

POP BOTTLE ECOSYSTEM

ELEMENTARY SCHOOL LEVEL 3

An ecosystem is a community of organisms living within the same environment. For this project, students will build a thriving ecosystem they can put in the window at home. Add a little fishy friend and this project relies on you daily to keep the ecosystem healthy and balanced.

EDUCATIONAL STANDARDS:

NGSS CONNECTION:

K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.

COMMON CORE CONNECTION: ELA/Literacy

W.K.7 Participate in shared research and writing projects (e.g. explore a number of books by a favorite author and express opinions about them).

K.MD.A.2 Directly compare two objects with a measurable attribute in common, to see which object has “more of”/“less of” the attribute, and describe the difference.

MP.2 Reason abstractly and quantitatively.

MP.4 Model with mathematics.

MP.5 Use appropriate tools strategically.

DOK:

Level 3: Strategic Thinking

Level 4: Extended Thinking

MATERIALS NEEDED:

- ☐ Empty pop bottle
- ☐ Potting soil
- ☐ Aquarium rocks
- ☐ Small fish
- ☐ Small plant
- ☐ Coffee filters

DIRECTIONS:

1. Cut the top off of your pop bottle.
2. Fill the bottom of the bottle with small aquarium rocks.
3. Fill the bottle up halfway with water. Add any aquarium toys or objects.
4. Put your fish in the water, it's their new home.
5. Cut a small hole above the water level to put fish food through.
6. Turn the top of the bottle over, the cut off part. Line this with the coffee filters.
7. Fill the top of the bottle with a small layer of potting soil.
8. Add your plant and nestle it in the soil.



9. Place the inverted top into the bottle, above the fish, with its mouth resting in the water.
10. Place it at home in a window where it can get sunlight. The water will grow rich with nutrients from the fish, which you must feed daily. The fish-water nutrients will feed the plant and help it grow healthy.

OBJECTIVE:

Students will be able to conduct observations from experimentation and literature to identify patterns in what living things need to live.

ESSENTIAL QUESTIONS:

- What do living things need to survive?
- Do plants and animals have the same requirements?



FUN FACTS

- A. **Green plants are autotrophs, or producers, which means they make their own food from sunlight.**
- B. **Most plant and animal species are found in the rainforest biome.**
- C. **Oxygen currently makes up about 21 percent of the gases in the planet's atmosphere.**

ENGAGE / EXPLORE:

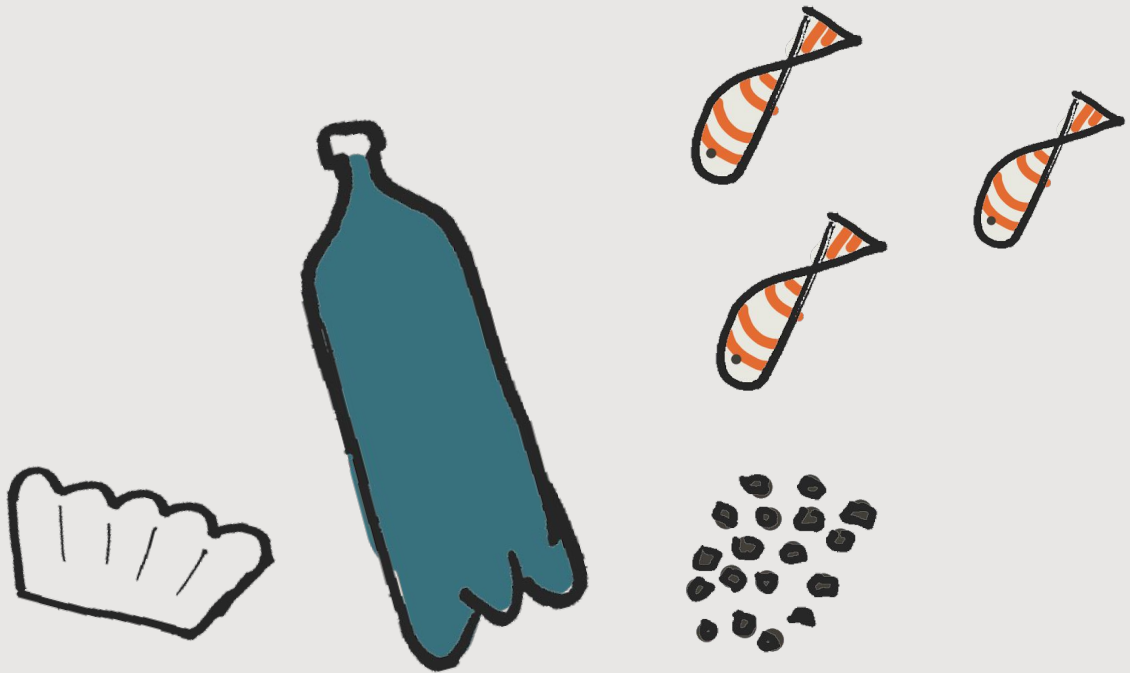
1. Students create the pop bottle ecosystem with facilitator support
 - a. Recommended 1:1 so students may take their project home
2. Teacher sets up a plant without water
3. Students observe their ecosystem and plant without water for several days
 - a. Feed fish daily
 - b. Water for plant should come from the fish area
 - c. Should be placed in a well-lit window in a temperature-controlled area
4. Evaluate (informal)
 - a. Students' use of materials
 - b. Research

EXPLAIN:

1. Ask students to identify patterns from their daily observations
 - a. Of the plant?
 - b. Of the fish?
2. Teacher facilitates student comprehension through books and questions
 - a. Potential literature
 - i. How a Seed Grows (ISBN-13: 978-0062381880)
 - ii. Cactus Hotel (ISBN-13: 978-0805029604)
 - iii. What's Alive? (ISBN-13: 978-0064451321)
 - iv. I Am a Living Thing (ISBN-13: 978-0778732532)
 - b. Ask students what living things need
 - i. Animals
 - ii. Plants
3. Evaluate (formal and informal)
 - a. Observation and pattern recognition from the pop bottle ecosystem
 - i. What fish need to live
 - ii. What plants need to live
 - iii. Where do the things come from
 - b. Reading/listening comprehension

ELABORATE:

1. Students complete the "What Do Living Things Need" worksheets
 - a. Teacher support with cutting, pasting, and reasoning
2. Evaluate students
 - a. Cut/paste motor skills
 - b. Explanation of what living things need by placement of items.



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OBSERVATION LOG

NAME: _____

DIRECTIONS:

Write your observations of the ecosystem, and how it changes from day to day.

Note: The bottom portion of this page, drawing and cutting, will be used for page 2.

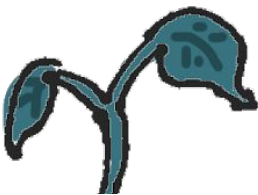

Day	Plant	Fish	You
1			
2			
3			
4			
5			

Draw and Cut (use for page 2)

Picture of water	Picture of fish flakes	Picture of water
Picture of pizza	Picture of soil	Picture of water

DIRECTIONS:

Draw and use the pictures of water, fish food, and human food provided below (and from page 1) to cut out and place in the appropriate column. What do your living things need?

Plant	Fish	Student Picture (Draw)
		

Draw and Cut		
Picture of sunlight	Picture of air blowing	Picture of air blowing
Picture of a sandwich	Picture of small worms	Picture of bubbles (air in water)