



MARINE BIOTECHNOLOGY & BIOINFORMATICS FOR TEACHERS
MOSS LANDING MARINE LABS NSF ITEST GRANT
TEACHER LESSON PLAN FOR CLASSROOM USE
RESTRICTION ENZYMES

Title of Lesson: Restriction Enzymes

Designed by

Becky Corrigan
rcorrigan@cpsmail.cps.k12.il.us

Background

This lesson incorporates bioinformatics as a way to virtually explore the uses of restriction enzymes in biotechnology.

Description of Audience: This biotechnology/bioinformatics activity is designed for use by 9th grade high school students

State Standards: This biotechnology/bioinformatics activity fulfills the following State of Illinois Science Standards:

STEM Connection:

Technology Integration:

This lesson uses NEB cutter and virtual gels.

Goals(s):

- Goal 1: to incorporate the idea of gel electrophoresis as an identification tool
- Goal 2: to understand how restriction enzymes are used in biotechnological applications

Learning Objective(s)

- Objective 1: Students will learn how to virtually visualize differences in DNA sequences
- Objective 2: Students will discover how different restriction enzymes work

Purpose/Rationale

The purpose is to give students in insight to how DNA research is conducted. Due to constraints with equipment, I am approaching this topic as a virtual lab.

Materials/Resources

Computers

Prior Teacher Preparation

Research has to be done in order to find DNA sequences and enzymes that can be used as identification

3-Step Procedure

#1 Introduction

- Links to prior knowledge will include DNA mutation, gel electrophoresis and DNA fingerprinting
 - New concepts will include restriction enzymes

- Students will be introduced to concepts using a mystery that they must solve. The mystery can only be solved by comparing DNA fingerprints of different species

#2 Exploration

- Students will be introduced to the project which is to solve a mystery
- They will be learning about restriction enzymes through lecture and a kinesthetic activity will assess their understanding
- Students will use NEB cutter to explore restriction enzymes, and they will be creating virtual gels to identify their "suspect"

#3 Application

- This lesson lends well to criminal investigations as well as provides students with an understanding that forensic scientists are not the only scientists that use DNA evidence for their work.

Assessment

- The assessment will be the correct identification of their "suspect" species

Teachers' Self Evaluation

Reflect on strengths and weaknesses of the lesson as taught.

- Describe individual student responses to techniques used. How did they react?
- Discuss student "thinking" and ideas.
- Include samples of students answers on lab sheet or journal entry (photocopy is fine).
- Ask students for a brief evaluation of lesson. Include their responses.
- Discuss fulfilled and unfulfilled expectations. Any surprises?
- In retrospect, how would you modify this lesson?