

Workshop #5

Anatomy of a Plant & Types of Leaves

Age Groups:

- 5-8 year-olds* This workshop may be too complex for the younger end of this scale, use your discretion
- 9-13 year-olds
- 14+ year-old

Learning Objectives:

- Students will be able to identify and describe the basic parts of a plants.
- Students will be able to describe different kinds of leaves.
- Students gain basic understanding of the function of different plant parts

Materials/Resources Needed:

- Attached worksheets
- Chalk/White Board/Large poster
- Paper and pencil
- Leaves (fallen on ground or on tree, best in the fall!)

Estimated Time Needed	Activity
10 Minutes	<p>Introduction to activity:</p> <ul style="list-style-type: none"> ● 5-8/9-13: Draw a picture of a plant on the sidewalk in chalk, on a whiteboard, or on a large piece of paper in front of students <ul style="list-style-type: none"> ○ 14+: Have students draw their own plant, ask them to include the parts of the plant they think are important to it staying alive <ul style="list-style-type: none"> ■ <i>Discuss:</i> the importance of including stem, roots, leaves and flower ● Ask students what was drawn <ul style="list-style-type: none"> ○ Have students identify different parts of the plant* Refer to the plant anatomy diagram attached to this workshop. ○ Have students label the different parts of the plant ○ <i>Answers:</i> include stem, roots, flower and leaves ● Discuss what the different parts of the <u>plant</u> do: <ul style="list-style-type: none"> ○ 5-8: What do the roots do? What do the roots keep the plant alive? <ul style="list-style-type: none"> ■ <i>Answers:</i> Roots absorb nutrients and moisture through water in the ground. Roots hold the plant in the soil. They take in water and minerals to help the plant stay alive (like food). Flowers provide ○ 9-13: What do leaves do? What do flowers do? How

	<p>do plants reproduce? What does the stem do?</p> <ul style="list-style-type: none"> ■ <i>Answers:</i> Stem=part of the plant that carries water from the roots to other parts of the plant. Flower=helps the plant reproduce (other species pollinate, seeds grow from the flower and are transported by wind). Leaves=take in the air and light that a plant needs to live ○ 14+: What is the process called that incorporates all of these parts? Can anyone describe how it works? (Supplement with middle school questions and answers, too). <ul style="list-style-type: none"> ■ <i>Answer:</i> Photosynthesis. the process by which plants and other things make food. It is a chemical process that uses sunlight to turn carbon dioxide into sugars the cell can use as energy. ● Discuss different types of <u>Leaves</u>: 9-13 and 14+ only <ul style="list-style-type: none"> ○ Explain to class that different plants have leaves with varying shapes and sizes. <ul style="list-style-type: none"> ■ 9-13: ask students to draw two different shaped and sized leaves ■ 14+: ask students to shout out different type of plants/trees that they know
<ul style="list-style-type: none"> ● 10 Minutes 	<ul style="list-style-type: none"> ● Break students into groups of 3 or 4 (have them count off to avoid ostracization). Give each group a Leaf Shape handout. <ul style="list-style-type: none"> ○ 5-8: Have students find plants inside the garden to identify. Have them draw what they see. Have students identify their drawing to include the basic plant anatomy parts (leaf, stem, flower, roots, etc.) ○ 9-13/14+: Have each group find 4 different shaped and sized leaves in or around the garden (if fallen on the ground, have them collect them. If still on the plant, have them draw a representation of the shape and size). ○ Ask students to match the leaves they find with one of the leaf shapes on the handout. Why are they similar? Why are they different? Can you identify what kind of leaf this is? ○ Once they have become slightly familiar with the different leaf types/shapes, have them walk around the garden to find plants with the same characteristics. <ul style="list-style-type: none"> ■ Have them pick one (each has a different one) plant to draw and label the best to their ability. (edible parts, leaf types, flowers etc.)

