

# Ecosystem Column Lab

**Purpose:** This lab will provide an opportunity to explore several types of ecosystems, the components within each ecosystem, the conditions required for the sustainability, and the interconnections between the various chambers composing the column.

**Materials** (per lab group):

- 2-liter clear plastic bottles (6) with the labels removed completely\*
- 2-liter bottle caps (3)\*
- Scissors (1)
- Soil (top soil – 1 bag)
- clear packaging tape (1 roll)
- straw (1)
- sand (1 bag)
- gravel ( 1 bag)
- rocks (1 bag)
- fist-sized insoluble rock\*
- seeds or viable plant cuttings\*
- leaves, grass clippings, and / or fruit pieces\*
- selected aquatic plants (anacharis, elodea, duckweed, hornwort, green hedge, ludwigia, etc.)\*
- terrestrial fauna (pillbugs, earthworms, earwigs, fruit flies, etc.)\*
- aquatic fauna (small fish (Beta Fish), small aquatic snails, etc.)\*

*\* Students will bring these materials to school.*

**Procedure:** Setup your EcoColumn as per the diagram found on the next sheet. Monitor water, N & P cycles. Observe changes to your system.

**Monitoring:**

Over the next 6 weeks, you will monitor all possible abiotic and biotic factors pertaining to your ecosystem column. Every 2 weeks, you will add fertilizer to your system. Data is to be recorded regularly (see form attached) and is to be included in the final lab report. Use the attached data sheet as an example to help organize your record keeping. All data collected will be turned in with your questions.

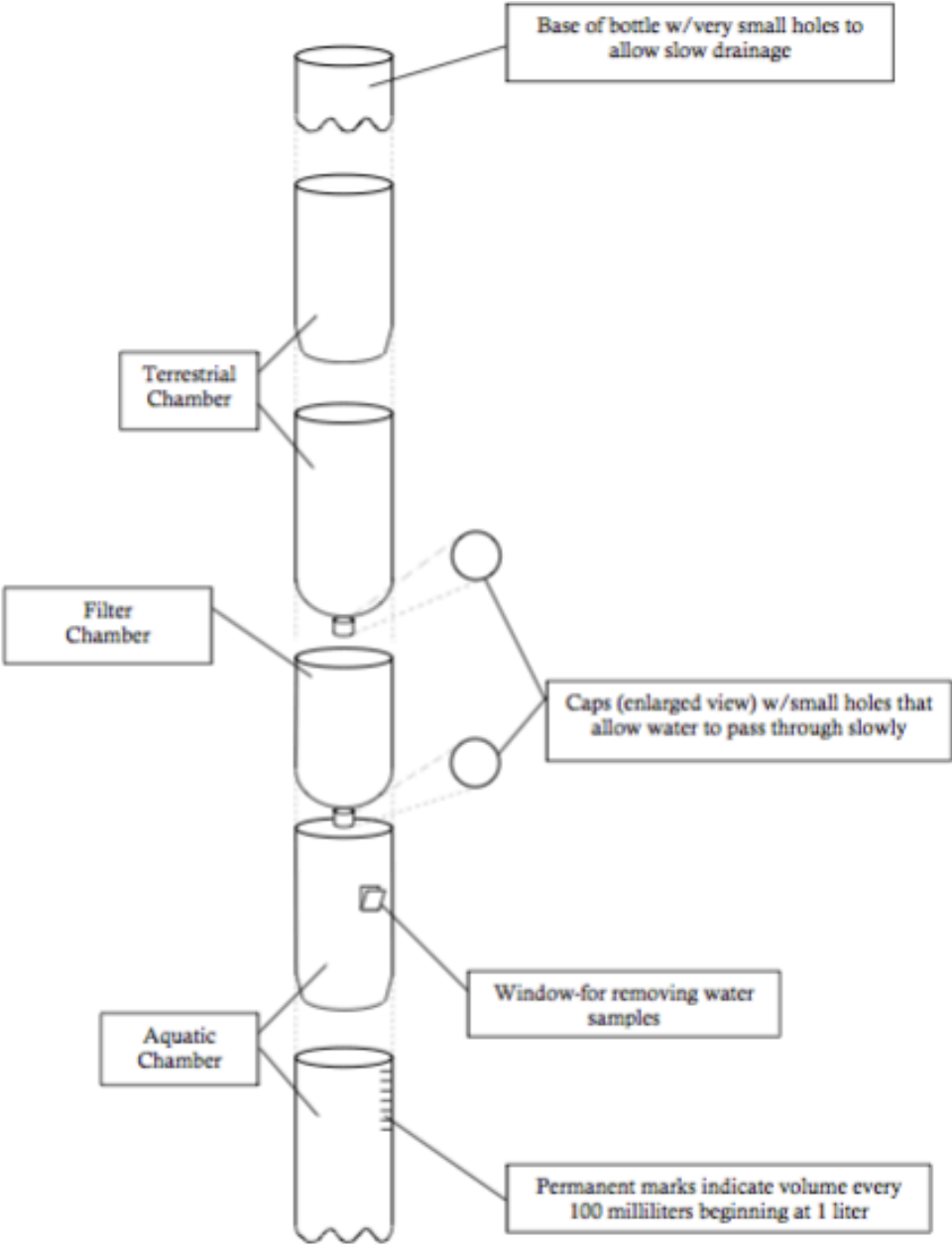
**Deliverables:**

Data collection and Questions. Answer all questions found in the Ecosystem Column Lab Questions section as per this sections instructions.

