

Unit 3: Integration and Coordination

Content Area: **Science**
Course(s): **Anatomy/Physiology Lab Honors**
Time Period: **3rd Marking Period**
Length: **10 Weeks**
Status: **Published**

Unit Overview

This unit will describe the general functions of the nervous system and the structures that are primarily involved, and the divisions of this system, distinguish among the general and special senses of the body and the general characteristics of the endocrine system.

Transfer

Students will be able to....

- Understand how the nervous system relates to the rest of the body in relation to its' functions.
- Determine how reflexes take place.
- Determine if a person is left or right brain hemisphere.
- Determine what happens to someone with a cranial or spinal nerve injury.
- Relate sense of smell to taste.
- Explain how hearing occurs.
- Differentiate among eye diseases and treatment.
- Understand how hormones affect daily routines.
- Determine what happens with insufficient and oversecretion of growth hormone.
- Explain how diabetes mellitus occurs and the difference between Type I and Type II.

For more information, read the following article by Grant Wiggins.

http://www.authenticeducation.org/ae_bigideas/article.lasso?artid=60

Meaning

Understandings

Students will understand that.....

- The nervous system is divided into two major components and the general functions of each.
- Neurons and neuroglial cells play a major role in various nervous tissue function.
- Nerve impulses pass from one neuron to the next.
- Nerve impulse conduction differs in myelinated and unmyelinated neurons/nerve fibers.
- There are different nerve pathways.
- The brain has two hemispheres and it contains a cerebral cortex that contains a motor, sensory and association functional area.
- The difference between the sympathetic and parasympathetic divisions of the autonomic nervous system.
- Differentiate among the general senses and special senses.
- The relationship between sense of smell and taste; as well the relationship between the ear and equilibrium.
- The functions of the eye and how eye disorders relate to these functions.
- Describe the path of light through the eye to where vision occurs.
- Relate the nervous system and endocrine system.
- Know what hormones are and examples of major ones.
- Identify what the pancreas is and its relationship to the hormone insulin.

Essential Questions

Students will keep considering.....

- How does the brain and spinal cord control the rest of the body?
- How does a nerve impulse occur and how does it relate to the cell membrane?
- Why are some people analytical thinkers while others are artistic and musical?
- What makes people break out in a "cold sweat" when they are not warm?
- How do we sense pain?
- How does one want to taste something that smells good?
- Why is our equilibrium affected when we have an ear infection?
- What is the major cause of hearing loss? and loss of sight?
- Why are hormones important to our growth and development?
- Why is insulin so important for promoting facilitated diffusion of glucose?

Application of Knowledge and Skill

Students will know...

Students will know.....

- The two major groups of the nervous system.
- Identify and differentiate among neurons and neuroglial cells and how they are classified.
- Describe the events that lead to the generation of an action potential.
- Compare nerve impulse conduction in myelinated vs. unmyelinated neurons.

- Identify the events of a reflex arc.
- Describe the spinal cord and brain; their structures and functions.
- Distinguish among motor, sensory, and association areas of the cerebral cortex.
- Name the cranial nerves and their functions.
- Distinguish between the sympathetic and parasympathetic divisions.
- Name and describe the 5 kinds of receptors and how they are associated with the senses.
- Distinguish among the senses.
- Explain the relationship between taste and smell.
- Identify the parts of the ear and pathway of hearing.
- Identify the parts of the eye and how sight occurs.
- Differentiate among eye disorders.
- What a hormone is and give examples of some major ones.
- How glands are associated with the production of hormones.
- Understand how the pancreas is able to regulate glucose absorption and the effects of insulin.

Students will be skilled at...

Students will be skilled at.....

- Using the microscope to differentiate among nerve tissues.
- Use charts/pictures to identify and relate the steps of a nerve impulse; polarization, depolarization, repolarization.
- Using models and animal brains to identify parts of the brain and spinal cord.
- Identifying the senses of the body and relationship of smell and taste.
- In lab pairs, be able to test each others hearing.

- In lab groups, be able to test each others sight.
- Using pictures, photos, be able to identify/differentiate among glands that produce major hormones.
- Using dissections, be able to identify the pancreas.

Academic Vocabulary

neuron neuroglial schwann cell central nervous system peripheral nervous system sympathetic
parasympathetic synapse neurotransmitters

action potential nerve impulse excitatory inhibitory neuronal pool reflex arc meninges spinal cord
brain cerebrum cerebellum cerebral cortex

corpus callosum cerebrospinal fluid diencephalon thalamus hypothalamus medulla oblongata
midbrain pons cranial nerves receptors

adaptation visceral pain olfactory auditory ossicles auditory tube cochlea lacrimal gland cornea optic
nerve sclera lens retina iris hormones

pancreas steroids glands growth hormone thyroid insulin diabetes mellitus

Learning Goal 1

Students will be able to understand how the nervous system works, how it is divided into sections, and how it controls the rest of the body.

Proficiency Scale

SCI.HS-LS1-3

Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

SCI.HS-LS1-2

Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

Target 1

Students will be able to differentiate among neurons and its structures, neuroglial cells and their corresponding functions, along with the different types of nerves.

Target 2

Students will be able to explain how a membrane becomes polarized and describe the events that lead to the generation of an action potential, and eventually a nerve impulse.

Target 3

Students will be able to describe the events of a reflex arc.

Target 4

Students will be able to identify and describe the parts of the brain, and their functions.

Target 5

Students will be able to distinguish among sympathetic and parasympathetic divisions of the autonomic nervous system.

Learning Goal 2

Students will be able to distinguish among general and special senses, including touch, taste, smell, equilibrium, sight, and hearing.

Proficiency Scale

SCI.HS-LS1-3

Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

SCI.HS-LS1-2

Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

Target 1

Students will be able to describe the receptors associated with general and special senses.

Target 2

Students will be able to explain the relationship of smell and taste.

Target 3

Students will be able to identify the ear structures and pathway of hearing.

Target 4

Students will be able to identify the parts of the eye, and pathway of light through the eye.

Learning Goal 3

Students will be able to identify the general functions of the endocrine system, how the nervous system and endocrine system are alike, and how it relates to the body's general health.

Proficiency Scale

| | |
|--------------|--|
| SCI.HS-LS1-3 | Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. |
| SCI.HS-LS1-2 | Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. |

Target 1

Students will be able to identify the secretions of the endocrine system.

Target 2

Students will be able to explain how the nervous and endocrine systems are alike and different.

Target 3

Students will be able to explain how the pancreas regulates the effect of insulin on glucose.

Formative Assessment and Performance Opportunities

Labs, classwork and homework assignments, group activities, guided notes

Summative Assessment

Unit assessment will be created collaboratively and used for every student in the course. In addition, there will be other assessments in the form of labs, projects, pen and paper tests, and quizzes.

Accommodations/Modifications

Provide more opportunities to practice identifying nerves and their location

Assist students in making review cards for endocrine glands and their secretions

Pair struggling students with a study partner

Make use of online review resources

Unit Resources

Hole's Essentials of Human Anatomy and Physiology 11th Edition

21st Century Life and Careers

CAEP.9.2.12.C.1

Review career goals and determine steps necessary for attainment.

CAEP.9.2.12.C.3

Identify transferable career skills and design alternate career plans.

Interdisciplinary Connections

- LA.WHST.11-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
- LA.WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
- LA.SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.