

## Lesson Plan Template

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Course: Aquaculture Science **Bottle Habitat**

### I. **Goal(s): Aquatic Plants and Animals**

To develop an understanding of the fundamental biological principles of aquaculture species. Students will exercise important early scientific skills, like observing, measuring, classifying, communicating data, inferring, and predicting.

### II. **Objective(s): The student will**

1. In groups of 2-4 construct aquatic habitats in coke bottles.
2. Create charts to record data from observations.
3. Observe habitats over a period of four weeks and record what they see – changes in population, plant growth, water quality, and animal growth.
4. Students at end will graph their data.
5. Students will write explanations for what they observed.

### **Alabama Course of Study Objectives National Science Education Standards**

### III. **Materials and Technology:**

- |                             |                 |
|-----------------------------|-----------------|
| 1. (2) 2-liter coke bottles | 6. duckweed     |
| 2. water source             | 7. water snails |
| 3. light source             | 8. sand         |
| 4. guppies                  | 9. scissors     |
| 5. elodea                   | 10. graph paper |

### IV. **Safety Precautions: None**

### V. **Lesson Procedures: [Not all phases of the Learning Cycle are often present in one 50-min. lesson]**

#### A. **Opening (15 minutes) – ENGAGE PHASE** Bottle Habitat

Questions: (1) What is a habitat? (2) What would happen to plant populations if you added more snails? (3) What environmental factors do you think influence growth of your fish/snails/plants? (4) What do you think would happen if the fish population doubled? Quadrupled?

#### B. **Activity (15 minutes) – EXPLORE PHASE**

Students will construct an aquatic ecosystem in a 2-liter coke bottle. The stock organisms will be: water plants, snails and fish. Students will record data concerning the observations they make over a 4-week period.

#### **Procedure:**

1. Cut the top off one bottle, at the shoulder (where it tapers). Cut the base off another bottle and score it with holes. This is the cover.
2. Fill the bottom with sand, two inches deep.
3. Add water - slowly, to minimize sand displacement – and then root three 10 cm elodea stalks firmly in the sand. Sprinkle a small amount of duckweed onto the waters surface.

4. Let the aquaria stand overnight to let the sand settle, and to allow chlorine from the water to dissipate (if tap water is used).
5. Add (2) guppies and (2) snails.

C. Directed Teaching (**15 minutes**) – EXPLAIN PHASE

Students graph information they have obtained through observations – discussion.

D. Closing (**10 minutes**) – ELABORATION PHASE

They should write hypotheses to explain some of the things they've seen. Also poses some of the opening questions now.

**VI. Additional:**

Hands on learning experience. Ask questions and help with observations each day.

**VII. Evaluation:**

Are the aquaria appropriately stocked? Have they been well-maintained? Are observations recorded at regular intervals? Are graphs drawn correctly? Are hypotheses based on fact?

**VIII. Assignment:**

Over a four-week period, have the students record daily observations in journals. Suggest certain things for them to be watching for, like plant growth or population changes. Ask for quantitative measurements (exactly how many? exactly what size? how many days?) as well as qualitative (what color? what shape? slow or quick movement?)

During the observation period, have students research pond or tank ecology and the organisms involved in the project.

At the end of the observation period, have the students graph the information they've obtained through observation. At this time, they should write hypotheses to explain some of the things they've seen.