

Biomed Enzyme Unit Plan

Mr. Rabold

AP Content Standards

2.A.2: Organisms capture and store free energy for use in biological processes.

- Free energy becomes available for metabolism by the conversion of $\text{ADP} \rightarrow \text{ATP}$, which is coupled to many steps in metabolic pathways.

4.B.1: Interactions between molecules affect their structure and function.

- Change in the structure of a molecular system may result in a change of the function of the system.
- The shape of enzymes, active sites and interaction with specific molecules are essential for basic functioning of the enzyme.
 - For an enzyme-mediated chemical reaction to occur, the substrate must be complementary to the surface properties (shape and charge) of the active site. In other words, the substrate must fit into the enzyme's active site.
 - Cofactors and coenzymes affect enzyme function; this interaction relates to a structural change that alters the activity rate of the enzyme. The enzyme may only become active when all the appropriate cofactors or coenzymes are present and bind to the appropriate sites on the enzyme.
- Other molecules and the environment in which the enzyme acts can enhance or inhibit enzyme activity. Molecules can bind reversibly or irreversibly to the active or allosteric sites, changing the activity of the enzyme.
- The change in function of an enzyme can be interpreted from data regarding the concentrations of product or substrate as a function of time. These representations demonstrate the relationship between an enzyme's activity, the disappearance of substrate, and/ or presence of a competitive inhibitor.

Day 1

Objectives:SWBAT:

- explain the flow of energy in living things
- describe the nature of enzymes
- demonstrate the factors that affect enzyme activity
- draw and explain a molecule of ATP

Standards: Free energy becomes available for metabolism by the conversion of $\text{ADP} \rightarrow \text{ATP}$, which is coupled to many steps in metabolic pathways.

Process:

Enzymes Pretest

Intro. to Energy in Cells and ATP cycle

Team Lab work.

Closure: Chapter 6 and 8 guided readings, Capstone chapter 2 draft.

Day 2

Objectives:SWBAT:

- explain the flow of energy in living things
- describe the nature of enzymes
- demonstrate the factors that affect enzyme activity
- draw and explain a molecule of ATP

Standards: 4.B.1: Interactions between molecules affect their structure and function.

- Change in the structure of a molecular system may result in a change of the function of the system.
- The shape of enzymes, active sites and interaction with specific molecules are essential for basic functioning of the enzyme.
 - For an enzyme-mediated chemical reaction to occur, the substrate must be complementary to the surface properties (shape and charge) of the active site. In other words, the substrate must fit into the enzyme's active site.

Process:

A.P. Bio-Intro. to Enzymes and Chapter 8

Team Lab work.

Closure: Chapter 6 and 8 guided readings, Capstone chapter 2 draft.

Day 3

Objectives:SWBAT:

- demonstrate the factors that affect enzyme activity
- perform ELISA test for antigen presence
- draw conclusions based on data collected

Standards: Other molecules and the environment in which the enzyme acts can enhance or inhibit enzyme activity. Molecules can bind reversibly or irreversibly to the active or allosteric sites, changing the activity of the enzyme.

Process:

Intro to Enzymes

Team Lab work

Closure: Chapter 6 and 8 Guided Readings, Capstone Chapter 2 draft due

Day 4

Objectives:SWBAT:

- demonstrate the factors that affect enzyme activity
- develop laboratory procedures based on proposed hypothesis
- draw conclusions based on data collected

Standards: Cofactors and coenzymes affect enzyme function; this interaction relates to a structural change that alters the activity rate of the enzyme. The enzyme may only become active when all the appropriate cofactors or coenzymes are present and bind to the appropriate sites on the enzyme.

Other molecules and the environment in which the enzyme acts can enhance or inhibit enzyme activity. Molecules can bind reversibly or irreversibly to the active or allosteric sites, changing the activity of the enzyme.

Process:

Enzymes Part 2

A.P. Bio-Enzyme lab Chapter 3 development/Trial Runs

Closure: Chapter 6 and 8 guided readings, Capstone chapter 2 draft

Day 5

Objectives:SWBAT:

- demonstrate the factors that affect enzyme activity
- develop laboratory procedures based on proposed hypothesis
- draw conclusions based on data collected

Standards: Cofactors and coenzymes affect enzyme function; this interaction relates to a structural change that alters the activity rate of the enzyme. The enzyme may only become active when all the appropriate cofactors or coenzymes are present and bind to the appropriate sites on the enzyme.

Other molecules and the environment in which the enzyme acts can enhance or inhibit enzyme activity. Molecules can bind reversibly or irreversibly to the active or allosteric sites, changing the activity of the enzyme.

Process:

A.P. Bio-Enzyme activity and factors affecting enzyme activity

Team Lab Work

Closure: Lab work checkpoint.

HW: Guided reading chapter 6, 8, Capstone chapter 2 draft edit

Day 6

Objectives:SWBAT:

- demonstrate the factors that affect enzyme activity
- develop laboratory procedures based on proposed hypothesis
- perform ELISA test for antigen presence
- draw conclusions based on data collected

Standards: The change in function of an enzyme can be interpreted from data regarding the concentrations of product or substrate as a function of time. These representations demonstrate the relationship between an enzyme's activity, the disappearance of substrate, and/ or presence of a competitive inhibitor.

Process:

Enzymes Part 3 Minidiscussion

Team Lab Work completion

Closure: Finalize Group work and presentation preparations.

Day 7

Objectives:

- explain the flow of energy in living things
- describe the nature of enzymes
- demonstrate the factors that affect enzyme activity
- draw and explain a molecule of ATP

Standards: All above

Process:

Enzymes and Energy Quiz

Team presentations.