

Why Autumn Leaves Fall: Making a 'Leaf Man'

First Grade Science Curriculum

45 min

Objective:

Students will continue to behave like scientists by making observations and asking questions. Students will learn to identify a variety of different leaves from the garden, note their different characteristics, and classify them as evergreen or deciduous, learning why some leaves change color/drop in fall and others do not.

Materials: Various leaves in different shapes, textures and sizes, various seed pods and found objects like rocks and sticks, etc. Paper or paper plates optional.

Procedure

5 min intro

quick rule review & reminder to behave like scientists: what do you observe or notice that's different since you last visited? What season is it? Why do we call autumn 'Fall'? Today we will talk about leaves: why some fall and some stay green

Split class into 2 groups, then switch

Group One: 20 min - tree tour

10-12 students tour garden for walk and talk about trees, visit in walking order

- 1) the giant Ash tree – totally bare now – look down on ground for leaves
- 2) the Yew evergreen has needles – still green – will it change color? Notice how it is waxy not crumbly and dry...

* discuss evergreen (coniferous) vs. broadleaf (deciduous): why the one keeps its needles and the other loses its leaves in fall. Water loss, tiny openings in leaves we can't see let the water out, as days get shorter and less sun the trees can't make as much energy so the leaves die slowly so they don't lose moisture. Trees need to conserve moisture in winter when ground is frozen and no access to water. When leaves die they reveal the colors that are there, hiding, under the green – chlorophyll is the pigment that makes leaves green in summer – leaves make food for the plant from the sunlight! In winter some trees stop making food and go dormant, etc.

- 3) Sassafras tree with its 3 different leaf shapes! Yellow color, will all drop
- 4) climbing English Ivy vine (like holly!) stays green even though broadleaf not needles – why? Waxy coating on leaves helps trap moisture in, allows plant to keep making energy from sun (photosynthesis) even in winter so long as access to water/ground not totally frozen
- 5) White Pine evergreen (soft needles, bring a spruce branch to compare how it has spiky needles) bring some pine cones too for kids to see – explain that a needle is structurally the same as a leaf only rolled up tight with wax!
- 6) sugar maple (?) sapling behind compost – orange/red colors! – maple syrup!

Group Two: 20 min - story & activity

10 -12 students gather in courtyard, listen to book: Lois Ehlert's 'Leaf Man'

Explain they are going to make their own Leaf Man/Woman/Animal with materials found in the garden. Remind them their leaf creature will live outside and might blow away to turn into another leaf creature, just like in the story!

Students use natural materials and different leaf shapes to create their own leaf characters. Have a pile of natural found objects for them to choose from OR allow them to search an area in garden for found items of their own. When time is up, students say goodbye to their leaf men or purposefully "blow" them away to emulate the wind and see if the leaf people float away and reshape themselves!

Lesson source: *Lois Ehlert's book "Leaf Man" is about a man made of leaves and sticks drifting off on an adventure. Read the book with students as an introduction into an art collage project. Allow first-graders to create their own leaf man as depicted in the book with collected sticks, leaves and other natural objects. As an alternative, students can use nature items collected at home or on a nature walk to create a collage. These projects allow students to explore the texture, shape and structure of leaves in a creative setting. http://www.ehow.com/info_7996894_1st-plans-leaf-connect-dots.html*

Alternate expansion activities: *students can instead bring their found objects from garden back into the classroom to glue onto paper and bring home their leaf man, woman or animal, giving it a name, writing their own story about its travels outdoors! (Students can collect and press leaves in advance before pasting onto paper.)*

Students can also make rubbings of found leaves using crayons and paper, compiling these into a book with the different names of the trees – creating a leaf identification book.

Additional Sources

Books:

Why Do Leaves Change Color? By Betsy Maestro

Plants in Winter by Joanna Cole ** really good book!!! (Let's Read and Find Out Science Book)

Kid project:

<https://prezi.com/vfw0wtkrmvu/why-do-evergreen-trees-stay-green-all-year/>

Deciduous leaves contain three main pigments: chlorophyll (green), carotene (yellow, orange, brown), and anthocyanin (red). In the Fall, cooler temperatures and shorter days cause chlorophyll in deciduous trees to disintegrate rapidly letting carotene or anthocyanin shine through causing the leaves to change colors.

Why do evergreens stay green all year round?

http://www.idahoforests.org/ask/trees/f_tf_17.htm?OpenScript=12858

The reason evergreens stay green all year is not simple. Evergreen trees (trees that keep their leaves year-round instead of losing them all at once) originated in cold, northern climates. In the north, the growing season (spring/summer) is very short compared to that of the south. Trees use light to make food through photosynthesis. In order to survive in the shorter growing seasons, trees needed to gather light all year long. The only way to do this was to gather light for photosynthesis in the winter. (However, trees can only photosynthesize when water is available in a useful form, so when the only available water is snow or ice, even evergreen trees are dormant. They rest until conditions are right for photosynthesis to start again.)

Evergreen needles are an adaptation (a change that allows something to survive). Botanists long ago discovered that needles are actually regular leaves that are rolled up very tightly. This shape is an adaptation that allows evergreens to conserve water (also necessary for photosynthesis). Evergreen needles also have a very waxy coating that also helps save water during summer and winter.

Try this experiment: put two cups of water on a table in the sun, leave one cup open to the air, but cover the other with plastic wrap. The sun's energy begins to evaporate the water. From which cup does the water evaporate faster? The answer to this experiment will help you to understand how the waxy covering on evergreen needles helps conserve water.

There is your answer...evergreen trees are regular trees whose leaves are rolled up and covered with wax! This way they can make food for themselves all year long (as long as water is available in a useful form), without drying out.

Common Deciduous Broadleaf trees/leaf shapes

Oak – *Quercus rubra* (red oak) - acorns – red and white oak trees

Maple – *Acer saccharum* (sugar maple) - samaras (helicopters)

Sweetgum – *Liquidambar styraciflua* - gumballs

Ginkgo biloba – one of oldest living trees! Around at time of dinosaurs!

Ash – *Fraxinus pennsylvanica*

Sassafras – 3 different leaf shapes!

Sycamore/London Plane – spooky bark, white underneath, ghostly

Tulip Tree – *Liriodendron tulipifera*, makes giant flowers like Tulips

Common Coniferous Needle leaf trees make cones, called Evergreens

Pine – *Pinus strobus* (white pine)

Spruce – *Picea abies* (Norway spruce)

Yew – *Taxus baccata*

Arborvitae – *Thuja occidentalis* – white cedar

Juniper – *Juniperus communis* - berries make gin

Cypress – *Chamaecyparis thyoides* – false cypress