



Year 1

Fall Lesson 3: Seed Dispersal

Summary

During this lesson, students will explore the many ways in which seeds move away from their parent plant. Students will have the opportunity to explore and examine the diverse world of seeds, become engineers during the Build a Seed activity, and have the opportunity to save seeds from their own garden.

Background

All living things have some system for reproducing members of their species. Most plants reproduce using a system that includes flowers and seeds. In general, seeds develop within the ovary of the plant's flower after being fertilized by pollen from another plant of the same species or being self-fertilized. For a seed to germinate and grow into a mature plant, environmental conditions must be just right.

Each plant needs a certain amount of sunlight, air, water, and nutrients from the soil. If a seed simply drops from the parent plant, it might compete with the parent for those essentials and have difficulty growing. Therefore, most seed-bearing plants have developed a way to disperse seeds away from the parent, giving the new plant a better chance to find what it needs to grow.

The six main dispersal methods:

Burs: These seeds have hairs and barbs which make them sticky and capable of traveling via animal fur or socks! Examples include forget-me-not, agrimony and burdock.

Wind: These seeds can be fluffy, flat and thin. They often have specialized feathering to help them fly through the air, or a flat sail to glide to the ground. Examples include maple, dandelion and milkweed.

Float on water: These seeds have a waterproof seed coat, and are hollow with air inside. They also need to be light enough to float. Examples include coconut, willow and water lilies.

Bounce & roll: These seeds have a soft pod and a hard shell. They are often round and heavy enough to bounce. Examples include peas, all brassicas (broccoli family) and walnuts.

Objectives

Students will use built knowledge to design, test and evaluate a simple model which mimics how seeds move away from plants to improve survival rates.

NGSS Primary Standard:

2-LS2-2 Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

Science and Engineering Practices:

Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.

Cross-cutting Concepts:

Structure and Function: The shape and stability of structures of natural and designed objects are related to their function(s).

NGSS Supporting Standards:

4LS1-1 Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior and reproduction.

Lesson Length

40-60 minutes

Materials

- Precut recycled materials
- Scissors
- Tape
- 3-4 small tubs
- Water access
- Varying seed types for observation
- Loupes/magnifiers
- Various screens
- Old seeds for optional open inquiry activity
- Old blanket or socks for optional seed hunt activity

Preparation

- 1) Precut recycled materials for students to use for engineering.
- 2) Collect and dry seeds for observation station.

Vocabulary

dispersal, variation, floatation

Evidence of Learning

Students will design, test and evaluate models which mimic the plant or animal function of dispersing seeds.

Garden Related Activities

- Plant two different types of seeds and discuss seed depth needs
- Use a blanket or old sock to drag across the garden area. Observe the seeds that are collected during the process and try and identify how they move

Exploding: These often have long seed pods with small round seeds. Examples include, peppergrass, some oxalis species and witch hazel.

Eaten: These seeds are found inside of fruit. They are small enough to be swallowed by an animal and have a thick enough seed coat to protect them through the digestive process. Examples include berries, grapes and many small fruit varieties.

Procedure

Classroom Introduction

To introduce the concept for the day, bring in either a dandelion seed head or a maple seed. Begin by silently showing students how the seed moves by either blowing on the dandelion or tossing the maple seed into the air. Wait until students begin asking questions to introduce your essential question for the day: "How do seeds move from one place to another and why?" Let students brainstorm different ways in which seeds move and write/draw each example on the board.

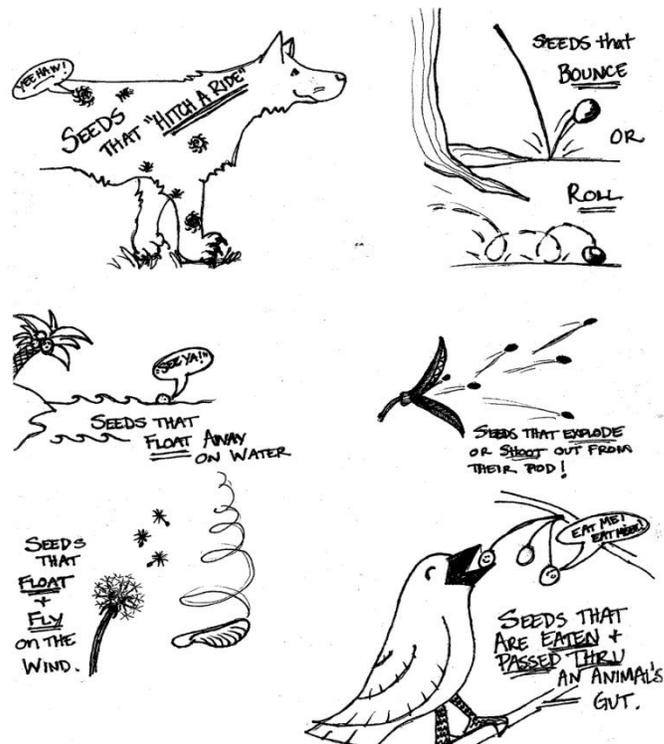
Now that you have a list of dispersal methods, have students think and share in pairs as to why moving is so important to plants that they have evolved to have very sophisticated structures to get away from their parent plant. Once students have shared in pairs discuss the why's as a whole class.

