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# Woodland Scavenger Hunt: Studying Plant Adaptations

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## Activity Overview

Students search for certain types of plant adaptations.

## Objectives

Students will:

- Understand how a plant's structure can reflect adaptations to its environment
- Be introduced to the structure and function of leaves and roots
- Observe and begin to recognize several woodland plants

Subjects Covered: Science and Art

Grades: K through 8

Activity Time: 30 minutes min.

## Season:

Late spring, Summer, Early fall

## Materials

Small bags (one for each 2-3 students) each including a bright red bead, a green fan, length of knotted twine, and a piece of brown paper bag. Also in each bag have several strands of red yarn or ribbon to tie onto the plants..

## State Standards

Science: Discover how organisms meet their needs (F.4.1)

Investigate how organisms respond to internal/external cues (F.4.2)

Find connections among living and non-living things (F.4.4)

Investigate structure & function of organisms (F.8.1)

Show organism's adaptations (F.8.2)

Explain survival and population growth of species (F.8.9)

Understand energy storage, digestion, metabolism (F.12.9)

## Source

Kathy Miner

## Background

Sunlight is often limited in a woodland environment because in the summer, the broad leaves of the tree canopy can cast shade and make light levels quite low on the forest floor. Winds are not strong or constant in the woods as they are in an open environment. Additionally, the frozen water of the winter months is unavailable to plants. As a result of these conditions, woodland plants have many traits that are believed to be adapted to these low light, intermittent wind, and/or winter drought conditions. "An adaptation is any anatomical, physiological or behavioral characteristic conferring survival value (termed fitness) that contributes to eventual reproductive success." (From Peterson Field Guides: Ecology of Eastern Forests, page 252)

Leaf size tends to increase along gradients of increasing rainfall, humidity and/or soil fertility, and to decrease with increasing sunlight. So, in forests where sunlight levels can be rather low in the summer we may expect to see herbaceous and woody plants with large leaves. Larger leaves in shadier areas allow plants to absorb as much sunlight as possible filtering through the forest canopy.

Low light on the forest floor also drives many species to grow up towards the canopy. Small, young trees sprout up quickly where gaps appear in the canopy. Vines make use of the stability of trees by climbing up trunks to the forest canopy and the sunlight.

The frequency of appearance of different seed dispersal mechanisms changes from one plant community to another. In open communities, wind dispersed seeds are common. The wind is almost ever-present to disperse those seeds. In the forests however, wind is minimal. So plants with wind-dispersed seeds are less common than plants with animal-dispersed seeds. One way for seeds to be dispersed is to attract fruit-eating birds and mammals with showy red berries. Winterberries, viburnums, Jack-in-the-pulpits, and bittersweet are just a few examples of woodland plants with showy fruits. Of course, there are bright berries in other communities and in some forest plants (e.g. maples and ash) with wind-dispersed seeds, but overall, wind-dispersal is more common in prairies and meadows, and animal dispersal is more common in woods.

When winter rolls around, the ground can freeze to a depth of several feet, and water that does fall from the sky is frozen. This creates a months-long drought. Trees in woodlands are adapted to this drought in part because they drop their leaves each autumn, thus minimizing water loss.

The items in the scavenger hunt reflect low light, intermittent wind, and/or low winter water adaptations.

Red bead represents the bright fruits that attract birds, chipmunks or other

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## Woodland Scavenger Hunt: Studying Plant Adaptations (cont.)

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animal seed dispersers.

Paper fan represents the big leaves that can fan out to absorb as much light as possible.

Piece of brown paper bag represents the fallen leaves that drop in autumn.

Piece of string with knots represents vines that twist or tendril around tree trunks on the way to the canopy.

Woodland plants have developed adaptations in response to conditions of low light, non-constant wind, and winter droughts. They face competition for nutrients, water, pollinator attention, and also pressure from herbivores and disease organisms. These are points to discuss with students.

Note: If you have poison ivy or deadly nightshade in the site for this activity, be sure students recognize it before starting.

### Activity Description

Divide into teams of 3-4, give each team a bag. How many different plants can they find with adaptations represented by the objects in the bag? Trace a leaf, sketch the plant or tie a piece of yarn around it to show others. Be careful not to harm the plant. Regroup and compare findings.

### Extensions

- Find examples of adaptations to other factors such as the need to disperse seeds, competition for space or pollinators.
- Create a “perfectly adapted” woodland plant. Build a model of the plant and present it to others. After discussion and examining other students’ work, revise your own plant.
- For each adaptive trait observed, hypothesize a different condition that could have caused the same trait.
- Describe animal adaptations that could have arisen in response to the woodland conditions.

### Additional Resources

- Caduto, M.J., Bruchac, J. (1994). *Keepers of life*. Golden, Colorado. Fulcrum Publishing.
- Kricher, J.C., Morrison, G. (1988). *Peterson field guide: Ecology of Eastern forests*. New York, NY. Houghton Mifflin Company.

### Assessments

- Describe three examples of how plant structures are modified by low water availability and high temperatures.
- Given the adaptations woodland plants have developed in response to low light availability, what kinds of adaptations would you predict plants might develop in response to excess light availability?