TAKE & MAKE KIT
Microscope

TIME: 30 min + time to collect specimens

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What's in this kit?

There's a big world to see in the smallest bits of life under a microscope. Look a little closer to discover things you never knew about everyday plants, fibers and other tiny samples from the world around you.

You will learn:

- Parts of a microscope
- Specimen collection
- Scientific illustration
- Making observations

Let's Get Started!

Materials

Clear plastic bottle
Plastic microscope slides
Field collections
Cup of water

Tools

Scissors
Handheld magnifying glass
Pipette
Tweezers
Pencil
Ruler or measuring tape

Collecting Specimens

A specimen is a sample of a substance or material used for examination or study. Use the bag your kit came in to collect interesting specimens.

Get outdoors and find plant life or insects. Look for flowers and different leaves from trees and bushes. How about collecting a fresh leaf and comparing it to a dry leaf?

You can also collect things from **your kitchen**, **fridge or pantry**. Collect samples like the skin of a zucchini or potato, broccoli florets, or a tomato slice. Open up your spice cabinet or a tea bag and discover the colors and shapes of dried ingredients. (Bonus experiment at the end.)

Everyday objects can be observed too! That unraveling sweater? Snip off some fibers. What do those look like compared to the bristles of an old paintbrush or some sewing thread?

Botany is a branch of biology. It is a field of study about plant life. A botanist can study what a plant looks like, where it can be found, and its relation to other plants around the world.

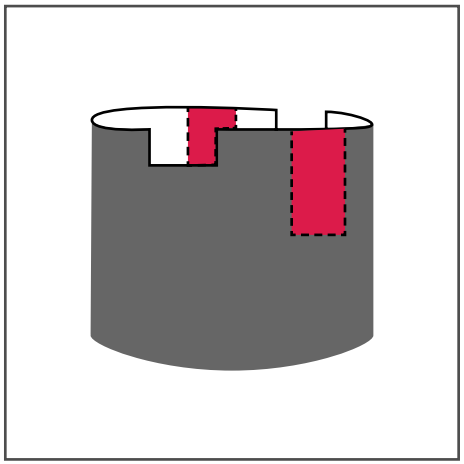
Entomology is a branch of zoology. It is the scientific study of insects. Most entomologists specialize in a particular type of insect like ants, beetles, flies, bees, or butterflies to name a few.

Step 1 - Prepare the bottle

Take a clear plastic bottle and remove any labeling. Use a pair of scissors and cut the bottle in half.

Step 2 - Create the stage

Cut two rectangles on each side of the bottle, about 1.5 inches deep and 1 inch wide (the microscope slides need to fit nicely inside. Cut two more notches on the opposite sides of the bottle about .5 inches deep and one inch wide.

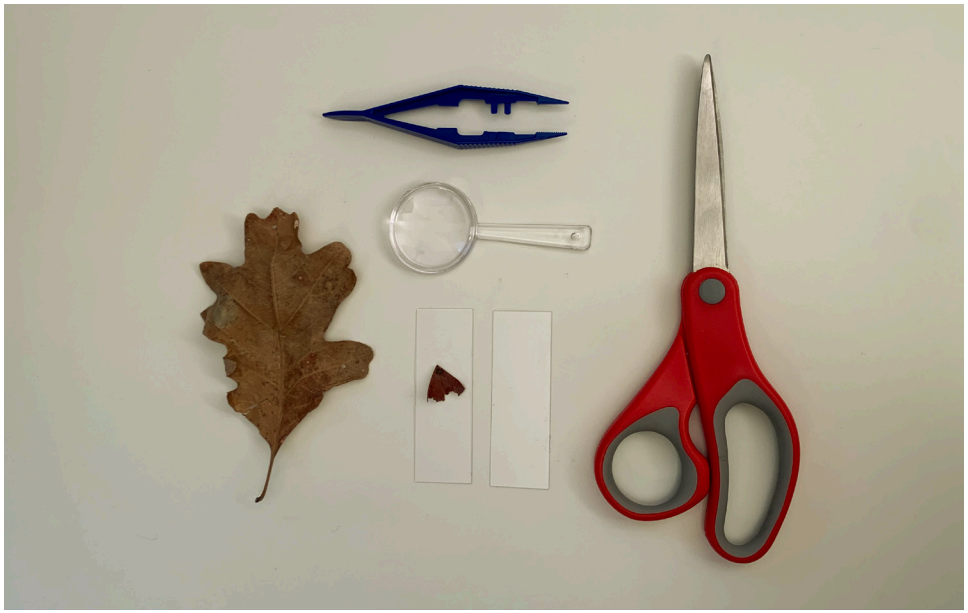


Remove the plastic protective film from microscope slides. Place one slide into the deeper notches. You now have your microscope slides set on a stage to view your samples.

