Unit 6: Animal Structure and Function

Content Area: **Template**
Course(s):
Time Period:
Length:
Status: **Published**

State Mandated Topics Addressed in this Unit

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N/A	N/A

Animal Structure and Function (~3 Weeks)

Learning Objectives

- Animal Homeostasis: What role do the following systems play in maintaining a stable internal environment for animals?
- Animal Systems
- Chemically characterize hormones and distinguish between the mechanisms of hormone action via gene induction or secondary mechanism via cyclic AMP.
- Compare and describe negative and positive feedback mechanisms in an animal's ability to regulate their internal environment.
- Compare first line of defense, second line of defense, and memory B cells.
- Define homeostasis in relation to the internal environment of an organism
- Define the terms antigen and antibody and describe how antigens stimulate immune responses.
- Define the terms hormone, endocrine gland, exocrine gland and identify the sources of hormones.
- Describe functions of the autonomic system and contrast the functions of the sympathetic and parasympathetic systems, giving examples of the effects of these systems on specific organs
- Describe how immune cells interact by cell-cell contact, antigen-presenting cells (APCs), helper T-cells and killer T-cells.
- Describe the detection of internal and external signals, transmission and integration of information, and production of responses.
- Describe the effects of hyposecretion and hypersecretion of thyroid hormone and growth hormones
- Describe the role of white blood cells in defense against pathogens.
- Diagram a neuron, provide the name and function of each structure and describe synaptic transmission and explain how it regulates an organism's response to specific stimuli.
- Differentiate between nonspecific and specific immune defenses and give examples of each.
- Digestive System, Respiratory System, Circulatory System, Osmotic Regulation and the Urinary System, and Animal Development

- Distinguish between the primary immune response and secondary immune response and the basis for immunization
- Endocrine System
- Explain how nerve stimulation occurs via resting potential, threshold potential, action potential, signal propagation.
- Explain why the hypothalamus is considered the link between the nervous and endocrine systems and describe its influence on the anterior and posterior pituitary.
- Homeostasis
- How do feedback mechanisms regulate growth and reproduction and maintain dynamic homeostasis in organisms?
- Immune System
- Locate the principal vertebrate endocrine glands, list the hormones secreted by each, and describe the actions of each hormone.
- Nervous System
- Overview of Structure and Function
- Overview of the different sensory systems and their role in detection of external and internal signals.
- Summarize the regulation of hormone secretion by negative feedback mechanisms.
- Trace the evolutionary history of the development of a nervous system beginning with the simple invertebrates to humans.

Essential Skills

- 2.A.1
- 2.C.1
- 2.D.2
- 2.D.3
- 2.D.4
- 2.E.1
- 2.E.2
- 3.D.2
- 3.E.2
- 4.A.4
- 4.B.2
- 4.C.1
- Big Idea 1
- Big Idea 2
- Big Idea 3
- Big Idea 4
- Science Practice 1
- Science Practice 2
- Science Practice 3

- Science Practice 4
- Science Practice 5
- Science Practice 6
- Science Practice 7

Standards

Instructional Tasks/Activities

Please note: Some activities, labs, and/or projects are subject to change, activity with numbers in parentheses indicates AP Biology required lab.

