

# Enzyme Environment Activity: Environmental Effects on Enzyme Function

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## Middle School (NGSS Aligned) Teacher Guide

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### Overview

This guide supports implementation of the Enzyme Environment Activity: Environmental Effects on Enzyme Function using the 5E instructional model.

### Learning Objectives

- Students will discover that enzymes need specific conditions to work
- Students will observe how temperature and pH affect enzyme shape
- Students will connect enzyme function to digestive system conditions

### Standards Alignment

- **MS-LS1-3:** Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells
- **MS-LS1-7:** Develop a model to describe how food is rearranged through chemical reactions

### Prerequisites

- Basic understanding of digestion
- Knowledge that proteins help break down food
- Familiarity with hot/cold and acid/base concepts

### Time Estimate

45-50 minutes

## Materials Needed

- Computer/tablet with internet access
- Student Activity Sheet
- Colored pencils (optional)

## Teaching Tips by Phase

### Phase 1: ENGAGE (5-10 minutes)

- Start with the phenomenon or problem presented
- Elicit student predictions and prior knowledge
- Create cognitive dissonance if possible
- Build excitement for investigation

### Phase 2: EXPLORE (15-20 minutes)

- Allow students to investigate with minimal guidance
- Circulate and ask probing questions
- Encourage systematic data collection
- Note common discoveries and difficulties

### Phase 3: EXPLAIN (10-15 minutes)

- Have students share their findings first
- Build on their observations to introduce concepts
- Address misconceptions directly
- Connect to broader biological principles

### Phase 4: ELABORATE (10 minutes)

- Apply knowledge to new scenarios
- Make real-world connections
- Encourage deeper investigation
- Support transfer of learning

### Phase 5: EVALUATE (5-10 minutes)

- Use varied assessment strategies
- Focus on conceptual understanding
- Provide immediate feedback
- Plan follow-up based on results

#### **Remember:**

The goal is student discovery through guided inquiry. Resist the urge to explain concepts before students have explored them!

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