

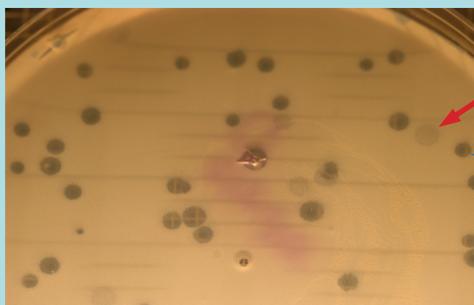
# Biology 125-126. Phage Hunters at the University of Mary Washington (or How You Too Can Teach This Course With 40+ Students)

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## ABSTRACT

Biology 125-126 was taught as a course for first year students, and is a replacement for our introductory Biology 121-122 sequence. Students were not selected or screened for enrollment in this course, so we had prospective majors as well as students simply fulfilling their science requirement. This meant a wide variety of interest and abilities. The course was designed as three sections of 15 students each but we actually had a total of 40 students complete the first semester. Two sections were taught by Lewis in the Fall, and Loesser-Casey taught one. Because a few students did not continue, each professor taught one larger section during the Spring. Both instructors worked together to ensure that all students received the same information and instruction as much as possible, including giving identical exams. Further, both instructors were frequently present during lab periods to make labs run more smoothly. This also allowed us to utilize our different strengths for all sections. What did we learn? There were a lot of students to keep track of in the first semester, since students were not working at the same pace. Having adequate assistance with lab preparation is essential, and having student lab aides actually in the lab sections would have been helpful (we have recruited two of our current students to act as lab aides for next year). The second semester, even with larger sections, was much easier since all students were working on the same thing at the same time. Because our phage was difficult to sequence, we had time in the spring semester to add several traditional introductory biology labs, which allowed us to ensure that our students received some of the more essential laboratory experiences they would have received in our traditional course. What were our successes? All 40 of our Fall students isolated bacteriophages, although some were probably duplicates. Thirty-eight out of 40 students were able to isolate DNA from their phage. All 33 Spring students had electron micrographs of their phages. And finally, our impression is that a number of students have decided to major in Biology after completing this course.

### Example of other phages isolated by students



This micrograph is from a phage isolated by a student in the class (not Eagle)  
Note the varying sizes and even differences in opacity (see arrows)



Our Poster session

## INTRODUCTION

The University of Mary Washington is a 4 year public liberal arts college with about 5000 students. All undergraduates are required to take a lab science. Biology 125 & 126 was our "Phage Hunters" course and fulfills this science requirement. Features of the course include:

- 4 credit course
- 1 hour, twice a week, for lecture
- 2 hours, twice a week, for laboratory.
- All students in the class were freshmen
- Mixture of both majors and non-majors
- Students self-selected the course based on a description available to them at registration time
- 3 sections, 41 students, first semester
- 2 sections, 33 students, second semester
- All students given same lectures and exams
- Covered same material in lecture as the traditional Introductory Biology class, just in a different order
- Some traditional Intro Bio labs were added in the second semester (fetal pig dissection, labs on photosynthesis and respiration)

## CHANGES FOR FUTURE

There are a few things that we want to change for next year. We plan to:

- schedule the electron microscopy for the second semester
- give the students more up-front training on the use of lab equipment (centrifuges, micropipettors, etc.)
- try to keep the students on-track better. Those that are behind will *have* to come in on their own to catch up.
- schedule more times to get all lab sections together
- have students from this year assist in lab sections as paid lab aides
- have the building laboratory technician make media and prepare plates
  - prepare a simplified set of instructions for the lab aides and technician

## SUCCESSSES

We had many successes in this course, including:

- all 41 students were successful in isolating a phage
- 95% of the students were able to isolate DNA from their phage
- every student enrolled in the second semester took an electron micrograph of their phage
- several students changed their major to Biology after finishing the course
- students designed primers that worked and experienced the sequencing process first hand
- every student learned the computer programs for the *in silico* portion of the course and successfully annotated part of the genome

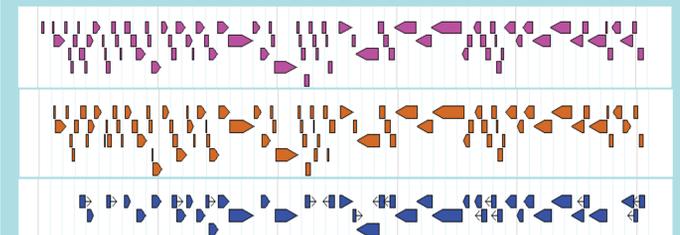
We also think there were some things we did that helped make us successful:

- Both instructors were available for each other's lab times the first semester (and attended the labs)
- We gave the same lectures and the same tests to all sections
- Because of the number of students, we started out with the enrichment protocol
- We had a poster session/pizza party during the last week with ALL students attending

As for retention:

- 33 out of 41 came back to take the second semester
- Only 1 student that registered dropped the class (the first week of the first semester)
- 5 students out of 41 failed the first semester (most of these failures were due to not handing in any of the major portions of the lab)

### Glimmer, GeneMark, and Called Genes



Another electron  
micrograph  
from our class

