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Science
Kindergarten Experiments

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Kindergarten Experiments

Advance Sample

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3 Why Do Leafcutter Ants Need Leaves?

Key Concepts

All creatures need food to live and grow. They get food from plants or other animals. Both ants and fungi eat food to survive.

Not all ants gather food. Some change their environment to meet their needs by using leaves to grow fungus to eat instead.

Materials

- 1 cup of warm (not hot) water
- 1 small, clear glass/plastic bottle with a narrow mouth
- 1 tsp sugar
- 1 package of yeast K
- 1 balloon K

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Introduction

All creatures, including ants, need food to survive.

What do you think Leafcutter ants eat? Surprisingly, they do not eat leaves. Instead, these ants use leaves to *grow* food like farmers. They chew up the leaves and mix them with their own waste (poop), which acts as a **fertilizer**. Fungi grows on this "garden" and the ants eat the fungi.

Fungi eats food too. One type of fungi eats the leaves in the ant's garden. Another type will eat food found in your kitchen.

Yeast is a safe kind of fungus people use to bake bread. Yeast produces a lot of gas as it grows, and we use that gas to make bread rise. In this experiment we will pretend to be Leafcutter ants and feed our yeast fungi so it will grow.

Did you know?

Farmers use **fertilizers** to add nutrients to the soil. This helps them grow big, healthy crops.

Make a Prediction

If we put yeast in a bottle, feed it, and cover the bottle with a balloon, what do you think will happen?

Hint: Air is a gas. What happens when you blow air into a balloon?

Some familiar fungi are mushrooms, molds, and yeast.

Important: Fungi can be very dangerous. Stay away from any mushrooms or mold you see growing unless an adult tells you they are safe.

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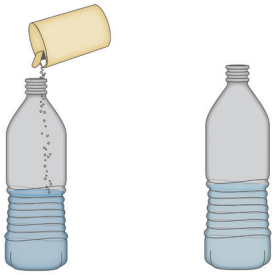
Make Connections

Do you think yeast is more like a plant or an animal? Some mushrooms, which are a type of fungus, grow in lawns so they appear to act like plants. However, since fungi don't make food through **photosynthesis** the way plants do, they are really more like animals. In fact, scientists classify fungi and algae in their own separate kingdom (or group) from plants and animals. You will learn more about photosynthesis later this year.

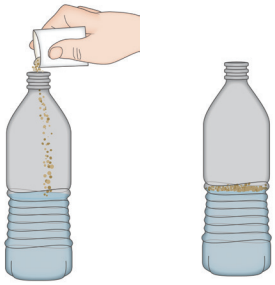
Investigate

Make a Yeast Balloon

1. Mix 1 cup of warm water and 1 tsp of sugar in the bottle.



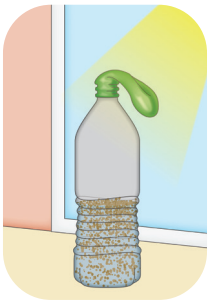
2. Once the sugar is dissolved, pour in the yeast.



3. Slip the balloon over the top of the bottle to act as the lid.

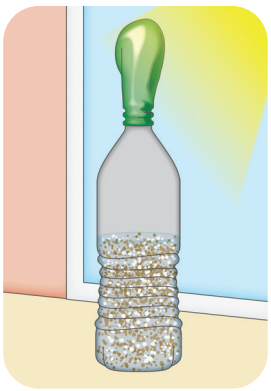
4. Leave the bottle in a warm place.

Tip: It will take at least 20 minutes to see any changes, but the balloon will keep growing for quite a while. Keep checking back periodically to watch the fun.



What's Happening

The yeast eats the sugar, converts it into energy and releases a gas called carbon dioxide, which fills the balloon. The yeast grows. This process is called **fermentation**. The sugar and water feed the yeast the same way the leaves and waste the ants feed the fungi they eat.



Draw Conclusions

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What happened to the balloon in our experiment? Was your prediction correct? (Possible: It stood up.)

Based on how we set up this experiment, what do you think yeast needs to grow? (sugar, water, heat)

How do you think the yeast used the sugar? (as food)

So if yeast needs food, water and heat to grow, how does that compare to what you and I need to grow? (we too need food and water; we also need shelter when the weather is too cold or too hot)

Takeaway

Leafcutter ants change their environment by collecting leaves to help them to grow food. In life, matter and energy flow: the fungi uses the fertilizer the ants make to grow, and the ants eat the fungi for food. Fertilizer gives energy to the fungi, which in turn provide energy for the ants.

Go Further

Humans also use leaves in composting to make rich soil, but the process can take up to a year to see the final outcome. The easiest way to turn a pile of leaves into useful soil is to create "leaf mold". Simply break up a pile of leaves into little bits, keep them damp, and mix them once a week or so. In six to twelve months you will have some awesome material that helps keep water in your soil. Some gardeners also use bags of leaves on top of carrots to insulate them from frost in the fall. Doing so can extend the carrots' growing season for many weeks.

Bake bread together. Can your children smell the yeast in the dough? The gas causes the bread to rise. Show them how much the dough has grown after it has had time to rise.

See the Bigger Picture

Fermentation is a chemical process in which an organism changes one substance into another. During fermentation, an organism usually changes a starch or sugar (a carbohydrate) into an acid. Yeast convert sugar into alcohol. Bacteria convert carbohydrates into lactic acid. Fermentation usually involves effervescence (tiny bubbles) and the release of heat.

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