



LESSON/ACTIVITY

How Leaves Work

LESSON: FALL - HOW LEAVES WORK

Ages 5 - 12 years | Grades: K - 6

In this lesson, students will learn:

- Living things have life cycles adapted to and can sense their environment
- Exchange ideas and perspectives to build shared understanding.
- Develop their skills and add new ones through play and collaborative work
- Make exploratory observations using their senses
- Safely manipulate materials to test ideas and predictions
- Make observations with ideas orally, or through written language or drawings
- Compare observations with those of others through discussion
- Develop and use multiple strategies to engage in problem solving

RESOURCES/VIDEOS

Green Thumbs at School: SPEC Food Garden Lesson Book Unit: How Leaves Work

[*Why Do Leaves Change Colour?*](#)

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What changes do you notice in Autumn that are different from summer?

In the fall (Fall officially starts Sept 20 - 23, depending on the calendar), the weather shifts from hot to cool/cold. As colder, wetter weather appears, farmers prepare by harvesting an abundance of crops and celebrate the arrival of Autumn.

As November approaches, temperatures become very cold and different types of frost cover the ground and plants in the early morning. The days become shorter with less sunlight, the sun sets earlier, the weather is often cloudy, rainy, windy and occasionally foggy.

Some plants are at the end of their life cycle and begin to decay and die. Deciduous trees shed their leaves and form new buds that will bloom next spring. Animals collect food for winter and some prepare to hibernate (become inactive by resting or sleeping for long periods of time). Some bird species start to migrate to warmer climates, while others birds such as the snow geese travel here to rest, eat and have babies.

Some insects like dragonflies, or bees will die. Their offspring, such as larvae or caterpillars, baby spiders will seek shelter underneath leaf litter, or decaying wood for the winter, waiting for the warm spring.

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Why do leaves change colour in the fall?

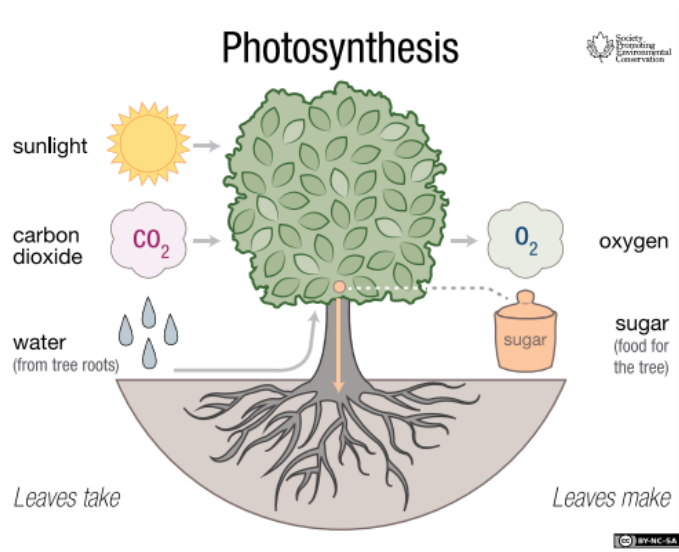
Often when we think of the fall season, we notice the physical changes in our surroundings, like the leaves transforming from bright green to beautiful hues of deep orange, crimson red, burgundy, amber yellow and cinnamon.

Activities:

Collect leaves of different shapes, sizes and colours to observe their shape, size, margins and veins.

- Observe their shape, size and veins***
- Create a leaf rubbing***
- Use books or iNaturalist to identify the tree the leaves***
- Conduct a leaf symmetry experiment***

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The reason some leaves change colour in the fall is a part of a process called **photosynthesis**. This only occurs to trees that lose their leaves, not evergreen trees like a douglas fir.

Let's use a maple tree as an example: The main job of leaves is to create food in the form of sugars. As new buds emerge in the spring and new leaves form, they soak up the sun's energy and turn that into chemical energy through a process called **photosynthesis**.

