

Stress Essential Knowledge Interactions

Slide 12: Click on images and receive “correct” or “incorrect” feedback or draw a line to the correct portion of the brain. Answers: Riding a bicycle → cerebellum; Digesting your lunch → Brain Stem; Recalling information about the nervous system in order to answer a test question → cerebrum

Slide 15: Click on images and receive “correct” or “incorrect” feedback Answers: brain and spinal cord (middle and last image)

Slide 20: Hangman or similar; answers are: nerves, autonomic, somatic

Slide 24: Click and drag words to correct blank. Answers: top right – **cell body**, location of the **nucleus**; top left – **Dendrite**, Takes information **to** the cell body; middle right – **Axon**, Takes information **away** from the cell body; bottom right – **Synapse**, Electrical and chemical information moves **across** this space.

Slide 27: Move labeled images into the correct order. Answers: Sensory neuron, spinal cord, interneuron, motor neuron, skeletal muscle

Slide 33: Students choose the correct word(s) for each sentence and receive correct or incorrect feedback (word, color, sound, etc.)_Answers: endocrine, chemical, hormones, slowly

Slide 42: Drag lines to match statement and organ. Answers: Creates adrenaline and cortisol to respond to stress → kidney/adrenal; Regulates blood sugar → pancreas; Key player in the immune system by developing T cells → Thymus; The master gland, controls other glands and aids in growth → pituitary

Slide 54: maybe have an unbalanced scale that tips/balances based on correct/incorrect drag and drop answers? The images are just ideas for the graphic. I prefer the modern one on the left as many students may have used something similar. Answers: homeostasis, endocrine system, nervous system

Slide 58: Game ideas

Slide 66: drag and drop diagram similar to pictured. Students would place text boxes next to/on/etc. the appropriate image. They would also click the word “negative” or “positive” (the correct response is negative).

Key Terms and definitions:

axon, brain stem, central nervous system, cerebellum, cerebrum, dendrite, effector, gland, homeostasis, hormone, negative feedback, neuron, peripheral nervous system, positive feedback, reflex, set point, soma, stimulus, synapse

- Axon: neuron structure that carries messages away from the cell body or soma.

- Brain stem: connects the brain to the spinal cord and is made up of the midbrain, the pons, and the medulla.
- Central Nervous System: division of the nervous system made up of the brain and spinal cord.
- Cerebellum: part of the brain that controls voluntary muscle movements, maintains muscle tone, and helps maintain balance.
- Cerebrum: the largest part of the brain where memory is stored, movements are controlled, and impulses from the senses are interpreted.
- Dendrite: neuron structure that receives messages and sends them to the cell body.
- Effector: an organ or cell that acts in response to a stimulus.
- Gland: an organ which produces and releases hormones that perform a specific function in the body.
- Homeostasis: regulation of an organism's internal, life-maintaining conditions despite changes in its environment.
- Hormone: Two or more different types of tissue working together to perform a specific function
- Negative Feedback: processes that act to oppose the stimulus, or cue, that triggers the response
- Neuron: basic functioning unit of the nervous system, made up of a cell body, dendrites, and axons.
- Peripheral Nervous System: division of the nervous system, made up of all the nerves outside the CNS; connects the brain and spinal cord to other body parts.
- Positive Feedback: processes that amplify the initiating stimuli; they move the system *away* from its starting state
- Reflex: automatic, involuntary response to a stimulus; controlled by the spinal cord.
- Set Point: the normal value of a physiological variable such as temperature, glucose level, blood pressure, etc.
- Soma: cell body; non-process portion of a nerve cell
- Stimulus: any internal or external change that brings about a response.
- Synapse: small space across which an impulse moves from an axon to the dendrites or soma of another neuron.

Background Information

Nervous System

The nervous system is an organ system containing a network of specialized cells called neurons that coordinate the actions of an animal (people included) and transmit signals between different parts of its body. It coordinates the body's communication with our brain and vice versa.

The nervous system has two components: the central nervous system and the peripheral nervous system. The central nervous system consists of the brain and spinal cord. The brain is divided into two, identical hemispheres and has four different lobes based on general regions of functions. These four lobes make up the cerebrum portion of the brain. The other, smaller portion of the brain is the cerebellum, which involves controlling and planning motor movements. The basic unit of the brain is the brain cell, or neuron. It has three parts: dendrites that look like branches and receive chemical messengers called neurotransmitters, the soma which is the body of the cell and houses the organelles, and the axon which sends electrical signals onwards to other neurons by releasing its own neurotransmitters. These connections between axons to dendrites are how neurons communicate with one another.

Neurons do not undergo mitosis so damaged or dead neurons are not replaced. The spinal cord is the main pathway for information to travel to and from the brain. The spinal cord is made of long bundles of neuron axons.

The peripheral nervous system is composed of all the cranial and spinal nerves that run throughout the body. They collect sensory information from the body and send it to the brain via the spinal cord for processing.

Endocrine System

The endocrine system assists in the regulation of many body functions including growth and development and reproduction. It does this by releasing chemical messengers called hormones produced in glands.

Eight glands make up the endocrine system. The hypothalamus receives signals from the receptors located on the target organs and stimulates the pituitary gland (often called the “master” gland) to release hormones. Although the hormones circulate throughout the body, each type of hormone is targeted toward certain organs and tissues. Additionally, the endocrine system receives help from organs such as the kidney, liver, heart and gonads, which have secondary endocrine functions.

Homeostasis and Feedback Mechanisms

Homeostasis is the steady, life-maintaining conditions inside an organism, despite changes in its environment. The nervous and endocrine systems are control centers that play a vital role in maintaining homeostasis. When balance is not maintained disease or death can occur.

The nervous and endocrine systems have specific mechanisms to regulate homeostatic variables (temperature, blood sugar, etc.) called feedback loops. Negative feedback opposes changes in variables from their target values, or set points. This system acts to return a variable to its set point. For instance, when the temperature rises because of a hot day we produce sweat which will cool us down; the response was to lower the temperature to balance out the deviation of a rising temperature. Positive feedback amplifies a starting signal. The best example of positive feedback is childbirth. When labor begins, a hormone called oxytocin is released, oxytocin causes more contractions which again releases more oxytocin. This culminates in stronger contractions closer and closer together that ultimately help deliver the baby.