

Investigation 2.D: Biosphere in a Bottle

Question: How can you design a model ecosystem that can survive as a self-regulating system?

Materials

- 2 L (or larger) clear
- bottom sediment
- pond or river water
- small aquatic plants (such as floating duckweed and various submerged plants)
- small aquatic invertebrates (such as snails, flatworms, shrimps, and insects)
- thermometer (alcohol or bottle with lid digital)
- Parafilm™ or sealing wax
- 10 mL test tube

Procedure

1. With your group, design a model biosphere using the suggested materials. Your model biosphere must be completely sealed, using the Parafilm™ or sealing wax. It will require an outside light source, however, and a method for monitoring temperature. Record initial and any subsequent changes in water level, and note any condensation on the inside of the bottle.

Note: Consider the ethical treatment of animals in your design.

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HANDOUT		

2. Create a table to use to record, over time, observations such as temperature, water level, species present, changes to species composition or abundance, clarity of the water, and other variables that you feel may be important.

3. Set up your model biosphere, and make initial observations.
4. Make daily observations of your model biosphere for two weeks or longer.

Analysis

1. Identify the producers, consumers, and decomposers in your model biosphere.

2. Which biogeochemical cycles were represented in your model biosphere?