Photosynthesis occurs when leaves: Absorb sunlight **and** Carbon dioxide (from the air) **and** Water (taken in from the roots of the tree)

 Image from SPEC Green Thumbs at School: Food Garden Book

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In return the plant creates oxygen + sugars. The sugars travel through the veins of the leaves and feed the plant/tree. The oxygen is also released from the leaves for us to breathe!

Is that why leaves are green in the summer?



YES! The leaves are green through a pigment called **chlorophyll** which is found in the chloroplast, the plant cells. The chlorophyll absorbs the light energy from the sun. This continues into the late summer, until an internal (seasonal) clock reminds the plant that the seasons are changing. It begins to slow down and chlorophyll production stops. That's when the true colour pigments in the leaves make an appearance.


 ***What colours, shapes and patterns have you noticed on the changing leaves in your neighbourhood?***

 Image by Sharlene Singh, SPEC School Gardens Program Coordinator

Last updated September 2024

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 Images courtesy of Canva

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Why do some trees shed their leaves in the fall and other trees don't?


Deciduous trees shed their leaves like maples, oak, birch, beech, and horse-chestnut. Evergreen trees like pine, fir, spruce, cedar keep their needles/scale-like leaves (not actually leaves) during the winter.

The deciduous tree is preparing itself to adapt to the changing season.

- In August, the tree starts to produce a great number of seeds so the fall winds will help the seeds travel.
- In late September, the green pigment chlorophyll disappears and the true vibrant colours like red, tangerine orange, lemony-yellow and dark red and purple appear. These colours were in the leaves all along. As the leaves change colour, they will be shaken off the tree by winds, and rain.

The tree is saving its energy to sleep or go into a dormant state. It can't really collect water from the roots as both the soil and ground are cold and could be frozen. The days are quite short and there is a limited amount of sunlight. So the tree stores its energy and stops growing.

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 Explore your neighbourhood by going for a walk in all kinds of weather. Can tell the difference between deciduous trees vs. evergreens. How many did you find of each? Use the [Fall Seasonal Scavenger Hunt](#) as a guide.

How are fall leaves used in the garden?



Leaves are nature's recyclers. They contain nutrients such as carbon that the soil needs as it slowly starts to decompose (break down) over the winter. Dry leaves can be used in compost bins as well.

Leaf mulch: Many gardener's use leaves in their garden as mulch (a protective covering or blanket over the soil). They collect and break up the leaves into smaller pieces and pile a 3 inch thick layer over their garden. This will prevent the soil from eroding from heavy fall winds, rain and snow as well as suppressing weeds.

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Shelter for insects: Leaves provide shelter for insects such as lady beetles (bugs), ground nesting bees and caterpillars that will lay their eggs on the underside of leaves. Be gentle when picking up and moving leaves to the garden.

Food Source: Leaves are a food source for earthworms and some caterpillars like the banded woolly bear feast on fall leaves before they turn into moths in the late spring.

So remember, next time you see a pile of leaves, save some for the garden or leave a pile for insects and worms.

ACTIVITIES

<p>Kindergarten to Grades 1-2</p> <p>Leaf Rubbings - refer to SPEC leaf Activities</p> <p>Signs of Fall</p> <p>Fall Scavenger Hunt</p>	<p>Grade 3-7</p> <p>Leaf Symmetry (Grade 3 - 6)</p> <p>SPEC Leaf Activities (Leaf Types, Leaf Game, Leaf Rubbings)</p> <p>Leaf Magic</p> <p>Leaf Experiments</p> <p>How to make leaf mold (compost)</p>
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CHILDREN'S BOOKS

Goodbye Summer, Hello Autumn by Kenard Pak (K to 2) | We're Going on a Leaf Hunt by Steve Metzger (K to 2)

Autumn Leaves by Ken Robbins (Grade 1 - 3)| Fall Leaves: colourful and crunchy by Courtney Burdick (K to 2)

Leaves Fall Down by Lisa Bullard | Fall Leaves Fun by Martha Rustad

Summer Green to Autumn Gold by Mia Posada (Grade 3 - 5)| Strong Science: Animals - The Ducks Fly Away by Kim Soo

Goodtrack |This is How I Know by Brittany Luby | Seasons by Terri Mack