

Wind Power

Summary

Students create a model of a wind-dispersed seed.

Grade Levels: 3-4; 5-8

Time: 30-45 minutes
(1 class period)

Subjects: Science, Art

Skills: Analysis, application, comparison, construction, evaluation, observation, problem-solving, research

Learning Objectives:

Students will be able to:

- Describe four ways that plants disperse seeds
- Explain why plants disperse seeds
- Recognize that wind is a part of the physical environment
- Describe one way that the physical environment is connected to living things
- Create a model of a wind-dispersed seed
- Design an imaginary wind-dispersed seed and compare it to a model of an actual seed (Grades 6-8 only)

Materials:

- Posterboard or other thin cardboard
- Scissors
- Modeling clay
- Color markers
- Ruler
- Pencil
- Pictures or real samples of wind-dispersed plants and seeds
- Strong electric fan (optional)
- Linden Seed Helicopter Sheet

Background

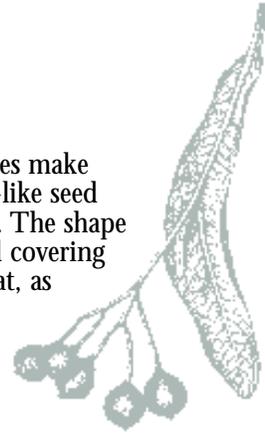
For the next generation of plants and trees to flourish, a parent plant tries to disperse its seeds far from itself. That's because young seedlings could become competitors with their parent for basic survival needs such as sunlight (to make food) and water. In this competition, the seedlings often lose. A tree that drops seeds directly below its boughs may block the sunlight that its offspring need to grow. Plants have solved this problem through a number of interesting adaptations.

Plants can't move, but they do have ways of scattering seeds as far from the parent as possible. Some seeds may even end up more than a hundred miles away from the parent tree. One way, used by foxtails, is to stick to the fur of animal passers-by. Covering seeds in a tasty fruit is another method used by fruit trees and berry bushes. The fruit meal attracts animals like birds and bats, which fly the inedible seeds to a new location. Likewise, the seed of the oak tree is found inside an acorn, which squirrels collect, eat and distribute. Pine cones hold seeds for some trees.

Catkins hold tiny seeds that can float in the wind or in water. Other plants place seeds in pods, which burst open and eject seeds away from the parent plant. Trees like the maple and linden have seeds with wings and rely on the power of the wind to carry the seeds away from the parent.

Wind is part of the physical environment that affects living things. Some plants' reliance on wind to scatter seeds shows how physical factors can become intertwined with the living community of plants and animals.

Linden trees make helicopter-like seed containers. The shape of the seed covering ensures that, as the seeds drop from the trees, the seeds will spin like helicopter blades. This helps seeds stay aloft longer. Pushed by strong winds, the seeds can travel far. Birch trees wrap their seeds in the folds of a catkin that opens to the wind when the tiny seeds are ripe and dandelions form very small, light filaments shaped like parachutes that lift and float in the wind. Thistles develop fluffy hairs easily picked up in the wind. Maples have wing-like flaps that allow the seeds to spin like helicopters (much like the Linden seeds) and help the seeds travel farther.



Preparation

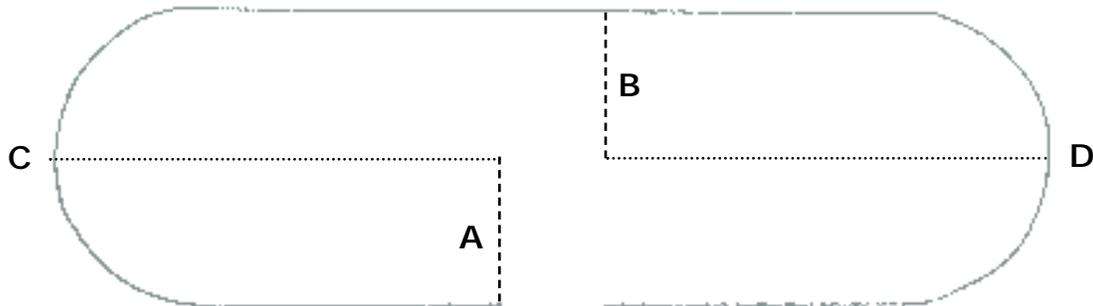
1. Copy the illustration of the Linden seed "helicopter" for all students.
2. Find out which local plants use wind to disperse seeds. Collect a sample if possible.

Procedure

1. Review the idea of habitat and the four basic elements all living things require to survive: food, water, cover and places to raise young. **How do these needs apply to plants?** While earlier activities explored how plants get the food and water they need, understanding what it means for a plant to find places to raise young may prove difficult. Start this activity by asking students how they think plants meet this survival need.

WORKSHEET

Linden Seed Helicopter



Instructions:

Cut out this shape from thin cardboard.

