

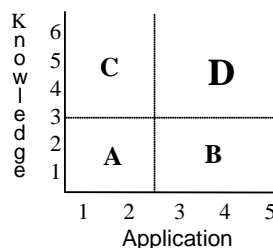
**GOLD  
SEAL  
LESSON**



**ENZYME DEFICIENCIES**

**Subject(s)**  
Biology  
Anatomy & Physiology

**Rigor/Relevance  
Framework**



**Grade Level** 10–12

**Instructional  
Focus**

**Writing:** Students write for a variety of purposes and audiences with sophistication and complexity appropriate to the grade level.  
**Basic Concepts and Knowledge:** Students develop an understanding of scientific concepts using facts, theories, principles, and models.  
**Science in Personal and Social Perspectives:** Students apply scientific principles to personal and social issues.  
**Unifying Concepts and Processes:** Students recognize patterns and processes, making connections in terms of systems and subsystems that explain the interrelationships of the natural and designed world.  
**Communication:** Students communicate and apply scientific concepts  
**Science:** Students demonstrate knowledge and skills necessary to perform science inquiry  
**Health Informatics:** Students formulate and report information clearly and concisely  
**Inquiry and Investigation:**  
 Formulate explanations by using logic and evidence.  
**Biology:**  
*Students know* enzymes are proteins that catalyze biochemical reactions without altering the reaction equilibrium and the activities of enzymes depend on the temperature, ionic conditions, and the pH of the surroundings.  
*Students know* the individual functions and sites of secretion of digestive enzymes (amylases, proteases, nucleases, lipases), stomach acid, and bile salts.

**Student  
Learning**

- Students will research the source, action, and pH of major digestive materials
- Students will produce a PowerPoint of a digestive material deficiency.
- Students will present their discoveries to the class.

**Performance  
Task**

**Overview:**  
 (Prior knowledge of macromolecules and how to make a PowerPoint is preferred for this lesson, as well as a general discussion of enzymes.)  
 In order to understand the need for functioning enzymes in the body students will correlate the two by researching different enzyme deficiencies.

	<p><b>Description:</b>  Students will create a table of the digestive enzymes, stomach acids, and bile salts as well as their source, purposes and the pH conditions under which they work best. This will require using resources such as the textbook or the Internet. Students will then work in small groups and examine the consequences of the loss of the function of one of the digestive materials. The group will produce a PowerPoint and then present their discoveries to the class.</p>
<b>Essential Skills</b>	<p>E1 Apply in writing the rules and conventions of grammar, usage, punctuation, paragraphing, and spelling.</p> <p>E7 Research information from a variety of sources and draft a well-organized, accurate, and informative report or essay that engages an audience and addresses its needs.</p> <p>E9 Organize supporting detail in logical and convincing patterns that focus on audience and purpose.</p> <p>E20 Understand the nature and purpose of a variety of technical formats (essays, business letters, memos, investigative reports, brochures, critiques, instructions, policy statements, technical proposals, lab reports, etc.) and write in these formats.</p> <p>E4 Use resources (dictionary, grammar books, thesaurus, online references, etc.) as needed to edit.</p>
<b>Assessment</b>	<p>Digestive Materials Table – correct and complete  PowerPoint Presentation  Oral Presentation – rubric</p>
<b>Attachments/ Resources</b>	<p>Essentials of Anatomy &amp; Physiology, Elaine Marieb, 8<sup>th</sup>  Digestive Materials and Deficiencies guide  PowerPoint Presentation – grade sheet</p>
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