

Resources: Pre-test/Post-test Assessment Tool**General Ecology Lab – Fall 2005**

This pre-test is not part of your grade, and your answers are strictly anonymous. Participation in this assessment is voluntary. The information we are collecting is important, so that we can best understand what aspects of the scientific process we need to focus on in lab and lecture. Please do the best you can!

About me and my background:

1. Which of the follow best describes your year standing? I am a
 - A. 2nd year
 - B. 3rd year
 - C. 4th or 5th year
 - D. Other

2. Which of the following best describes your preparation for this class?
 - A. I took Introductory Biology last year at RIT
 - B. I took Introductory Biology before last year at RIT.
 - C. I took General Biology
 - D. I got AP credit for Biology
 - E. I took Introductory Biology at another school.
 - F. None of these describe my preparation.

3. Have you ever participated in scientific research outside of a regular class?
 - A. Yes
 - B. No

4. Before this lab, how many scientific papers have you written? (*i.e.* papers with an introduction, methods, results and discussion).
 - A. None
 - B. 1
 - C. 2
 - D. 3
 - E. more than 3

About your confidence of your understanding of the scientific process:

5. I am confident that I can write a hypothesis that is testable with an experiment or observational study.

- A. strongly agree
- B. agree
- C. disagree
- D. strongly disagree
- E. do not know

6. I feel that I can design an experiment or observational study to answer research hypotheses.

- A. strongly agree
- B. agree
- C. disagree
- D. strongly disagree
- E. do not know

Analysis – Read this short description and answer the questions below

A greenhouse experiment was set up in which a series of plots were placed on a table top. Each pot contained a similar soil mixture and three plants of the same size. A total of 12 pots were set up. Different thicknesses of neutral density shade cloth were placed above each pot to allow different amounts of sunlight to reach plants. These different thicknesses were no cloth, single thickness of cloth, and double thickness of cloth. Each of these levels of shade cloth was assigned randomly to pots until each of the 12 pots was assigned a treatment (assume equal numbers of pots in each treatment). On the 14th day of the experiment, leaf thicknesses and plant heights were measured.

7. What is (are) the independent variable(s) in this experiment?

8. What is (are) the dependent variable(s) in this experiment?

9. What is the experimental unit in this experiment?

10. How many replicates (i.e. trials) were there in this experiment?

Student A hypothesized that plants obtained their energy from light and student B hypothesized that plants obtained their energy from nutrients in the soil. They set up the following experiment: Each of several groups of plants received different treatments of light and fertilizer. After all the seedlings grew for 21 days, the energy in each group of plants was measured using an instrument called a bomb calorimeter. The treatments and results of the energy measurements are shown below:

Treatment Group	A	B	C	D	E
Light Intensity	10	20	30	40	50
Fertilizer (grams)	1	2	3	4	5
Energy Content after 21 days (Kcal)	974	1190	1510	2170	2855

11. Which of the following would be the best statement about the data from the students' experiments?

- A. The data contradict student A's hypothesis but support student B's hypothesis.
- B. The data contradict student B's hypothesis but support student A's hypothesis.
- C. The data contradict both hypotheses.
- D. The data are consistent with both hypotheses.
- E. The data show that energy is obtained from both light and fertilizer.

12. Would you redesign their experiment, and if so, how? If not, why not? (Use the same hypotheses)

Questions taken from:

- Donovan and Allen (1983), *Analytical Problems in Biology*
- A. Griffith, Mary Washington College