

How do I construct a terrarium?



Build a small terrarium for growing plants.

Setting: Indoors

Time: < 3 hours

Concepts: ecology, water cycle

Skills: building, observing

Subject(s):

- ✓ Earth Sciences
- ✓ Environmental Science

Ages:

- ✓ 6-8
- ✓ 9-11

Materials:

- Clean and dry 2 L pop bottle with lid
- Scissors
- Tape
- Rocks or broken clay pieces
- Potting soil (2 cups)
- Seeds (bean, cat grass, radish, etc.)
- Water



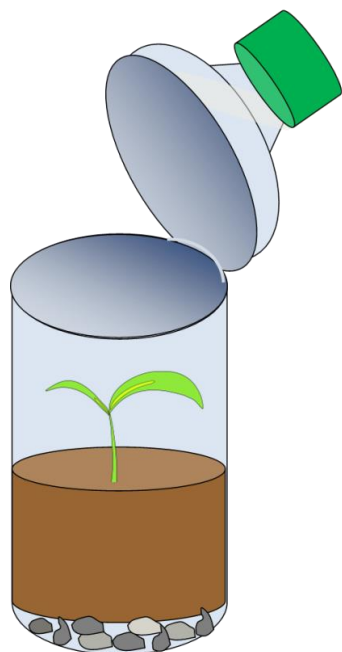
Safety First!

Be careful working with sharp scissors and utility knives. Provide adult assistance for young children.

What to do!

1. Remove label from pop bottle.
2. Cut an empty 2 L pop bottle $\frac{3}{4}$ of the way around about 10 cm from the top of the bottle. The part that you didn't cut will act like a hinge so that you can open the bottle (see diagram below). Leave the lid on the bottle.
3. Fold back the top of the pop bottle and add a layer (about 5 cm deep) of rocks or broken clay pieces into the bottom.
4. Add potting soil into the pop bottle until it is about $\frac{1}{4}$ full.
5. Dig a small hole in soil and put a bean seed into the hole. If you are using a smaller type of seed, such as cat grass or radish, simply put the seeds on the top of the soil and sprinkle a bit of soil over the seeds. Soak larger seeds such as bean or corn for 3 - 4 hours before planting them. Tamp soil down over the seeds. Pour a $\frac{1}{2}$ of a cup of water onto the soil above the seed.
6. Fold the top of the pop bottle back into its original position (so that it looks like a pop bottle again). Put tape over the cut part of the bottle to seal it. Keep the terrarium near a window in bright light, but not in direct sunlight. Rotate the terrarium regularly so that plants don't grow in one direction.

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What's happening?

Plants do not have to go out and find food; they make their own food. The leaves of most plants have structures within them that make a type of food we know – sugar! The plant uses some of this sugar right away for normal life functions (e.g. growth). Excess sugar is stored for later use. In order to make sugar, leaves need three essential ingredients: water (from the soil), carbon dioxide (from air) and energy (from the Sun). The process that plants use to convert these three things into sugar is called photosynthesis.

Water is one of the key needs of all living things, including plants. Plants absorb water from the soil through their roots. Water then moves through a plant's stem and branches to the leaves where most of the photosynthesis takes place. Some water escapes into the air from small pores on the underside of the leaves. This is called transpiration. Because terrariums are closed containers, they keep the water vapour from escaping into the environment. Instead, when the water vapour encounters the plastic bottle, it condenses (forms into a liquid) and drips back down into the soil, allowing the cycle to start again.

Why does it matter?

A terrarium is a small ecosystem. Ecosystem is the word for the interactions between a group of organisms living in the same place and the resources that support them. The main living organisms in a terrarium are the plants and the micro-organisms in the soil. The resources supporting the terrarium ecosystem are light, water and soil. As in any ecosystem on Earth, the terrarium is completely sustainable. This means that everything in the ecosystem works together to produce what is needed for all the living organisms in it to survive. An ecosystem, like a terrarium, could be sealed up and still survive because everything in the ecosystem works together. However, ecosystems require specific conditions to function properly and small changes can upset an entire system! This is why human interference, as a result of pollution, the introduction of invasive species, deforestation and over-hunting, can harm more than just one species.

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Investigate further!

- Try starting a terrarium with one or more seedling plants instead of from a seed.
- Once you have a growing plant(s), conduct additional investigations to find out how other factors can influence the terrarium ecosystem. For example:
 - Investigate the impact of changing the light level, direction of light or type of light provided
 - Investigate the impact temperature by putting the terrarium in the fridge or warming it with a blow dryer
 - Observe the influence of changing the soil pH by adding different amounts of vinegar (an acid of pH 3) or baking soda solution (a base of pH 8)
- Compare your terrarium to an aquarium ecosystem. How are they the same? How are they different?