

**EDCI 786 “Topics/Science Research in the Classroom”  
Instructional Unit Outline**

Participant Name: **Tina Savage**

Project Title: **Effect of pH on Enzyme Function**

Instructional Overview and Timeline

**DAY BEFORE – show KSU Konost lab powerpoint** (available on KSU class site)

**DAY 1-**

1. **(10 minutes) Activity introduction/background discussion and safety.  
Pre lab vocabulary/questions page.**
2. **( 30 minutes) Prepare buffers. (see lab handout)**
3. **(remainder of class) practice with micropipettes**

**DAY 2-**

1. **(5 minutes) introduction/safety**
2. **( 30-40 minutes) complete enzyme activity assay. (see lab handout)**
3. **(10-15 minutes) post lab questions**

Purpose: **To help students understand the impact environmental factors like pH can have on protein structure and enzyme function.**

Grade Level(s): **9<sup>th</sup> – 12<sup>th</sup> grade biology students**

Student Learning Outcomes (Instructional Objectives)

- **Students will practice measurement and mathematical calculation lab skills.**
  - Measurement skills**
    - mass measurements with electronic balance
    - volume measurements with graduated cylinder
    - pH measurements with pH meter
    - quantitative measure of enzyme activity with spectrophotometer
  - Mathematical calculation skills**
    - molarity calculations-calculate chemical needed to prepare buffer solutions
- **Students will understand that one of the signals used to determine when chemical reactions occur is physical change (color change).**
- **Students will become aware of enzymes and their function.**
- **Students will examine the effects of environmental conditions on enzyme function.**

Pertinent Sections of Science Standards

**The student...**

**(Science as Inquiry)**

**1:1:3 actively engages in using technological tools and mathematics in scientific investigations.**

**(Chemistry)**

**2A:3:1 understands a chemical reaction occurs when one or more substances (reactants) react to form a different chemical substance(s) (products).**

**(Life Science)**

**3:1:2 understands cell functions involve specific chemical reactions.**

Plan for Implementation

**Fall 2007 – Biology I – Chemistry of Life Unit**

**Aug. 07 trial run with Biology II students**

Unit Assessment:

**Lab rubric used for assessment**

Resources (Print and Websites)

Pre/post lab vocabulary/questions handouts

Lab procedure handout

KSU powerpoint

Online protein data bank – [www.rcsb.org](http://www.rcsb.org)