

Winter: Choices to Make

Nº. 42

PRIMARY/JUNIOR

Science



LESSON SUMMARY

Students will have the opportunity to discover and observe how buds grow into leaves.

Activity Information

Grade Level Primary/Junior

Estimated Duration: 60 minutes or two 30 minute sessions

Materials: **Activity #1** Empty large shaker dispenser (like for cheese), flour or powder sugar, clipping from a pine tree, clipping from a broad leaf tree, 2 pieces of black construction paper

Activity #2 Wax paper, paper towel, samples of coniferous needles, eyedroppers, water and diluted green food colour

Setting: Indoors

Key Vocabulary: Stipule, dehydration, evaporation

Background information

For deciduous trees, decreasing periods of daylight affect a special layer of cells at the base of the leaf where it joins the twig from where it grows - the stipule. In the fall, as days grow shorter, this cell layer weakens and the leaf turns brown and drops from the tree. It is essential that the leaves are shed during the early fall since the tremendous after loss of moisture through the pores of the leaves would result in dehydration during the drought of winter when liquid water is in short supply.

In the summer, the leaves act as reservoirs of water for the tree. Some of the water evaporates into the air and this forces the tree to draw up more water from the roots. When the leaves fall off the tree in the autumn, the moisture left in the roots, trunks and branches is preserved. Thus shedding the leaves protects the tree.

For coniferous trees, also called evergreen because their needles do not appear to turn brown and fall off at the approach of winter. The waxlike coating on the needles helps prevent water stored inside from quickly evaporating during hot summers or colder windy weather. This ensures that the tree can survive the winter drought by making it harder to lose its moisture.

The special design of the evergreen needles enables them to survive in snowy regions. Sloping branches and sturdy needles that are waxy and flexible shed the snow more easily. Because the needles are less likely to have a large build up of snow they are also less likely to be damaged over the winter. Most evergreens needles also have an anti-freeze that helps protect them from frost damage as well.

ACTIVITY #1

Made for Snow

1. Lay the sheet of black paper down on the table and hold a sample of a clipping 15 cm above the paper.
2. With sugar or flour in the dispenser, make it “snow” over the sample.
3. Repeat the process with the second clipping and a second sheet of construction paper
Try to settle an equal amount of “snow” onto each clipping.

Questions to ask the class:

1. Which paper has the most snow on it and why?
2. Which leaf design is better adapted to heavy winter snowfalls?
3. Over time, which type of tree is more likely to grow in northern climates and why?

ACTIVITY #2

Made for Drought

1. Have the class observe the samples of coniferous leaves looking for waxy surfaces and being careful of sharp points.
2. Cut the wax paper and paper towel into 10 cm squares and give each student one of each.
3. Place a drop of water dyed with food colouring on each square and compare the reaction.

Questions to ask the class:

1. Which paper sample is more like the coniferous needles?
2. Why do coniferous needles have better water retaining capabilities than deciduous broad leaves?

Extensions

In fall or spring when leaves are still on the trees, during a sunny day, take two identical plastic self sealing bags and cover an equal amount of leaves from a deciduous and coniferous trees and leave them out in the sunshine for 2 hours. Check the amount of moisture lost in the bags.

[The needles loose less moisture due to their waxy coating.]