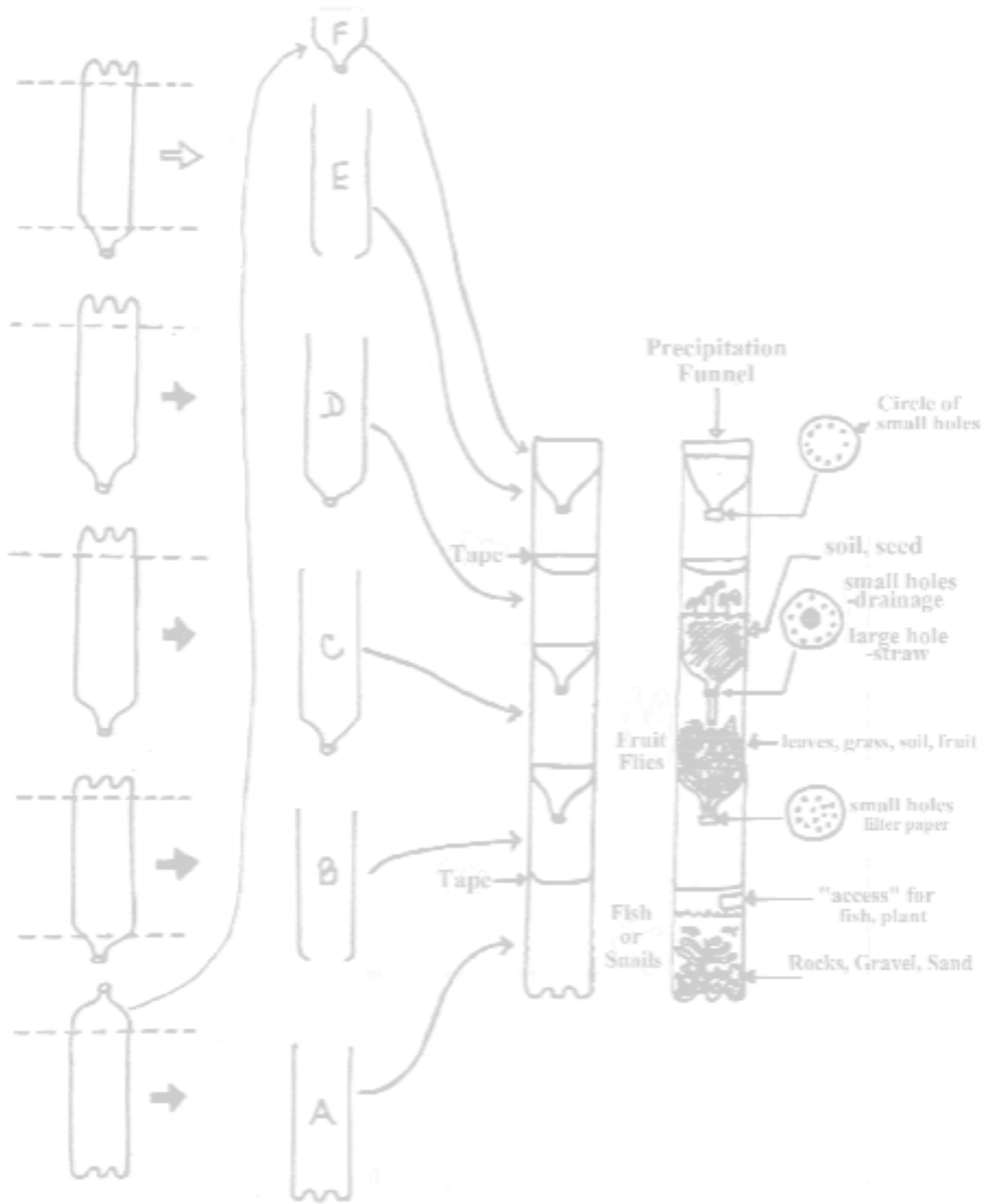
Points to ponder as you observe:

- Differences between the chambers
- Foodchains and food webs present
- Biogeochemical cycles in action
- Open or closed system? Which applies to your ecosystem column?
- Discuss evidence of ecological succession taking place in your column
- Compare and contrast your lab group's column with others in the course

EcoColumn Schematic #1



EcoColumn Schematic #2 (Example Student Rendition)





## Ecosystem Column Lab Questions

Answer the following questions in complete sentences, providing sufficient detail and explanations. Response should be clear, organized, and as comprehensive as possible. If your handwriting is difficult to read, it may be difficult to find points in your responses.

1. Identify **one** Food Chains or Food Webs in each of your habitats (chambers). Use **arrows** to illustrate these food chains and food webs; complete sentences are not required for question 2 a, b, or c.
  - a. (a)Aquatic Chamber
  - b. (b)Decomposition Chamber (top soil chamber)
  - c. (c)Terrestrial Chamber
2. How is matter being recycled and energy being transferred in your eco-bottle?
3. Identify and explain the biogeochemical cycles which are taking place/which are present in your EcoColumns for water, nitrogen, and phosphorus. Do not merely state that “they are all present”; instead, provide more specific information about the cycling and any organisms involved. You may draw a picture and label it.

Water:

Phosphorus:

Nitrogen:

3. Is your ecosystem column a **closed** or **open** system? --- or is it something in between a closed or open system? **Explain** how this (closed, open or other) influences the ecosystem column overall.
  
4. Discuss evidence of **ecological succession** taking place in your column (or in the column of another lab group if you have not observed any signs of succession in your column).
  
5. Explain what eutrophication refers to and how this occurs. Apply this explanation to your ecosystem column. How might eutrophication take place in your column? Explain fully.