Step 3 - Prepare the sample

Use the tweezers and a pair of scissors when necessary to take a small sample from your specimen to examine. Place the sample on the lower slide.

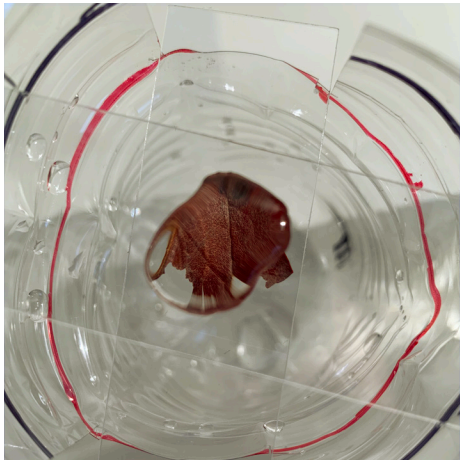
You can remove the slide from the stage to have better access for placing your sample. If you have some clear tape handy, you can create a loop and then stick your sample to it so your sample stays in place on the microscope slide.



Step 4 - Create the water drop lens

Place the second slide into the higher notches. With the pipette, add some drops of water in place to create a magnifying lens. This drop of water should be about the size of a dime. Do not add too much water or it may overflow and ruin your sample below.

With just your eyes you can begin to observe some characteristics of your sample. To enhance the magnification use your handheld magnifying glass. What are some things you can observe about your sample?



Bonus activity! Exploring colors and shapes of tea.

Teas are made of a combination of dried plants and spices. Open a tea bag and use your tweezers to sort out the different ingredients. Make scientific drawings of the dried ingredients and take note of their colors and other observations. Use your microscope or magnifying glass to see the details better.

On a flat piece of plastic, make tiny droplets of water. Add samples of your tea ingredients into each droplet and wait several minutes. Record your observations. Do any of them change color? Do any of them change size or shape?

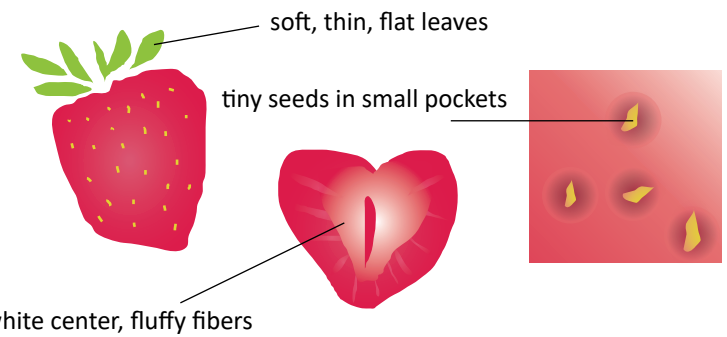
Once the ingredients have been activated by water, take your tweezers and place the wet ingredients on a paper towel, toilet paper, or notebook paper. Watch and see if the ingredients will bloom and stain the paper with different colors.

Make new drawings of the rehydrated ingredients and compare. How do the dry ingredients differ from the wet ingredients?

Field Notes

Use the following pages as a field notes diary of your findings. You can take notes about where you found your samples, create scientific illustrations (drawings), and record your observations. You can even tape in your samples if you'd like! Here is an example you can follow but feel free to create your own version.

Strawberry



Date Collected: September 25, 2020

Color: Red, white, yellow, green

Texture: Soft, prickly tiny hairs

Notes: Easy to squish, stains fingers red, sweet smell

Date Collected:

Color:

Texture:

Notes:

Date Collected:

Color:

Texture:

Notes:

Date Collected:

Color:

Texture:

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Challenge - Identifying Specimens

After a rainy day you will be able to find puddles or other collections of water around your neighborhood. Use disposable cups to collect different rain samples from the ground. Some good places are driveway puddles, roadside curbs, or sidewalks near gardens. Keep your samples in different cups and label them.

Use a plastic spoon or a pipette to select a small sample to place on the lower slide of your microscope. Make observations and record them in your field notes.

What can you identify from this sample? How many different specimens are in your sample?

Have you collected any previous samples with the same qualities?

Go Beyond!

Can you collect all these different specimens from all around you?

_____ Leaf that fits in your hand

_____ Pine needles

_____ Long, skinny plant

_____ Something fluffy

_____ Flower petal

_____ Spotted rock

_____ Woodchip

_____ Shell

How many different areas did you have to visit to complete the list?

Did you find the same specimens in different areas?

HANG OUT, MESS AROUND, GEEK OUT.

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