Ecocolumn Lab

Materials – Day 1

* 2-liter clear plastic bottle (6) with labels completely removed
* 2-liter bottle caps (3)
* Dissecting needle
* Heat source for dissecting needles (for poking holes)
* Scissors
* Soil
* Straws

Materials – Day 2

* + Fist-sized insoluble rock
* Filter paper
* Drinking straw
* Clear packaging tape
* Sand
* Gravel
* Compost (banana leaves, grass, dried leaves, etc)

Materials – After equilibrium established

* + Seeds or viable plant cuttings
  + Selected aquatic plants (anacharis, elodea, duckweed, hornwort, green hedge, ludwigia, etc)
  + Terrestrial fauna (pillbugs, earthworms, earwigs, etc; NO FRUIT FLIES)
  + Aquatic fauna (small fish, small aquatic snails, etc)
* *Students are responsible for obtaining and bringing to school*
* *Provided in class*

Procedure

* 1. Construct an Ecocolumn according to the diagram (provided on page 4)
  2. Add soil, sand, and gravel to the aquatic, terrestrial, and filter chambers as instructed in class
  3. Pour water through the filter chambers for several days or until water runs clear
  4. Ensure the rocks and gravel in the aquatic chamber are clean, then volumetrically calibrate the aquatic chamber
  5. If necessary, allow the soil in the terrestrial chamber to dry. Add seeds or viable plant cuttings to the terrestrial chamber.
  6. After the plants are growing successfully, add the compost, soil, and fauna to the decomposition chamber.
  7. Measure the dissolved oxygen (DO), pH, temperature, and your selected variable of the aquatic chamber, then add aquatic plants to the aquatic chamber
  8. After the aquatic plants are growing successfully, and the metrics are stable, add aquatic fauns to the aquatic chamber.
  9. Monitor the DO, pH, temperature, and selected variable daily.

Data Analysis

1. Keep comprehensive records of all your work, with clear labels for each day (every group member should have all the data, so leave room for the days your groupmates do the sampling). It should include the following:
   1. A general prediction related to the stability / resilience of the ecocolumn
   2. Bulleted lists of procedure and materials
   3. Daily observations (qualitative and quantitative)
   4. Data, tabulated and charted (DO, pH, temp, selected variable)
2. Observe and collect data from your ecocolumn ***until May 19/20th***. It should contain at least 10 overlapping days of sampling.
3. A thoughtful, scientifically valid, and collaborative discussion will conclude your lab report***, due 7am May 24th for all students***, and will contain:
   1. A summary of your experimental design and results, including an explanation of the data for each measured variable (irregularities, consistencies, etc)
   2. Two potential applications for ecocolumns in the business world.

Rubric

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| --- | --- | --- | --- | --- | --- |
| Objective | N/a | Unacceptable | Acceptable | Exemplary | Pts Earned |
| All components of ecocolumn as described and diagrammed in instructions | 0 | A few components are present or many of the components are not as described  10 pts | All components are present; a few may not be as described  20 pts | All components are as described and the column is still in good condition at the end.  100 pts |  |
| Photocopy of 1 notebook / group |  |  |  |  |  |
| Prediction | 0 | Not specific, lacks clarity, is written messily, and/or is difficult to understand  5 pts |  | Specific, clear, written cleanly, and is easy to understand  20 pts |  |
| Bulleted list of procedure and materials | 0 | List is incomplete or difficult to read  3 pts | List is missing key components.  7 pts | List is complete and understandable.  10 pts |  |
| Daily observations (qual and quant) | 0 | Several observations are missing or are difficult to read  15 pts | One or two observations are missing or difficult to read  30 pts | All the observations are present and legible  50 pts |  |
| Tabulated data | 0 | One or more variables is missing  8 pts | All variables are present. One or two data points may be absent  15 pts | All variables are present and the tables and charts are missing no data  25 pts |  |
| Charted data | 0 | One or more variables is missing  8 pts | All variables are present. One or two data points may be absent  15 pts | All variables are present and the tables and charts are missing no data  25 pts |  |
| Summary of experimental design and results | 0 | Summary leaves out variables or fails to summarize succinctly  10 pts | All variables and the setup are discussed  20 pts | All variables and the setup are discussed thoroughly and succinctly  40 pts |  |
| Two applications | 0 | One application mentioned, or applications don’t make sense  5 pts | Two applications described  20 pts | Two applications described and they make sense  30 pts |  |
| Teamwork factor (will be assessed by your teammates) | 0 | Little contribution  (x 0 – 0.25 | Equal contribution  (x 0.25 – 0.33) | You did the majority of the work  (x 0.33 – 0.1) |  |

Ecocolumn diagram

