

Science Camp

Ecosystem in a Bottle



MONSANTO 

Ecosystem in a Bottle



An ecosystem includes all of the living things in a given area that interact with each other with their environments. In an ecosystem, each element has its own role to play. A change in one part of the environment can have effects on the rest of the living components within that ecosystem. With Ecosystem in a Bottle you will be building a terraquacolumn which will allow you discover the relationships between living organisms, and their environment.

Getting Started

Before you Begin: Prepare a clean and safe work area. Read through the entire experiment so you understand each step and ensure you have all the tools you need to complete the project. Make sure any equipment in good working order.

During the Experiment: Take lots of notes and make drawings of your observations. Over the next few weeks you will see changes in the environment you have created. Scientists document all of their work so they can repeat successful outcomes and understand what changes they should make to see the results they are looking for. Include dates, measurements and colorful descriptions.

You will need:

- Scissors
- Marker
- Seeds
- Caps*
- Two 2-liter bottles
- Water
- Soil
- Wicks
- Ruler
- Drill
- Safety glasses
- Vice grips

** Caps will arrive predrilled for you*

Vocabulary

Ecosystem:

A complex group of connected elements such as plants, animals and microbes that function as a unit in an environment.

Ecology:

The science of the relationships of organisms to one another and their physical surroundings.

Terraqua Column:

A bottle system that is composed of elements that live or relate to the earth and aquatic habitats.

Organism:

An individual animal, plant or single-celled life form

Step-By-Step

Step 1

With your sharpie marker, draw a line around one of the bottles about 2 cm below the curve. This will create the cut line for you to follow.

Journal Opportunity:

Before you begin plan the organisms you plan to put in your ecosystem. Don't limit to what is included in the kit. You could add an earthworm from the garden or some dandelion seeds from the yard. Let your imagination guide you. Write down your hypothesis of how you expect the elements you have chosen to interact.



Step 2

Use the box cutter to create a slit along the line that your scissors can fit into. A box cutter is one of the most dangerous cutting tools, so please have a parent or another adult help you start your cut.



Safety Tip:

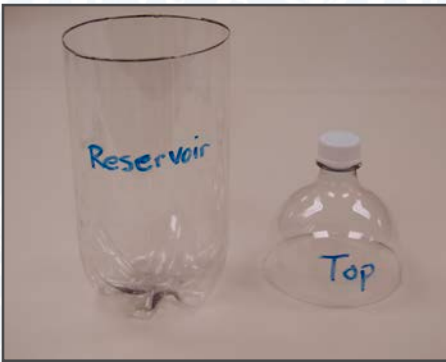
To use your box cutter safely, point the blade away from yourself when cutting. Make sure no body parts are in the cutting path. Be sure that other people in the area are at a safe distance before you cut into the plastic.

Step 3

Use scissors to cut the rest of the way around the line. You've just created the bottom part of your ecosystem which is the "reservoir" for your water and the lid for your planter.



Step-By-Step (cont'd)



Step 4

Take the second bottle and draw a cut line about 1cm below the hip. Again, ask for help from an adult to start the cut. Then complete the cut using a scissors. The top half of the bottle creates the planter.

Step 5

It is time to assemble. Start by placing the two wicks in water until it is very wet and then thread it through the hole in the cap. Screw the cap onto your second bottle.



Step 6

Pour water into your reservoir. Invert the planter onto the reservoir. Make sure that the wick reaches all the way into the water reservoir into the planter.

Journal Opportunity

Measure the amount of water you place in your reservoir. Use a marker to put a line where the top of the water reaches. This will allow you to make observations on how much water is being drawn up to the soil.

Step 7

Add soil to the planter. When adding the soil, hold the end of the wicks up and fill in the soil around the wicks. Make sure that the wicks are not stuck against the side of the planter. Bury the top of the wick in the soil



Step-By-Step (cont'd)



Step 8

Plant seeds in the soil. Always read the recommendations for depth and spacing recommendations.

Journal Opportunity:

Record how many seeds you have planted and include the spacing and depth. Draw a picture to demonstrate where you've placed your seeds.

Step 9

Use a marker to label the ecosystem with a name

Journal Opportunity

You want to capture the name and a description of what is in your ecosystem. This is especially important if you are creating multiple ecosystems that you plan to compare to one another.



