

Safe Plates Mad Science Experiments

Tiny Microbes vs. Moisture

Introduction:

Tiny microbes can be everywhere, and often like to hang out on food. Some tiny microbes are good guys, and help make things like bread, cheese and yogurt. Some are mischievous and just make food look, smell, taste or feel strange. We call those ones spoilage microbes. Still others are the bad guys that will make you sick. Those are called pathogens. Pathogens are really sneaky and often don't change the way food looks, tastes or smells. But, they do often hang out in the same places and grow in the same conditions as the spoilage microbes.

There are lots of ways to stop the spoilage microbes from making food taste strange and stop pathogens from making you sick. One of those ways is with moisture. Just like people need water to survive, most bacteria and fungi also need water to survive. If you take water away, many of those things can't grow, which helps some foods keep longer before tasting or smelling bad.

Materials:

- Two clear plastic or glass containers with lids (canning jars, storage containers, even plastic zip bags)
- Can of plain beans
- Dry beans of the same variety

Instructions:

1. Find your containers and make sure they are clean and dry
2. Add dry beans to one container. Add canned beans to the other container.
3. Close the lids on the containers and leave out at room temperature for a few days. What differences do you observe?

For Teachers/Parents:

- Have students fill out the observation sheet with what they are expecting will happen (this is called a hypothesis.)
- Every day or every other day, have students check in with their experiments and see what is actually going on. Students should write down descriptions of what they see and smell (this is called data collection.)
- For older students, have them research what microbes might be causing the changes they see.
- **For safety reasons, students should not touch or taste experiments. Those allergic to mold should not smell experiments.**

Debrief:

It might take a while to start seeing changes in the beans. However, eventually the canned beans should get slimy and moldy. They will also probably start developing an opaque white liquid around the canned beans. There will also likely be a smell developing, and you may also notice some gas forming if your container is flexible. You most likely will have mold and bacteria growing in the beans, changing the texture and smell. Some spoilage will cause slime from bacteria, which you are likely to see here.

You most likely won't see any changes at all in the dried beans. This is because most of the water has been taken out of the beans in the drying process. Bacteria and fungi (mold) both need some water available in order to grow. If all of the water is taken away, or trapped by sugar or salt, then bacteria and fungi are less likely to grow. Drying foods, or adding things that trap water, are some ways of making food last longer, or making it so that food doesn't need to be refrigerated in order to keep it of good quality and safe for consumption.

Tiny Microbes vs. Moisture Observation Sheet

Name:

Date:

Hypothesis (What do you think is going to happen?)

What do you think might change? What will the experiment look like after two weeks? Write or draw what you think will happen.

Results (What actually happened)

Write or draw what is happening with your experiment. What does it look and smell like? Please do not taste the experiments

Day 1	
Day 2	
Day 3	
Day 4	
Day 5	

Day 6	
Day 7	
Day 8	
Day 9	
Day 10	
Day 11	
Day 12	
Day 13	
Day 14	