A fish tank in a person's home might hold 18 to 75 L of water. It is a mini-ecosystem that might contain fish, snails, and plants. Large aquariums hold much more water. One of the reef environments at the Shedd Aquarium in Chicago holds 1,514,000 L of water. It is a habitat for many different sharks, more than 500 species of fish, and many other living things. Aquariums contain many of the biotic and abiotic factors that interact in an ecosystem.

However, most aquariums are not balanced ecosystems. Water and food need to be added, and after a period of time, most aquariums need to be cleaned. Two conditions must be met for an aquarium ecosystem to be balanced: energy from sunlight must be converted into energy usable by organisms, and organic and inorganic nutrients must be recycled back into the environment. In this activity, you will make a model of a balanced ecosystem by constructing a sealed mini-environment of your own.

**Procedure**

1. Read and complete the lab safety form.
2. Obtain a small, clean glass jar with a lid. Use a marker to write your name on the lid.
3. Spread a 4–5 cm layer of sand on the bottom of the jar.
4. Slowly fill the jar three-fourths full with tap water that has aged at least three days. Allow sand to settle to the bottom of the jar.
5. Carefully plant a live *Elodea plant* in the sand. Gently trim the top of the plant to fit the size of the jar, and make sure the plant is completely submerged.

**Analyse and Conclude**

*Respond to each statement.*

1. **Describe** With the addition of a live plant, nutrient-recycling bacteria were also introduced to your mini-environment. Bacteria, as well as yeast, serve as food for *Daphnia*. In your own words, describe why your mini-environment is a balanced ecosystem. Include the terms **consumer**, **producer**, and **decomposer** in your answer.
2. A food chain is a specific sequence in which organisms obtain energy in an ecosystem. In the space below, diagram the food chain in your mini-environment.

3. Hypothesize. Ecosystems will remain in equilibrium unless disturbed by external factors. Write a hypothesis about the ecological consequences for each of the following variables.

   a. A rare disease kills all the Daphnia in the mini-environment.

   b. The mini-environment is placed in a dark part of the room.

   c. The Elodea plant is thoroughly cleansed of all bacteria before being planted.

4. Describe how carbon and oxygen are recycled in your mini-environment.

   Marine Biology. Visit biologygmh.com for information on marine biologists. What are the responsibilities of a marine biologist?