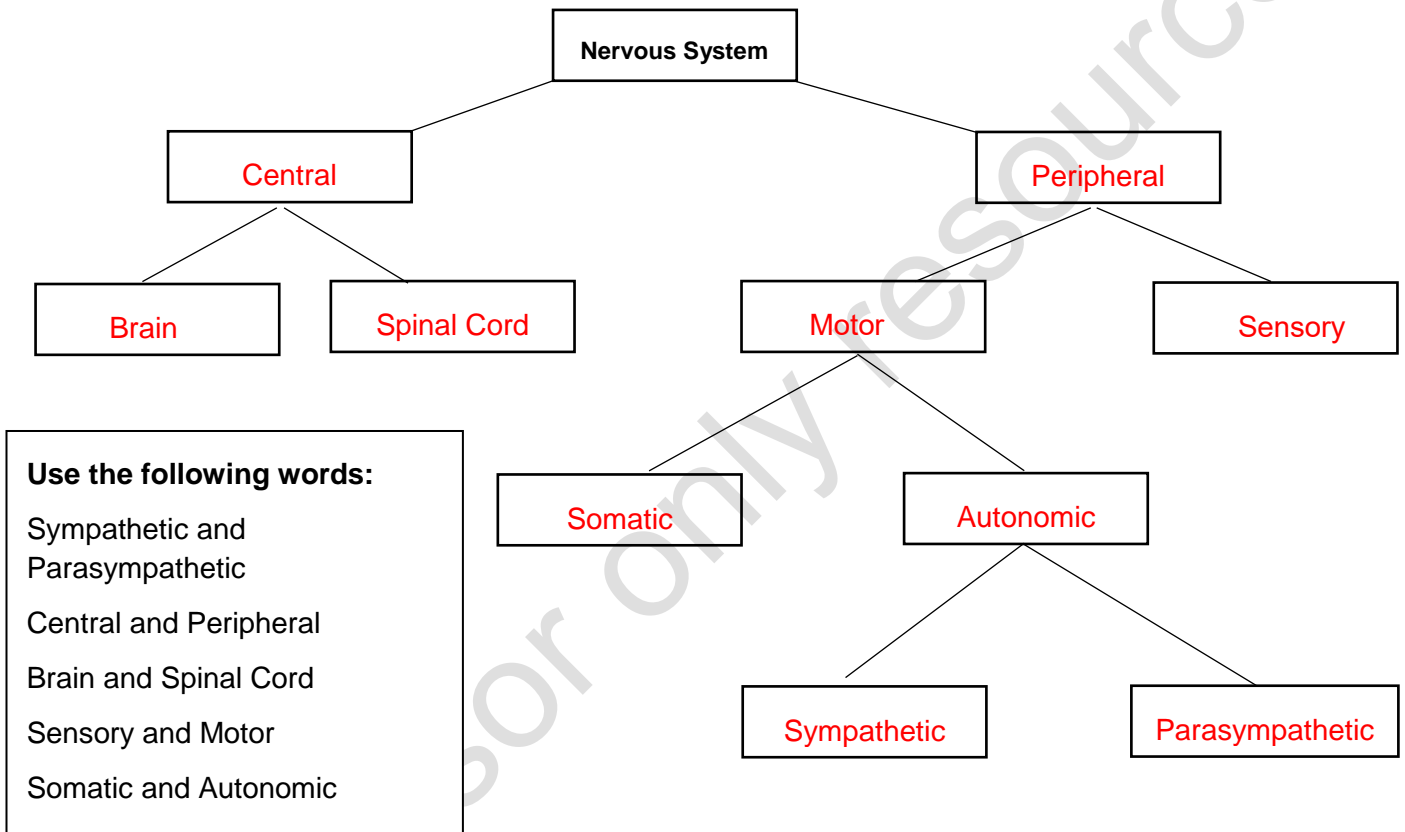
## Nervous System Quiz

### Assessment Outline

Below is a combination of model answers. Students do not need to be exact to gain the pass mark, however they need to be accurate and appropriate.

#### Task 1 Structure of the Nervous System

a) Fill in the boxes below to illustrate the hierarchical structure of the nervous system.



b) Describe the pathway of a nerve impulse, starting from a receptor and ending at the effector muscles. (50-100 words)

Starting from a receptor the impulse travels back towards the spine via sensory neurons. Once it arrives at the spine it uses interneurons to travel up into the spine where a decision is made. The impulse then travels down the spinal cord via interneurons and out using motor neurons to the muscles where it activates the muscle fibres to perform the task.

#### Task 2 Function of the Nervous System

a) What are the functions of the following

Receptors	Description
Muscle Spindle	They monitor both static and dynamic relative muscle length. They sense how much a muscle is stretched. If overstretched they cause the same muscle to contract. This set up works to protect the muscle from overextension and tearing.
Golgi Tendon Organ	The Golgi-tendon organ (GTO) receptors are found at the muscle-tendon junction. They monitor the tension applied to a tendon. If they detect too much tension, they will inhibit (switch off) the contracting muscle to protect the tendon and stop it from tearing.

b) Describe the following functions of the nervous system

Function	Description
Movement	Every voluntary movement that a person performs is under the direct control of the nervous system as the nervous system sends the messages to the particular body parts to move. If the movement has been repeated numerous times (walking for most of us...) the movement will be very efficient.
Memory/Learning	The nervous system, primarily the brain, is responsible for taking information from the senses and applying them into our memory. Constant use or practice results in these moving to long term memory.
Reflexes	An example of this is the stretch reflex. This reflex functions to protect us from injury. If we were out jogging and accidentally ran into a pothole and rolled our ankle, the stretch reflex would instantly sense the stretch in the muscles around the ankle and send messages to those muscles telling them to contract and resist the stretch. This reflex serves to protect the ankle from breaking and results in a minor sprain rather than a severe break.
Control of Internal Environment	An example of this is the regulation of body temperature. As we exercise, we create heat, in order to maintain a relatively constant core temperature the nervous system sends messages to the blood vessels to dilate (expand), increasing blood flow to the skin, and increasing sweating to help disperse the accumulating heat.

### Task 3 Responses to training of the Nervous System

a) The sympathetic nervous system prepares the body for exercise by doing what? (Minimum 2 points)

The sympathetic nervous system will increase our HR and dilate our blood vessels around the muscles, while constricting the vessels around our organs to increase blood flow to the muscles to prepare them for exercise.

b) Explain the All or None principle. (25 - 75 words)

The all-or-none law is a principle that states that the strength of a response of a nerve cell or muscle fibre is not dependent upon the strength of the stimulus. If a stimulus is above a certain threshold, a nerve or muscle fibre will fire.

c) Explain how an electrical impulse travel from a motor neuron to a muscle fibre. Your answer should contain the key chemicals involved in the process. (50-150 words)

Electrical impulse (action potential) flows down the body of the presynaptic neuron.

This positive charge (voltage) encourages ion channels on the membrane of the synaptic end bulb to open and let in calcium  $\text{Ca}^{2+}$ .

$\text{Ca}^{2+}$  triggers the packages (vesicles) of neurotransmitters to move from the middle of the bulb to the outer membrane and spill their contents into the synaptic gap. Note: Sodium  $\text{Na}^{+}$  is already 'floating' in the gap.

The neurotransmitters then bind to receptors on the postsynaptic terminal (bulb) and trigger the receptors on the postsynaptic membrane to open.

Sodium ions ( $\text{Na}^{+}$ ) which were floating around in the synaptic gap can now flow into the postsynaptic membrane and flood the membrane with a positive charge.

End of Quiz