Unit 3: Cells, Tissues, and Organ Systems
7th Grade Science

23 Class Meetings

Updated January 2025

Essential Questions

- How do the structures of organisms enable life's functions?
- What role do different organs in a body system play in digestion, respiration, and overall health?
- How does the digestive system work with other body systems to break down food the body needs to function?

Enduring Understandings with Unit Goals

EU 1: Photosynthesis results in the cycling of matter and energy into and out of organisms.

- Identify the origin of energy in the environment through the process of photosynthesis.
- Examine the process of photosynthesis and the important role the process plays in the cycling of energy and matter within organisms.
- Identify and describe different types of cells.
- Describe cellular respiration and a basic understanding of the process.

EU 2: Food molecules are rearranged through chemical reactions forming new molecules that support growth and/or release energy as matter moves through organisms.

- Examine how the particles (atoms) are rearranged through chemical reactions to form new molecules.
- Describe how enzymes break down food and aid in digestion.
- Discover how food molecules are rearranged, and how energy is released within organisms.

EU 3: In multi-cellular organisms, the body is a system of multiple interacting subsystems.

- Discover that different organs work together to form tissues and organs that specialize in certain functions.
- Determine how specialized tissues in the digestive system and other systems comprise each organ, enabling the specific organ functions to be carried out.
- Explore each body system and how chemical changes occur to carry out life functions.
- Conclude that organs are composed of interacting tissues.

Standards

Common Core State Standards:

- **RI.7.1:** Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
- **W 6.1:** Write arguments to support claims with clear reasons and relevant evidence.
- **W 6.2:** Write informative/explanatory texts to examine and coney ideas, concepts, and information through the selection, organization, and analysis of relevant content.
- **RST.6-8.:** Cite specific textual evidence to support analysis of science and technical texts.

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- **RST.6-8.9:** Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
- **RST.6-8.7:** Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table)

Next Generation Science Standards:

- **MS-LS1-3:** Plan and carry out an investigation to provide evidence that living organisms need energy and matter to live and grow.
- **MS-LS1-3**: Use argument supported by evidence for how the body is a system of interacting sub systems composed of groups of cells.
- **MS-LS1-6:** Construct a scientific explanation on evidence for the role of photosynthesis and flow of energy into and out of organisms.
- **MS-LS1-7:** Develop a model to describe how food and water are transported through the human digestive system.

ISAAC Vision of the Graduate Competencies

Competency 1: Write effectively for a variety of purposes.
Competency 2: Speak to diverse audiences in an accountable manner.
Competency 3: Develop the behaviors needed to interact and contribute with others on a team.
Competency 4: Analyze and solve problems independently and collaboratively.
Competency 5: Be responsible, creative, and empathetic members of the community.

Unit Content Overview

1. The Role of Photosynthesis
    - Identify the components necessary for photosynthesis to take place.
    - Apply how the process of photosynthesis can benefit organisms through the cycling of matter and energy.
    - Describe how energy is transferred from food to cells.

2. Food, Nutrients & Digestion
    - Explain how the digestive and circulatory systems work together to provide energy to cells.
    - Describe how enzymes aid in breaking down food and digestion.
    - Identify different types of nutrients and how they impact on our bodies and health.

3. Organ Systems
    - Identify that specialized cells make up organs in each organ system.
    - Describe the role each organ plays in different systems.

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- Identify the major organs in each organ system.
- Construct models depicting the beginning and end of an organ system.

4. Tissues
- Identify which tissues are found in each organ.
- Describe the features and purpose of each tissue type.

Key Terms and Vocabulary: photosynthesis, cells, tissues, organs, nutrients, enzymes, cellular respiration, glucose, oxygen, reactants, products, digestive system, saliva, esophagus, stomach, small intestines, large intestines, nutrients, digestions, absorption, circulatory system, respiration, blood vessels, capillaries, aorta, atrium

