

Parts of a Tree - Leaves

<p>Grade(s): 2-5, focusing more on photosynthesis for older grades</p>	<p>Topic: Plant Parts</p>	<p>Season: Whenever trees have leaves, but preferably Fall</p>
<p>Timing: 60 minutes, including 5 minute RPK, 5 minute introduction, 15 minute leaf activity and photosynthesis song, 25 minute observation and outside gathering activity, 10 minute leaf experiment setup and 5 minute conclusion Follow Up: Check in on photosynthesis experiments, observing results and comparing them to class predictions. Chromatography should be checked the next day, cardboard covered leaves should be checked the next week.</p>		
<p>Objectives:</p> <ul style="list-style-type: none"> • Students can explain that trees are alive like other living organisms and can list what all living organisms need to survive (food, water, ability to grow and reproduce). • Students can explain that trees, like all plants, make their own food using their leaves, and can distinguish this from how animals and humans get their food • Students start to develop a familiarity with relevant vocabulary • Students can explain that in their leaves, plants produce Oxygen (O₂), which animals (including people) breathe 		
<p>Materials:</p> <ul style="list-style-type: none"> • “Food” for tree and bag labeled “air” • Leaf and chlorophyll images • <i>What is a Leaf</i> worksheets • Magnifying glasses • Cardboard shapes and binder clips to fasten • Rubbing alcohol (70% or 91%) • Basket Coffee filters with a 1” flap cut into them • Pennies • Bag of spinach (optional) • Jars or other containers for rubbing alcohol experiment • Photosynthesis Song lyrics poster (for older students) • Photosynthesis poster diagram (for older students) • Leaves that you have collected (can be from trees or edible leaves, if desired) • <i>Leaves and Photosynthesis</i> background information sheet (familiarize with beforehand) • Clipboards • Pencils • Tape 		
<p>Degree of need for extra teacher or parent helper? Low</p>		
<p>Journal Prompt: Why are leaves important? How are they different from one another?</p>		
<p>Lesson Sequence:</p> <p>Reactive Prior Knowledge (5 minutes) Show the students a couple of leaves that you’ve brought in and ask them to remind you what part of the plant they are. How do they know it’s a leaf? What different colors can leaves be? What kinds of shapes can they have? Draw a quick diagram on the board of a</p>		

EarthWorks Orchard Curriculum

leaf with veins and a stem. Why are leaves important? Explain that today you're going to go outside to look more closely at leaves and learn why without them, plants and animals (including us!) wouldn't be alive!

How do trees eat? - Feed the Tree Activity (10 minutes)

Take kids outside to their class orchard tree (if they have one, if not, pick any tree that has leaves) and ask what they notice (size, leaves, colors, movement etc). Pretend that you are worried the tree is hungry. You can ask questions like, "If the tree is alive, doesn't it have to eat?" "I've never seen it eat, have you?!" "It's really big, it must be hungry! I hope I brought it enough snacks!"

Take out some human food options (sandwich, orange, etc.) from your backpack. Ask the kids what you think the tree would like to eat and where its mouth is. Try and feed the human food and then once the laughing has subsided ask about how plants actually eat. If kids don't come to it on their own, remind them about the Parts of a Tree game from the week before, and what the leaves did ("food from the sun"). Does anyone know what that means? Try making a parallel between the light energy from the sun (which we feel as heat) and the heat (energy) that that is used to cook with, making the idea of heat and energy doing work (in both instances to make food) a bit more tangible.

For older kids, explain photosynthesis in detail and sing the photosynthesis song. For younger kids, keep it more simple but you can still try singing the song.

Key Points to hit on:

- Trees make their own food using leaves – we don't do this!
- Food that plants make feeds everything else, including us – they are primary producers
- Simplified overview of photosynthesis
- Plants give us oxygen in addition to the food they produce and water they store

Outdoor Exploration (20 minutes)

Outside, stand at one of the orchard trees. First, look at the tree as a whole. Are all the trees the same color? The same size? Often, leaves growing in the shade will be larger than those growing in the sun at the top of the tree because they need more chlorophyll to trap sunlight. Take one leaf off of the orchard tree, demonstrating how to remove it with two hands to avoid injuring the tree and pulling off more than you want to. Have the class help you point out the stem and veins and describe its color, size, and shape. Next, tell the students they will be collecting their own leaves to observe. Tell them they can each collect 1 leaf (remember the rule of 100 – only collect a leaf if there are at least 100 more that are staying behind!). Ask them to pay attention to what sort of plants they come from (tree, flower, grass, etc). Give the children the boundaries in which they will look for leaves.

Once they have their leaves, have students sit with a partner and do a 2-minute share about their leaves with each other. Pass out clipboards and *What is a Leaf?* Worksheet and have students complete them. Attach leaves to back of worksheets if students so desire.

Leaf Experiments (20 minutes)

Experiment 1 - Why is Sunlight Important

In this experiment students will observe over a couple of weeks what happens to a leaf when

EarthWorks Orchard Curriculum

it is no longer able to collect sunlight and undergo photosynthesis.

With the class, pick 3 leaves that you are going to deprive of sunlight for a week or two. Reassure students that you are picking a plant with many other leaves, so the plant won't be hurt by your experiment. On each leaf, try to cover as much of it as possible (top and bottom, to ensure as clear results as possible) with your pieces of cardboard and hold them on with the binder clips. Record down class observations and hypotheses about what they think will happen to the leaf over the week.

Experiment 2 - What is Chlorophyll?

In this experiment students will be able to see a bit more of what chlorophyll (a pigment) really is, and maybe even the other pigments that are also in a leaf!

Have every student take a coffee filter, their leaf (or spinach leaves, if you've provided them), and a penny and demonstrate how they will rub the green spinach leaf onto the flap of the coffee filter with their penny making sure that they start *at least a finger's width from the bottom* of the flap. Place the flaps into the jar with rubbing alcohol so that just the very tip of the flap is touching. Take guesses about what will happen and record. Check back after 24 hours.

You should hopefully see a green to yellow smear on the filter, showing the different pigments in the leaf. Remind students that what they are looking at is the part of the leaf that does the work of turning water, sunlight, and carbon dioxide into food for the plant (and food that we eat too, when we eat a fruit or vegetable... or even when we eat a hamburger!)

Conclusion (5 minutes)

Review what students have learned about how leaves make food for the tree and how each leaf is different. Make sure that kids understand that plants are alive, make their own food, and provide animals with food and oxygen, which we need to grow and survive.

Vocabulary

Carbon Dioxide
Chlorophyll
Energy
Leaf
Oxygen
Photosynthesis
Sugar
Vein

Vocabulario

Azúcar
Clorofila
Dióxido de Carbono
Energía
Hoja
Oxígeno
Fotosíntesis
Vena

Extensions / Homework Ideas:

- Using their leaf observations, students can write a poem about the same leaf or another leaf they collect.
- Look at the poster and sing the photosynthesis song again.
- Watch the *Bill Nye the Science Guy* episode on plants