



Ecospheres

Look at a stream, or pond, or even a puddle near your house. It might look empty, but it's actually filled with life. In a single drop, there might be thousands, if not millions of different types of microorganisms, or infusoria, each one with unique adaptations to help it survive.

The environment that these infusoria live in is an ecosystem that goes through cycles of growth. Which organisms grow in an ecosystem depends on things like nutrients, sunlight, and temperature. This activity will let you explore the different kinds of organisms you can find in water around your area, and see how an ecosystem can change over time.

ECOSPHERE INSTRUCTIONS

1. You will need:
 - a. *A large jar, sterilised with boiling water (get an adult to help)*
 - b. *Hay or dried grass clippings*
 - c. *A water source*
2. Half-fill the jar from your water source. You can choose whether to take a sample of just water, or whether you want to take some mud and sand along with it.
3. Put enough hay or dried grass into the jar to fill it up to three quarters.
4. Place in indirect sunlight, and let sit for a few hours.
5. Gently pick up the jar and carefully look inside.
6. Can you see anything moving?
7. Is there anything in there you could identify using the internet?
8. Check the jar every day, making notes of any changes you can see. If possible, take photos at the same time so you have a record.

FOLLOW-UP QUESTIONS

- Does it matter whether the water is from a freshwater or saltwater source?
- Do you think the size of the jar matters?
- What could the different types of organisms you can see in the ecosphere tell you about where the water originally came from?
- What do you think would happen if you left your ecosphere for months, or even years? Would you need to do anything to keep it alive?



Stubborn Seeds

It isn't always the right time for a seed to start growing. If a seed starts to germinate at the start of winter, it will almost surely die before the weather gets warm again. Alternatively, if a seed starts to grow when it's surrounded by other plants, it'll have to fight them for sunlight, water, and nutrients. By waiting for the right moment, a seed can give itself the best chance of survival.

ACTIVITY A: SOIL SLEEPERS

Any gardener will tell you, just because a patch of soil is bare doesn't mean there isn't something hiding beneath just waiting to start sprouting. Weeds are the ultimate survivors, with seeds that can lie waiting for years.

1. Take a small clean jar and find a clear patch of soil. You might want to check a vegetable garden, or underneath a hedge.
2. Fill the jar halfway with soil, making sure to keep out any obvious plants or roots.
3. Place the jar in direct sunlight and water every now and then. Don't water it too much or algae will start to grow on the surface.
4. Check in every day to see if anything is growing.

FOLLOW-UP QUESTIONS

1. How soon can you start to tell what plants are growing?
2. Which plants grow the fastest?
3. Are these plants native to New Zealand, or were they brought here?

ACTIVITY B: SAVING SEEDS

Collecting seeds from the plants we want to keep growing is important. But not all of the seeds we find in fruits and vegetables in our kitchen can be grown into new plants, or produce the same fruit or vegetable as the original. Even if they could, it's not always easy for people to grow their own food, which is why we rely on farmers to do it. This activity will see which fruits and vegetables in our kitchen have seeds that grow, and which don't.

1. Collect the seeds from a few different fruits and vegetables in your kitchen. Good options are: pumpkin, tomato, cucumber, capsicum, orange, lemon, berries, dried beans.
2. Separate out the seeds and plant them in a damp cotton ball or paper towel.
3. Place them in direct sunlight, keeping the soil, cotton, or paper moist.
4. Observe the seeds each day. See if you can spot the stem, leaves, and roots as they grow.
5. Once the seeds have fully germinated, you can transfer them into soil.

FOLLOW-UP QUESTIONS

1. Which seeds germinated and which didn't?
2. Why do some seeds germinate faster than others?
3. Are there any differences or similarities in how the seeds germinate?
4. Some seeds germinate better if they've been kept in the fridge or freezer for a while. Why do you think that is?
5. Do you think the fruits or vegetables grown from these seeds will be the same as the original?
6. We never grow potatoes or kumara from seeds. What do we do instead?