ECO-COLUMN LAB

Purpose:
1. to create a simulated ecosystem in an effort to learn about ecosystems in the real world.
2. to devise a controlled experiment that will evaluate the effects of one variable on an ecosystem.

Part I: Set-up you eco-column
   a. Identify and **write the name** of the ecosystem you are creating.
   b. Decide on the components to your ecosystem that you will need: remember to include what will go in your aquatic, decomposition, and terrestrial section. Maybe even atmospheric section to your eco-column. You'll need approximately 5 soda bottles per ecocolumn.
   c. Decide what your variable will be for your experimental design. One pair will be responsible for the control set-up and one pair will be responsible for the experimental set-up.

   1. **Aquatic**: water, solid material (gravel or sand), organisms (fish, snails, elodea)
   2. **Decomposition**: Organic matter (leaves, grass, fruit peels), insects (flies, worms, etc)
   3. **Terrestrial**: soil, seeds, plants

Part II: Observation and Data Collection
Initially and at the end of the 3-4 week process, you will make observations of your eco-column.
   1. Date of measurement
   2. pH of water
   3. pH of soil
   4. Temperature
   5. D.O of water
   6. NO_3- of water
   7. Turbidity of water
   8. Nitrogen of soil
   9. Potassium of soil
   10. Phosphorus of soil
   11. Qualitative observations: plant growth, fish status, other organisms' status, odor, decomposition rate (relative %)

Part III: Lab Write-up
   1. Purpose:
   2. Procedure (include materials). Also draw a labeled diagram of your control and experimental set-up and list the variable that you are testing.
   3. Expected food web. Draw the expected food web for your community within the eco-column. If an organism is unidentifiable, include a drawing of it (you may use the stereo microscopes). For each organism, include its role: producer, consumer, decomposer, scavenger. Draw arrows in showing the flow of energy. Answer the following Qs:
      a. What would occur to these consumers if all the primary consumers were to die?
      b. If the secondary consumers in one of your food chains consumed 4200 kcal (this is what was transferred to from the previous level), what amount of energy would you assume was available to the primary consumer? What amount would be available to the tertiary consumers? Explain.
      c. What would occur if the decomposers were removed? Effect on food web? Effect on abiotic measurements?

d. Define biodiversity. Why is biodiversity so important?
e. If your ecocolumn was allowed to continue through multiple generations, how would natural selection be evident? Give 1 example of adaptation and 1 example of extinction. Describe the factors that influence adaptation and extinction.
4. Data: charts of measurements and observations for 4 weeks.
5. Data Analysis:
   a. Graph data
   b. Interpret.
      1. Any trends in the data?
      2. Are any aspects affected by other aspects to your eco-column?
      3. How did the control compare to the expected?
      in your eco-column.
   c. Choose one of the nutrient cycles (C, N, or P) and diagram. Explain how you think it worked
   d. What kinds of niches were available to the various organisms? Did you observe instances of different symbiotic relationships? Resource partitioning? Competitive exclusion?
   e. Did you observe the law of tolerance in action? What were the limiting factors in each eco-column?
6. Conclusion
   a. What conclusions can you make about your eco-column?
   b. What connections can you make between your eco-column and a natural ecosystem or community?
   c. For each of the following, describe each of the environmental legislation:
      1) Taylor Grazing Act
      2) National and Scenic rivers act
      3) National Environmental Policy Act
      4) Lacey Act
      5) Endangered Species Act
      6) Taylor Grazing Act
      7) Wilderness Act
      8) Migratory bird hunting stamp act,
   d. Any errors that could have affected your data?
   e. What would you do differently next time?

APES: ECOCOMUN LAB
GRADING SHEET

ITEM	POINTS POSSIBLE	POINTS EARNED		Name	Effort	Total
Purpose	5				/10	/70
Procedure	5				/10	/70
Food Web	10				/10	/70
Design	10				/10	/70
Data	10				/10	/70
Data Analysis	10				/10	/70
Conclusion	10					
Total Team Points	60					