**113 Lab Learning Objectives**

**Week 13: Information and Natural Selection lab #8**

Learning Objectives for Environmental Information and Natural Selection

*Skills*

* Write a clear lab report summarizing complex data generated in the lab.

*Cognitive*

* Employ a scientific approach to answer biological questions and test hypotheses.
* Analyze experimental data and reach logical conclusions.
* Construct a generalizable explanation linking genetically defined taste capacity to natural selection and evolution.
* Identify possible sources of environmental information that communicates the level of toxicity for plant tissues.
* Design an experiment to use model organisms to extrapolate potential toxicity of a compound or mixture.

**Week 13: Information and Evolution Lab #6**

Learning Objectives for Bacterial Evolution

*Skills*

* Tabulate your results
* Generate graphical summaries of your results

*Cognitive*

* Employ a scientific approach to answering biological questions and test hypotheses.
* Describe the big idea of evolution based on lab experiences.
* Explain how antibiotic resistant bacteria can appear quickly in the population.
* Design directed evolution process to select antibiotic resistant bacteria.
* Formulate an hypothesis how antibiotic resistant bacteria evolve outside the laboratory.
* Propose a mechanism that allows bacteria to evolve rapidly when exposed to antibiotics.

**Bio113 Week 13**

Before you come to lab

1) Complete your written lab report about the Information and Natural Selection Module.

2) Answer each of these four questions in two sentences or less.

A) Only 10% of the cells of your body are human cells (~25 trillion human cells). What are the other 90%? How many cells of your body are non-human?

B) How were you able to drive evolution towards antibiotic resistance using natural selection?

C) What is the difference between directed evolution and normal evolution?

D) What surprised you about this directed evolution experiment?

**Week 13**

In Lab

**Information and Evolution: Genetics of Perceiving Danger Module (an 8 week project)**

1) Submit your solo written lab report on *Information and Natural Selection Module*. Be sure to pledged the report.

**Evolution: Directed Evolution of Antibiotic Resistance in Bacteria (a 6 week project)**

2) Document your results by measuring the radius of the rings around the disks. Take photos of your plates as well.

3) Compare today’s results to the measurements you made early in the semester (see week #9 results).

4) Prepare for your final oral presentation that you will give next lab. Each person needs to prepare for all four sections because you won’t find out which section you are giving until one hour before the presentation.