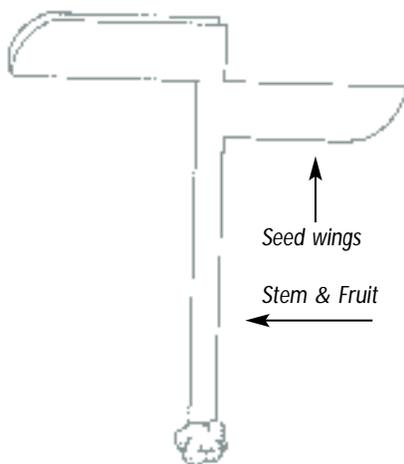
Use scissors to cut along dashed lines A & B.

Fold along horizontal dotted lines C & D.

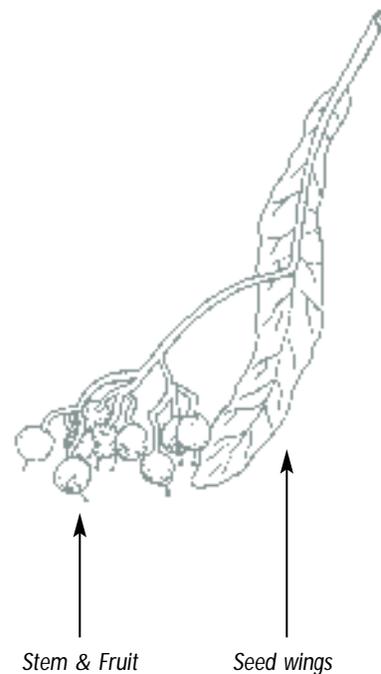
Fold **UP** on section A, **Down** on section B.

Add a small blob of clay to bottom of stem.

Try dropping, spinning and throwing it.



Actual Linden Seed



Ideas for other wind-dispersed seeds – Sycamore, Dandelion, Birch, Locust, Thistle, Maple.

Illustrations Copyright Jennifer DiRubio Lubinsky 2001

2. Explain that all plants must scatter seeds as far away from themselves as possible to give offspring the best chance for survival. Ask students to brainstorm some plant strategies to accomplish seed dispersal. **Why are different strategies used?**

Review ideas of animal dispersal (fruit and burrs and foxtails that stick to animals that pass by), plants ejecting seeds from pods and seed dispersal by wind.

3. Show pictures or real flowers/seeds to illustrate these ideas. You can use the examples on for this purpose. Have students look at each sample and predict how seeds are dispersed.

4. Tell students that they will make a model of a floating seed from a linden tree. Pass out copies of the linden seed “helicopter” and other materials and follow these instructions:

- Cut out the T-shape
- Carefully cut along line marked “A”. Be sure to cut only halfway through top section.
- Carefully cut along line marker “B”.
- Fold along line “C” and “D” to form the seed wings.
- Decorate seed with wings
- Add a small pinch of modeling clay to bottom of seed stem to represent the seed. This will give the “helicopter” weight so that it will land.

5. Go outside to test the Linden seed models. Try to spin them before letting go. **How far did the models travel in the wind?** (Older students should record

their findings.)

6. Discuss any questions students may have. Review main methods of seed dispersal. Ask, **why do plants scatter seeds?**

Modifications for Older Students

1. Follow steps above. Then, challenge students to design their own plants with seeds adapted for wind dispersal. They will need to draw and then make a model of the seed and its cover. After they make a model, students will compete to see which design travels farthest in wind or in front of a powerful fan. Have students research different seeds dispersed by wind, such as: daffodils, thistles, poppy flowers, maples and birch tree catkins. Include any local plants identified with wind dispersal of seeds.

2. Allow the class a set time to create, test and revise models. Test models with wind or a fan. Record how far each of the models travels. Back in the classroom, compare distance of all models (including the Linden seed model). **Which travels farthest? Why?** Do research to see if any of their designs are similar to those in nature.

3. Ask students to conduct research to investigate the evolution of seed dispersal, or methods invasive plants use for seed dispersal. Are they different from methods used by native plants?

Extensions

✓ Either during a field trip to the schoolyard, other natural area or as homework, have students collect different types of seeds from the ground (one per

type). Back in the classroom, have students sort the seeds by how they think the seeds are packaged and dispersed (wind, stick to animal, fruit (animal distributed), nut (animal distributed), pod ejected, in a cone, in a catkin or other.) Then have them do research to find out how each species disperses its seed. A local native plant society may provide helpful information.

✓ Plants produce huge numbers of seeds. Few of these seeds grow into mature adults. Does the number of seeds a plant produces vary according to what kind of seed dispersal strategy the plant uses? Compare how many seeds the following plants (each uses a different strategy to scatter seeds) produce each year: maple tree (wind); foxtail grass (sticks to passer-by); locust tree (pods burst and eject seeds); peach tree (animal eats fruit and disperses seed). Is one method more reliable than the others?

Assessment

✓ Have students make a poster of their own seed, with a drawing and description of it, pointing out different features of the seed, how it is dispersed, and why it works.



POLLINATION STRATEGIES