5 Minutes	<p>Wrap Up/Conclusion</p> <p>5-8: Have students share their drawing with a partner. Discuss what they have learned today.</p> <p>9-13/14+:</p> <ul style="list-style-type: none"> ● Ask students to discuss what a plant needs to survive. ● Ask students to draw a picture that displays what they learned about plant and leaf anatomy. <ul style="list-style-type: none"> ○ Have each student share their drawing with a partner: What did you learn? How does this drawing express that?
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More about Photosynthesis and plant anatomy:

The process by which green plants and some other organisms use sunlight to synthesize foods from carbon dioxide and water. Photosynthesis in plants generally involves the green pigment chlorophyll and generates oxygen as a byproduct.

Photosynthesis for kids:

<http://photosynthesiseducation.com/photosynthesis-for-kids/>

Plant structure for kids:

<http://www.scienceforkidsclub.com/plant-structure.html>

Plant anatomy:

<https://www.planetnatural.com/plant-anatomy/>

About Leaf Shapes:

Often a single plant will have leaves of several different shapes, so any description has to be taken as an indication of what you can expect to find on a particular plant, rather than a description of what they will look like. I have one book that uses phrases like 'ovate-lanceolate to obovately-cordate', but I prefer to keep it simple, and accept that most of the time the leaves will be fairly variable but roughly correspond to a basic shape.

<http://theseedsite.co.uk/leafshapes.html>

Variables that impact Photosynthesis:

Temperature: Most plants require a certain temperature range of the surrounding climate in order to grow

- Some plants can tolerate more shade, some direct sunlight, some a combination of both
- Some plants, like perennials, have adapted to colder temperatures and require a dormant period of freezing temperatures between fruiting seasons in order to re-blossom.
- Temperature can influence the growth rate of plants: depending on ideal temperatures for differing species some plants will grow slower in extreme heat or cold.

Moisture/Precipitation: Plants require adequate water in order to complete the process of photosynthesis

- Water helps nutrients be absorbed by a plant's roots, stems and leaves from inside the ground: how plants eat.
 - Best to water in the afternoon/evening because the plants will evaporate less water as the sun goes down.

- Most important to water plants and seeds in the first two weeks after being planted to provide aquifer for nutrient access to seeds and roots.
- There are no hard or fast rules for water, it depends on the type of plant, the soil and the weather. In summer heat, most plants require more moisture.
- If too much water is applied at once, it won't be accepted by plant roots
- Focus on the root zone when watering
- Mulching plants annually can cut down on the need to water by retaining water.

Soil: Healthy soil is the best way to ensure healthy plants.

Soil Composition - sand, silt, clay, loam. Good soil is made up of a combination of all of these

- Ribbon Test - rolling a sample of soil back and forth in your hands
 - If it sticks together easily, it high in clay. If it falls apart it's higher in sand.
 - Clay doesn't drain well, difficult for roots of plants to penetrate
 - Sand drains well but doesn't retain nutrients.

pH Levels - a scale to measure the concentration of hydrogen ions in a solution from 0-14. Acidic substances have a smaller pH number and more hydrogen ions. Basic substances have a larger pH number and fewer hydrogen ions. 7, the middle of the scale, is neutral.

- By measuring pH, you can indicate how plants will perform. Different kinds of plants thrive across the pH scale.

Organic Material - by adding substances like compost and mulch to soil you can balance the pH levels as well as improve nutrient retention and drainage.

*** Sources:*

Urban Gardening Help: Soil Basics for Urban Gardeners <http://www.urbangardeninghelp.com/soil-gardening/>

Burpee Garden Advice Center: Gardening 101

https://www.burpee.com/gardenadvicecenter/areas-of-interest/flower-gardening/gardening-101/gardening_101.html

Gardeners.com When To Water

<https://www.gardeners.com/how-to/when-to-water/8108.html>

The Spruce, New York Season Fruits and Vegetables

<https://www.thespruce.com/new-york-seasonal-fruits-and-vegetables-2217192>