Step 10

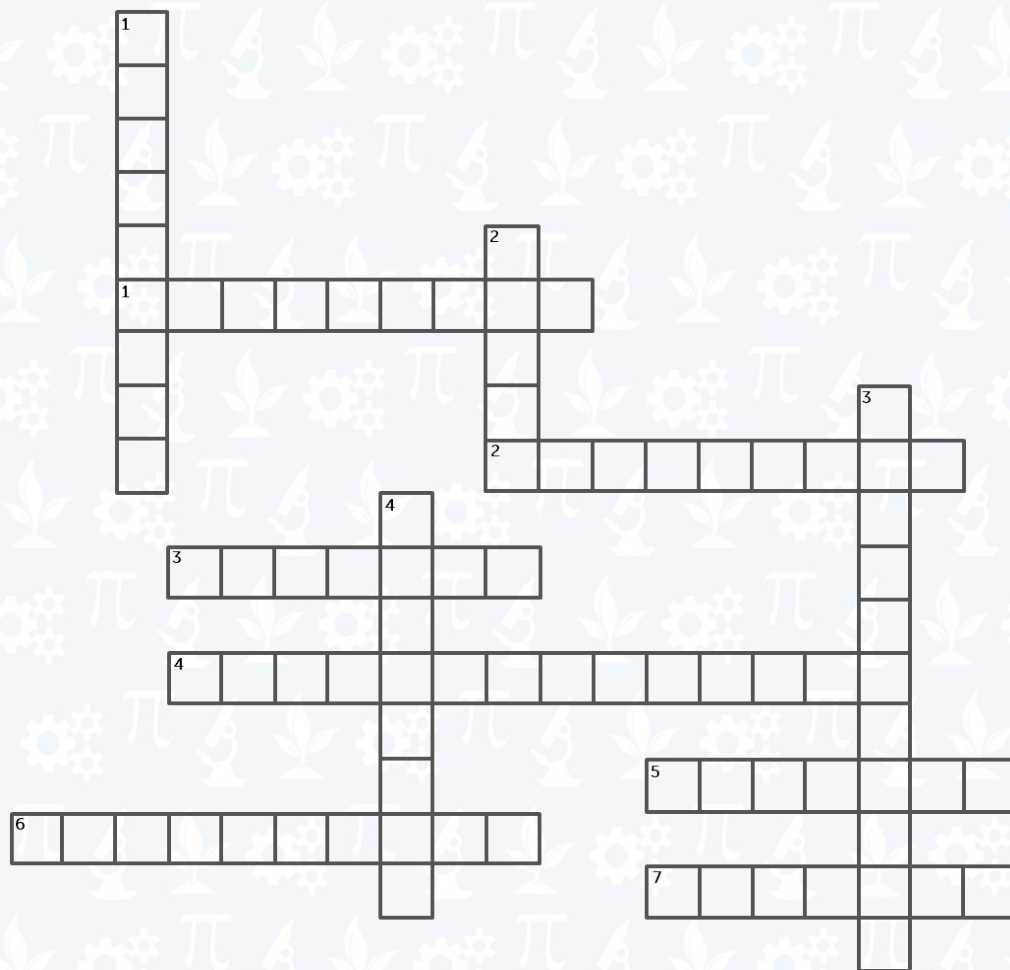
Place the top of the planter onto your ecosystem. And find a nice warm home that will start germinating your seeds.

Journal Opportunity

Write a description and sketch of the development of your ecosystem. When did you see the seeds germinate? What do the leaves look like? How much water is being absorbed?

Keep the Fun Going!

- What can you introduce into your ecosystem that may change the environment? Is there something in your yard you would like to add?
- Create another ecosystem and change the materials. Use pond water or soil from your neighborhood. Seeds are often found in the soil, so you never know what might germinate.
- Think about your ecosystem. What in your home or at school affects you each day? Draw a picture of your environment and what you interact with each day that makes up your ecosystem.



Across:

1. Factors you can control, change or measure in an experiment
2. A group of connected living and non-living elements that function together in an environment
3. A factor that is kept constant so that the impact of another factor can be better understood
4. A bottle system that can include various living elements that relate to the earth and aquatic habitats
5. A container to hold soil in which seeds or plants may be planted
6. An educated guess on what will happen in your experiment
7. The science of the relationship of organisms and their surroundings

Down:

1. An enclosed space to hold water
2. Finding a new use for an old item like the plastic bottles in our experiment
3. The process by which a plant grows from a seed
4. An individual animal, plant or single-celled life form

Draw Your Favorite Ecosystem