- Article Science and society- vaccines: "Ethical issues for vaccines and immunization" by Jeffrey B. Ulmer and Margaret A. Liu- students read, discuss and explore societal concerns, controversies and dilemmas surrounding immunization. This article describes some of the ethical issues involved, and presents some challenges and concepts for the global community.
- Case Study: Andrea: The Death of a Diabetic- students explore topics of metabolism, hormones, cell receptors, eye anatomy, and immunology as well as issues in nutrition, exercise, stem cell research, transplantation, drug delivery systems, genetic engineering, and health care. Students learn about the functions of the pancreas, especially the endocrine functions and the role of insulin and glucagon in the regulation of blood sugar. They explore complex activities regulating nutrients in the body, especially the interactions of the liver, gut, adrenal gland, pancreas, and body cells; and learn how high blood sugar over the long term affects the organs, especially the cardiovascular system and vision.
- Case Study: The Campus Coffee Shop, Caffeine Conundrums- Since caffeine is a widely used substance, this case provides students with the opportunity to study the effects of caffeine on the human body and serves as a real-world connection to many students' lives. Students cover background information on caffeine, cell biology and signal transduction, Parkinson's disease, cardiovascular effects, and addiction/withdrawal. Students will be able to: identify sources of caffeine in foods and drinks, describe the chemical structure of caffeine and general physiological effects of caffeine consumption, explain which molecules in the nervous system interact with caffeine, determine the relationship between caffeine consumption and the incidence of Parkinson's disease, hypothesize biological explanations for the correlation between caffeine and Parkinson's, explain the molecular basis of changes in blood pressure in response to caffeine, determine potential outcomes of interactions between caffeine and catecholamine signaling pathways.
- Chickens and Humans and Pigs, Oh My! A Case Study About Influenza- students explain the background information of their discipline to others (virology students: the influenza replication process; immunology students: how antigens are seen by the immune system). Understand how viral reassortment affects host immune response and vaccine strategy.
- Connect Modules for the following systems: Nervous, Endocrine, Digestive, Respiratory, Circulatory, Immune, and Urinary.
- Endocrine Poster on Cell Signaling- students choose a specific endocrine gland and diagram and describe the hormone it secretes, mode of action, target cell and effect/response.
- Infectious Disease Simulation Lab
- Neuron Models- with emphasis on neuronal communication. Students model, draw, and explain a reflex pathway and indicate the direction of information flow. They relate the reflex action to the processes of reception, transmission, integration, and actual response.

- Practice Free Response Questions from previous AP exams
- Summative Assessment: Chapter Tests
- Visual representation (movie, poster) to describe nonspecific and specific immune defenses and immune response.

Assessment Procedure

- Classroom Total Participation Technique
- Classwork
- DBQ
- Essay
- Exit Ticket/Entrance Ticket/Do Now
- Journal / Student Reflection
- Kahoot
- Other named in lesson
- Peer Review
- Performance
- Problem Correction
- Project
- Quiz
- Rubric
- Teacher Collected Data
- Test
- Worksheet

Recommended Technology Activities

- Appropriate Content Specific Online Resource
- Chromebook
- Copy/Paste Content Specific Link Here
- Copy/Paste Content Specific Link Here
- Copy/Paste Content Specific Link Here
- Gimkit
- GoGuardian
- Google Classroom
- Google Docs
- Google Forms
- Google Slides
- Kahoot

- MagicSchool AI
- Other- Specified in Lesson
- Quiziz
- Screencastify

Accommodations & Modifications & Differentiation

Accommodations and Modifications should be used to meet individual needs. Their IEP and 504 plans should be used in addition to the following suggestions.

Gifted and Talented

- Compare & Contrast
- Conferencing
- Debates
- Jigsaw
- Peer Partner Learning
- Problem Solving
- Structured Controversy
- Think, Pair, Share
- Tutorial Groups

Instruction/Materials

- alter format of materials (type/highlight, etc.)
- color code materials
- eliminate answers
- extended time
- extended time
- large print
- modified quiz
- modified test
- Modify Assignments as Needed
- Modify/Repeat/Model directions
- necessary assignments only
- Other (specify in plans)
- other- named in lesson
- provide assistance and cues for transitions

- provide daily assignment list
- read class materials orally
- reduce work load
- shorten assignments
- study guide/outline
- utilize multi-sensory modes to reinforce instruction

Environment

- alter physical room environment
- assign peer tutors/work buddies/note takers
- assign preferential seating
- individualized instruction/small group
- modify student schedule (Describe)
- other- please specify in plans
- provide desktop list/formula

Honors Modifications

Resources

- Resource 1
- Resource 2
- Resource 3
- Resource 4
- Resource 5