Supporting Activities

Seed Observations

Seeds for this activity can be found anywhere in the world. In the Pacific Northwest we use mostly common plants and weeds including agrimony, forget-me-not, wild carrot (Queen Anne's lace), maple, dandelion, milkweed, lupine, artichoke, linden, horse-chestnut, pinecones, thistle, and bay laurel. If possible, it is also great to bring in a coconut for a floating seed.

For this activity students will be building knowledge by observing different types of seeds to determine how they think each one disperses from its parent plant. Your observation station should include trays to keep seeds separated in, magnifiers or microscopes, and as many seed varieties as possible. This activity is aimed at getting students familiar with many shapes and sizes of



Garden Related Activities continued

- Save seeds for spring planting
- Search for weeds in the garden that are starting to form flowers or seeds and discuss why it is important to pull weeds before the seeds fall

Seed Saving Hints

You can save the seeds from any plant, but you won't always end up with a plant like its parent when you use them later. Some seeds breed true (tomatoes, beans, peas, lettuce, peppers, spinach) and others do not (squash, corn, brassicas-broccoli, kale, cabbage, kohlrabi).

Plants with smaller/closed flowers that are heirloom varieties breed "true" more often.

Plants with larger, open flowers, those that are wind pollinated and hybrids are less likely to breed "true".

seeds as well as encouraging them to think about varying seed structures and how these traits may affect dispersal.

Students should be given 5-10 minutes to observe the different seed types. It is helpful to instruct them to keep the different seed varieties separate (to the best of their ability) but they should look and feel, using observation to learn something about the seeds in front of them.

Build a Seed

The main activity for this lesson will challenge students to design and engineer their own seed with specialized dispersal mechanisms based on their observations. Students will be given a small seed to use as the base of their design, along with recycled materials (such as cut popsicle sticks, cardboard, egg cartons, cotton balls, string, tissue paper, bubble wrap, tin foil, bottle caps etc) to design a seed. Each student will need to choose only one dispersal method to focus on/engineer.

- 1) For larger classes you will want to break students into smaller groups. Provide each student with a "base" seed (which they have to move) and each small group with a bag of building materials, scissors and tape.
- 2) Each student should choose one dispersal method and be given 10-15 minutes to complete their design and engineer their seed.
- 3) Once the allotted time is up (some students will want more time, others less), gather back together as a whole group. If your group is smaller you can have each student share their design individually and test them one at a time. For larger groups you can test by category (ex: anyone who made a floating seed must float them at the same time).
- 4) To create a greater challenge (especially for older students) you can add restrictions to their tests including:
 - Float in water for at least five minutes
 - Attract an animal to carry them away
 - Glide, fly or soar in air at least 5 feet
 - Stick to an animal and be carried at least 10 feet
 - Be thrown at least 2 feet away from the parent plant

Seed Saving

During this activity, students will focus on the importance of saving seeds. You can work as a group to save one type of crop from the garden or have students rotate through several different seed saving stations to learn about the process of saving seeds from different crops. When students have finished all stations, each can label a container or envelope. Seeds need to be stored in a cool dry place to avoid rot or accidental germination. You can have students make seed packets of their own to take home, or store seeds in the classroom for spring planting.

Wrap-up

Conduct a short group discussion on the challenges and successes of their engineering projects. How do these challenges relate to engineering processes used for human travel including air, land and water?

Adaptations

To add complexity

Open Inquiry Stations

Add an open inquiry station for students to learn more about seeds and how they differ. Include seeds of all shapes and sizes (add in chia seeds for a surprise!), various sizes of screens, tubs with water, tubs without water, sand, toilet paper tubes, etc. Have students use the materials to discover something without any prompts regarding how to use them.

Seed Hunt!

Go on a seed hunt through the garden dragging blankets across the ground to see what may stick to them. See if students can identify some of the seed types and how they move.