

MIKE H. FELLOWS

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I have taught for 14 years, all in Lakewood. At one time or another, I've taught all of the science courses offered in Lakewood for 7th – 12th grades.

The courses that I currently teach are: Biology (10th grade), Chemistry (11th and 12th grades), and Advanced Biology: Forensics (11th and 12th grades). I have also designed an Adv. Bio: Ecology course and an Adv. Bio: Animal Behavior course.

I have been a member of the SEP learning community since 1997, as a participant and as a lead teacher for the summer teacher program. I have also been a member of the SEP Elephant Project Curriculum Development Team 2000-2002 .

Some of my special educational interests include: Forensics, Ecology, Evolution, Human Anatomy and Physiology, and Molecular Biology.

Some of my hobbies include: reading, photography, collecting old books and baseball cards, backpacking, collecting scientific and/or humorous T-shirts, and watching my son play soccer and baseball.

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- 5 sections of Sophomore General Biology, periods 1,2,3,5,6
- 55 minute class periods
- 28-32 students per class
- 7 lab groups of 4 to 5 students

I insert the Elephant Project into my genetics unit, so the students have already learned about DNA structure, replication, and protein synthesis. The genetics unit is usually in late November-early December. The Elephant Project lasts approximately two weeks of the five-week genetics unit.

HOW I CUSTOMIZE THE ELEPHANT PROJECT FOR MY CLASSES:

Prerequisites

- Day 1 – Micropipet Instructions and Practice
- Day 2 – Electrophoresis Basics
- Day 3/4 – Dye/Indicator Lab (alternate classes)
- Day 3/4 – Human Genetics Activity

Engage

- Day 5 – Scenario/Biographies/“Wildlife Warriors” Video/Nat. History

Explore

- Day 6 – RFLP Paper Activity
- Day 7 – “Ivory” Digest
- Day 8/9 – Elephant RFLP Lab (alternate classes)

Explain

- Day 8/9 – Analysis of Comstock and student data

Elaborate

- Day 10 – Discussion of Scenario Conclusion and Bioethics

Evaluate

- Day 11 – Whale Assessment

Specifics:

Day 1 – We go through how to use the micropipets properly and then I have the students practice by making the four microtube mixtures described in the Micropipetting Activity.

Day 2 – We go through the basics of gel electrophoresis by going over the handouts included in the kit, and I give them mental analogies to relate to (such as throwing two different sized rocks into a fast moving stream and seeing how the rocks “drop out” differently)

Day 3/4 – Several days before the Dye Lab I have my TA make the buffer and all of the gels for all of the classes. The gels can be stored in plastic sandwich bags in the refrigerator with a little buffer for a week or so. We alternate classes so that three classes (periods 1,3,6) do the lab first day, and the other classes (periods 2,5) do the lab the next day. I set up three stations of dyes (which I've aliquoted the day before from the stocks in the kit).

Day 3/4 – We do a fun Human Genetics Activity dealing with a variety of obvious traits.

Day 5 – We go through the scenario and background information about Kenine Comstock and Sam Wasser, including their mini-biographies. We watch the video “Wildlife Warriors”, then go through the information on the natural history of the African elephant.

Day 6 – I explain the basics about restriction enzymes and RFLP's then we do the RFLP paper activity. I do the first version in which the students write their own sentences and then cut them up into fragments.

Day 7 – A few days prior to the “Ivory” digest, I set up 7 lab stations with enough materials in each tube for all five classes (with a little extra). There are three tubes that each lab group uses: I (“ivory” DNA), B (buffer and water), and RE (restriction enzyme). These three tubes are kept in a styrofoam cup with ice, which is replaced in the freezer after each class period. Each lab group labels their digest tube with a number and a letter: the number represents the period and the letter represents the lab group/bench. I pull the tubes out of the water bath later, and then put them into the freezer overnight.

Day 8/9 - Several days before the Elephant RFLP Lab I have my TA make the buffer and all of the gels for all of the classes. The gels can be stored in plastic sandwich bags in the refrigerator with a little buffer for a week or so. We alternate classes similar to the Dye Lab. I aliquot all of the DNA samples and loading buffer into 4 sets/lab stations, so that each station has enough materials for 2 lab groups in each of the 5 classes (with a little extra). The students load and run the gels, then start staining them. I finish the staining and destaining later, and then store the gels in the refrigerator overnight.

Day 8/9 - We use option 2 for analyzing both the Comstock data and the students' data. The students make their acetates from their gels, then use them to estimate the base pair lengths of the bands. Then they determine which of the banding patterns match. They turn in their Data Submission Forms before they leave.

Day 10 – Although the students walked away from Day 9 with the knowledge of where the “ivory” DNA came from, we talk about the potential outcomes for grandpa and grandma. Then we broaden the discussion to include more global issues involving the African elephant.

Day 11 – The students are given the Whale Assessment to determine how well they learned the material, and how well they could transfer their learning.