Interdisciplinary Connection:
- Language Arts
- Humanities

Daily Learning Objectives with TWPS

Students will be able to…

- Examine the components necessary for the process of photosynthesis.
  - *How do plants get food?*
- Explain how plants use photosynthesis to make their own food. *
  - *How is food made during the process of photosynthesis?*
- Describe how animals depend on photosynthesis to get the energy they need.
  - *Compare and contrast plant and animal cells? What do you know about their differences?*
- Discover the purpose and function of seven organ systems.
  - *What organ systems do you already know? How do you think they work together to keep us healthy?*
- Explain the organs involved in the process of digestion.
  - *How do we digest our food? What organs are essential to this process?*
- Describe how the body breaks down food and absorbs nutrients to support overall health.
  - *What role do enzymes play in digestion? How do they help break down food? Describe a food you ate yesterday and describe the steps necessary for digestion.*
- Apply knowledge of energy transfer to organize and explain the digestive system.
  - *How do you think our digestive system turns food into energy that our body can use?*
- Identify the main organs in the respiratory system.
  - *How do you think our body would function without one of the major systems like the respiratory or digestive system?*
- Describe the circulatory system and the major function of each organ.
  - *How do you think our body would function without one of the major systems like the respiratory or digestive system?*
- Compare and contrast the respiratory system with the circulatory system. *
  - *How do the respiratory and circulatory systems work together to deliver oxygen to other parts of our body?*

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- Explain the process of cellular respiration.
  - *What do you already know about cellular respiration?*
- Explain how oxygen is exchanged for cardon dioxide in the lungs.
  - *Describe how the lungs function inside the body?*
- Describe the role of circulatory and respiratory systems to deliver oxygen throughout the body.
  - *How does your circulatory and respiratory system work harder during a physical activity like running the mile in PE?*
- Discover and explain information about how the nervous system sends information through the body. *
  - *How do you think the nervous system affects our reactions and decisions throughout the day?*
  - *How does our nervous system react to protect us from situations or dangers?*
- Discover and produce a model depicting the skeletal system and the muscular systems.
  - *Describe how our bones and muscles work together to complete physical activity like riding a bike.*
- Describe homeostasis and how it helps regulate our bodies.
  - *How would our life be different if our bodies did not have the ability to regulate temperature?*
- Explain the structure and purpose of your chosen organ system.
  - *Why is your organ system the most important? Explain*
- Create a model representing a chosen organ system. *
  - *What makes a visually appealing model?*
- Demonstrate content knowledge for success on the NGSS practice question.
  - *When taking a test like SBAC or NGSS, what strategies help you do well?*

Instructional Strategies/Differentiated Instruction

- Guided notetaking
- Interactive Notebook
- Warm up activities
- Flexible grouping
- Independent reading
- Lab Demonstrations
- Exit slips
- Graphic Organizers
- Whole group instruction
- Student-led instruction
- Independent problem-solving
- Collaborative problem-solving
- Cross-curricular problem solving (independent and collaborative)
- Accountable Talk
- Homework
- Word walls with visuals
- Investigations/labs
- CER (Claim, Evidence, Reasoning)

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EL DIFFERENTIATED INSTRUCTION:

- Sentence starters
- Simplified directions
- Prompting and questioning
- Alternate responses when needed
- Explicit modeling
- Key vocabulary
- Visuals
- Vocabulary word bank
- Reading and accountable talk discussions of texts
- Tiered Instruction
- Hands-on activities
- SIOP strategies- Teachers implement SIOP strategies

Assessments

FORMATIVE ASSESSMENTS:

- Interactive Notebook
- Labs
- Claim Evidence Reasoning Responses
- Guided notes
- Homework
- Daily Think-Write-Pair-Share (TWPS) Activities
- Accountable Talk Discussions
- Oral questioning
- Exit slips
- Warm Up activities
- NGSS Practice
- Diagrams
- Lab Reports

SUMMATIVE ASSESSMENTS:

- Quiz EU 1
- Quiz EU 2
- Unit 3 Performance Task EU1, EU2, EU3

Unit Task

Unit Task Name: "Build an Organ System"

Description: Students will use their knowledge of the body systems to create a model of one of the body systems creating a visual representation this could be a 3Dmodel, a comic strip, or a board game. Students will be sure to identify or label each organ and to describe the function. Students will then

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write an informative paragraph describing how the organ system works and interacts with one other organ system in the body. (EU2, EU3)

Evaluation: Teacher Created Scoring Guide, CER rubric

Unit Resources

- Open Sci Ed unit resources
- Science notebooks
- Laptops
- NGSS Interim Assessments
- Newsela
- Read Works
- Quizlet
- Pear Assessment