



Ecosphere



Raccoon Creek Explorers Activity #23

Supplies:

- Glass jar with lid
- A natural pond (No trespassing, ask for permission if not on your property)
- Small Shovel
- Indirect light near a window

Vocabulary:

Ecosphere: The planetary ecosystem, consisting of all living organisms and their environment

Macroinvertebrates: Any animal lacking a backbone and large enough to see without the aid of a microscope

Bio-load: Refers to all of the waste in the water column, which is the water inside your tank

Carbon Cycle: Nature's way of reusing carbon atoms, which travel from the atmosphere into organisms in the Earth and then back into the atmosphere over and over again.

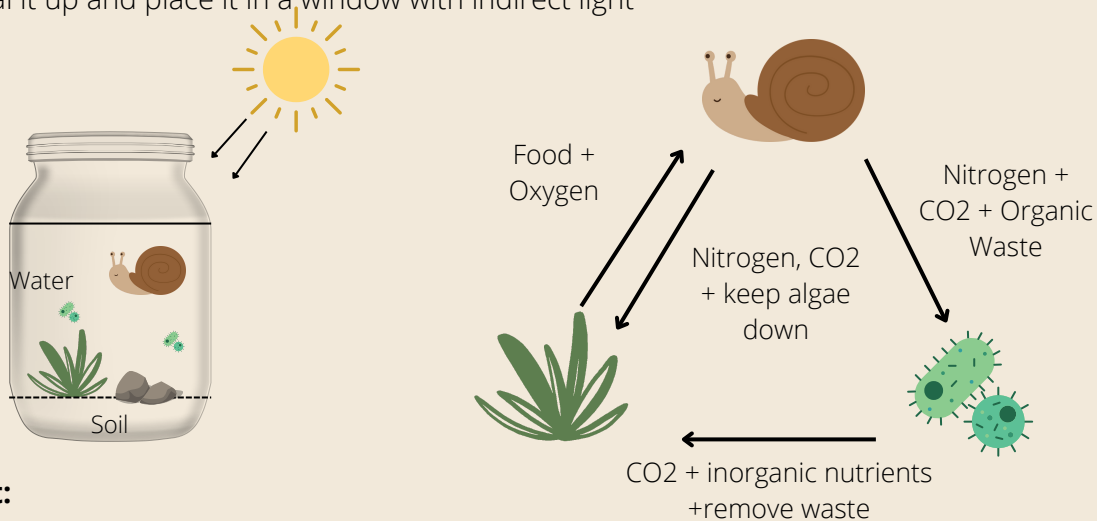
Nitrogen Cycle: Repeating cycle of processes during which nitrogen moves through both living and non-living things: the atmosphere, soil, water, plants, animals and bacteria.

Background:

Earth is made up of an ecosphere. This is the parts of Earth where living organisms are found and their environment. This includes, land air and water that support life. We need oxygen to breath, water to drink, food to eat, and the suns energy and warmth. We will be creating a mini, self sustaining ecosphere in a jar. Within the jar, plants and algae will produce oxygen. Then the macroinvertebrates in the jar will breath in the oxygen and breath out carbon dioxide. The animal waste contains nitrogen. The plants need the carbon dioxide and the nitrogen. If you have snails, they will eat the algae and keep the ecosphere clean. To keep the bio-load down, bacteria and other microorganisms in the water will eat the waste of the larger organisms, the decaying plants and will also help the plants too with carbon dioxide and inorganic nutrients that they produce as waste. The water continues to cycle inside the closed system through condensation. Thus the carbon and nitrogen cycles will continue within the jar. This mini ecosphere is self sustaining because it will go through a settling period where it will balance itself out and the bio-load will equal the same input and output.

Let's Get Started:

1. Shovel some sediment and soil into the bottom of your jar.
2. Add water from the pond. It will be very murky – this will settle over a couple of days.
3. Add a few aquatic plants. Algae will typically naturally grow and establish itself from soil and rocks added.
4. Find a couple of freshwater snails or small crustaceans to add. *Hint: look under leaves in the water.*
 - a. Note: Fish, larger animals and insects will not survive in a closed ecosystem like this. The reason for this is they have too high of a bio-load. Basically, their waste creates too much bi-products that the ecosystem cannot process.
5. Seal it up and place it in a window with indirect light



Reflect:

What kind of macroinvertebrates did you add to the jar?

How long did it take for the water to clear up?

Are you able to see any other organisms swimming around that you didn't specifically seek out?

Apply:

How does this mini ecosphere represent the real world?

Where do the microorganisms/ bacteria come from if you didn't seek it out to put in the jar?

What would cause this ecosphere to not be self-sustaining?

