

Unit 8: Animal Form and Function I

AP Biology

6 Class Meetings

Revised June 2019

Essential Questions

- How do the structures of animals serve their specific functions?

Enduring Understandings with Unit Goals

EU 1: The activities of the cells, tissues, and organs that make up the animal body are controlled and coordinated by hormones.

- Describe how animals maintain homeostasis through the endocrine and nervous systems.

EU 2: Animals meet their nutritional needs through the digestion of ingested food and efficient absorption of released nutrients.

- Explain the processes of digestion and absorption.

EU 3: Animals rely on circulation and gas exchange systems to carry out the interchange of oxygen, nutrients, and wastes with the external environment.

- Describe the pathways involved with circulation and gas exchange.

EU 4: Animals have an immune system to provide a barrier to infection and foreign cells/viruses.

- Summarize the immune response in animals.

Standards

Next Generation Science Standards (NGSS):

- **HS-LS1-2.** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

Common Core State Standards:

- **RST.11-12.1** Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
- **RST .11-12.8** Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.
- **MP.2** Reason abstractly and quantitatively.
- **MP.4** Model with mathematics.

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MSMHS Academic, Civic, and Social Competencies

Competency 1. Read and write effectively for a variety of purposes.

Competency 2. Speak effectively with a variety of audiences in an accountable manner.

Competency 3. Make decisions and solve problems independently and collaboratively.

Competency 4. Apply scientific knowledge and concepts to a variety of investigative tasks.

Competency 5. Contribute to a positive learning environment with respect and responsibility.

Unit Content Overview

- Hierarchical organization
- Regulation and homeostasis
- Endocrine signaling
- Neuroendocrine pathways
- Osmosis
- Essential nutrients
- Ingestion, digestion, absorption, elimination
- Regulation of appetite and consumption
- Circulatory systems
- Blood composition
- Gas exchange
- Respiratory adaptations
- Immune system recognition and response
- Innate immunity
- Adaptive immunity
- Disruptions in immune function

Interdisciplinary Connections

- Aquaculture: marine organism nutrition, gas exchange
- Marine Studies 1: marine organism nutrition, gas exchange

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Daily Learning Objectives with TWPS Activities

Students will be able to...

- Explain how the endocrine and nervous systems maintain homeostasis in animals.
 - *If a hormone pathway provides a transient response to a stimulus, how would shortening the stimulus affect the need for negative feedback?*
 - *Why could it be dangerous to drink a very large amount of water in a short period of time?*
- Summarize the processes of ingestion, digestion, absorption, and elimination and explain how each step provides animals with nutrients.
 - *“Lactose-intolerant” people have a shortage of lactase, the enzyme that breaks down lactose in milk. As a result, they sometimes feel cramps, bloating, or diarrhea after consuming dairy products. Suppose such a person ate yogurt containing bacteria that produce lactase. Why would eating yogurt likely provide at best only temporary relief of these symptoms?*
 - *Explain how people can become obese even if their intake of dietary fat is relatively low compared to their carbohydrate intake.*
- Describe the mechanisms involved in obtaining necessary gasses and eliminating waste products through circulatory and gas exchange systems.
 - *Describe the role of countercurrent exchange in facilitating both thermoregulation and respiration.*
- Discuss the evolutionary adaptations found in animals that provide defense against pathogens.
 - *Suppose a snake handler bitten by a particular venomous snake species was treated with antivenin. Why might the same treatment for a second such bite a year later have different results?*
- Discuss the pros and cons of government-mandated vaccinations.
 - *Should the government mandate vaccines for all children?*

Instructional Strategies/Differentiated Instruction

- **HLP:** Academically Productive Talk
- **HLP:** Writing to Learn (TWPS)
- **HLP:** Effective Feedback
- Daily Warm Up Activities
- Power Point Lecture with note-taking
- Flexible grouping
- Foldables
- Exit slips

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- Graphic Organizers
- Creating authentic connections for students
- Rephrasing and restatement of information and concepts
- Student use of headphones
- Independent reading
- Outlining of text
- Reading and Accountable Talk Discussion of Text
- Laboratory exercises

Assessments

FORMATIVE ASSESSMENTS:

- Vaccination Discussion
 - MSMHS Rubric 2: Accountable Talk
- Close reading and interpretation of text
- Outlining of textbook
- Warm Up Activities
- Exit slips
- Oral questioning
- Accountable Talk Discussions
- Daily Think-Write-Pair-Share (TWPS)
- Daily check-ins with students
- Practice FRQs
- Practice MCQs
- Homework/Reading checks

SUMMATIVE ASSESSMENTS:

- Quiz on EU 1 and EU 2
- Quiz on EU 3 and EU 4
- Vaccination Discussion
- Unit Test

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Unit Task

Unit Task Name: Vaccination Discussion

Description: Students will use information from this unit on the endocrine system, nervous system (EU 1), digestive system (EU 2), circulatory system and respiratory system (EU 3), immune system (EU 4) and homeostasis to take and defend a position about government-mandated vaccines and their effects on humans and society. Students will research the safety and effectiveness of vaccines, the ways vaccines work in the body among all systems, and the available information online regarding vaccinations. They will then participate in a class-wide discussion stating their positions. Students must use Accountable Talk and will be assessed using MSMHS Rubric 2: Accountable Talk. Students will also complete self-assessments using the same rubric following the discussion.

Evaluation: MSMHS Rubric 2: Accountable Talk

Unit Resources

- Textbook (Biology in Focus AP Edition. Campbell et al. 2014. Pearson Education, Inc)
- Interactive Science Notebook
- MSMHS School-wide Rubrics
- Lab Supplies
- Graphing calculators
- Internet databases
- Laptops