Bottle Biomes

Materials | Quantity per BIOME
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2L Bottles | 2 bottles
Cotton Strips | 1 strips
Clear Duct Tape | 1 roll / class
Pond Snails | 2 ~ 3 pond snails
Land Snails | 3 land snails
Mustard Seeds | From previous week
Redworms | 4 redworms
Elodea strands | 4 strands
Scissors | 1 pair
(Optional) Fish | 1 per class

Discussion & Big Ideas: (15~20 minutes)

Follow up on previous week’s plant experiment:
1. What was your hypothesis?
2. How did your experiment prove/disprove your hypothesis?
3. What can be done better next time?

Looking at the mustard garden, what are some living and nonliving factors of this ecosystem?
Living (or biotic) factors included the mustard seed. Non-living (or abiotic) factors included soil, water, carbon dioxide, and sunlight.

Animals (like humans) have needs that are different from plants’. What abiotic factors are necessary for animal survival? Name some!
Like plants, animals require nutrients and water. However, recall from last week’s discussion that plants “inhale” carbon dioxide and “exhale” oxygen, while animals do the exact opposite!

Last week we built a simple plant ecosystem. This week, we will build a more complex ecosystem using 2L bottles. This will consist of an upper terrestrial and lower aquatic chamber.
The chambers will be enclosed, meaning nothing will come in and nothing will go out, other than what is already placed in the ecosystem!

How does this work?
Each biotic and abiotic factor within each ecosystem will sustain the lives of each animal/plant living in it.

Draw out every organism and discuss its needs & contributions in a big food web.
Plant - needs carbon dioxide, water, soil nutrients, and sunlight.
Releases oxygen and provides energy to herbivores.
Snail eats plant matter, drinks water, inhales oxygen, and exhales carbon dioxide valuable to the plant.
Worm needs water, nutrients, and oxygen. Decomposes snail waste to provide soil nutrients for plant.

Elodea – needs carbon dioxide, water, nutrients, and sunlight.
Provides oxygen.
Snail – Helps keep water clean by decomposing plants and animal matter.
Fish – Needs oxygen and feeds on elodea. Provides carbon dioxide and nutrients for plant.

**How will the terrestrial chamber receive its water??

Procedure (~25 to 30 minutes)
Split class into 3 groups. 3 bottle biomes will be made per class. Stay clean and remind students to wash hands after the activity. As you add each organism, reiterate what it needs to survive and how it contributes to the ecosystem.
1. Make cuts as seen below. Bottle A is your aquatic chamber, Bottle B is your terrestrial chamber.
2. Cut a hole in the bottle cap of Bottle B and string a cotton string through the hole. This will transport water from Bottle A to Bottle B.
3. Place water, elodea, pond snails and (optional) fish into Bottle B.
4. Invert Bottle B into Bottle A. Tape the assembly together.
5. Place soil and mustard plants from last week into Bottle B. Add garden snails and earthworms.
6. Keep the assembly in a safe place until next week. Ask students to make hypotheses and observations for the following week.

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