



Science Unit: *Plants*
Lesson 2: *Seed Diversity*

School year: 2004/2005
Developed for: Queen Alexandra Elementary School, Vancouver School District
Developed by: Paige Axelrood (scientist) and Janet Vesterback (teacher)
Grade level: Presented to grade 3; appropriate for grades 1 – 4 with age appropriate modifications.
Duration of lesson: 1 hour and 20 minutes (revise as needed)

Objectives

1. Introduce students to seed diversity by examining different types of seeds contained in seed heads, seed pods or fruits.
2. Learn that the size of a seed does not influence the height of the plant that grows from the seed.
3. Discover that seeds represent a variety of sizes, shapes, textures, and colors and are produced inside different types of fruits and cones.
4. Review the parts of a seed and how seeds travel.

Background Information

Seeds provide plants with a method of reproduction and a germinating seed begins the life cycle of a plant. Seeds are produced by flowering plants (angiosperms) inside an ovary that generally develops into a fruit. Seeds are also produced inside cones by non-flowering plants called gymnosperms (such as conifers). A seed contains the embryo, a source of food, and a protective seed coat. A seed, containing a living embryo, will germinate into a plant with an adequate amount of water, oxygen, and the proper environment, including a favorable temperature.

Seeds representing different plant species are extremely diverse in their size, shape, color, and texture, as are the plants that grow from these seeds. Fruits are also very diverse in their size, shape, color, texture, skin, fleshy interior, water content and the number of seeds that they contain. Students can be helped to understand diversity by commenting on the variety of fruits that they eat and the different types of seeds that are inside different fruits. The diversity in the size of seeds is related to the amount of stored food in the seed. The diversity of plant fruits and cones, and the seeds inside them, help to determine how the seed will be dispersed. It is important for seeds to travel away from the mother plant to help minimize competition for space and sunlight. Seeds are dispersed by a variety of mechanisms including forcible discharge by the plant and by gravity, wind, water, animals, and people.

Vocabulary

Seed: The part of a plant that contains a protective covering, stored food, and the embryo.
Diversity: Varied or different types of any given object.
Disperse: To break up, spread, or scatter in different directions.



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Materials

- Magnifying glass and paper towel for each student
- Collect different types of cones, seed heads, and seeds from home gardens, a bulk food store, and a grocery store and bring them to the classroom. Some examples are listed below.
 - Pine cone and seeds
 - Douglas-fir cone and seeds
 - Durum wheat seed heads
 - *Lunaria* seed pods
 - *Clematis* seed heads
 - Maple seeds with wings
 - Rhododendron fruits and seeds
 - *Mullein* seed heads
 - Leek seed heads
 - Acorns
 - Horse chestnuts
 - Dandelion seeds
 - Avocado with seed
 - Apple with seeds
 - Tomato with seeds
 - Melon with seeds
 - Alfalfa seeds
 - Chickpea seeds
 - Mung bean seeds
 - Pea seeds
- Prepare 6 – 10 zip lock bags per group of students, label each bag with the plant name, and place corresponding seed heads, seed pods, seeds attached to fruits, or seeds into each bag so that students have ample plant material to examine. Seed types examined included Durum wheat, Leek, Maple, Common Rue, *Clematis*, *Lunaria*, and *Anemone*.

In the Classroom

Introductory Discussion

1. Ask students why seeds are important and where you can find seeds on the plant (fruits and cones). Introduce the word diversity and talk about what the word means. Discuss examples of the diversity of plants that grow on earth followed by the diversity of fruits and seeds. Show the students examples of different types of seed heads, seed pods, sliced fruits containing seeds (one at a time) and ask if they know the name of the plant that produced the seed. For some seed types, ask how the seeds are dispersed or the size of the plant that grows from the seed. Ask students if they know how wheat seed is processed for food. Discuss the similarities and differences between the seeds and how they are dispersed. Point out that the size of the seed does not determine the height of the plant.
2. Describe the science activity: to examine different types of seed heads, seed pods, or seed attached to a fruit, and the seeds they contain, using a magnifying glass and by touch; to brainstorm about how the seeds travel; and to compare how seeds from different plants are similar and different.

Science Activity/Experiment

Students will be divided into 6 groups of 3-4 students per group.

1. Seven labeled bags containing seed heads, seed pods, seeds attached to fruits, or seeds will be placed in the center of each table. Each student will be given a magnifying glass and a paper towel.
2. Students will examine the seed heads, seed pods, and seeds with their hands and with the magnifying glass. Students will gently dissect the plant material to find the seeds.



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3. Students can experiment with how quickly the seeds fall to the table if they are dropped from above. Students can brainstorm about how each seed travels and compare how the seeds are similar and different. During the lesson, students will be helped if needed to discover unique features about each seed (the delicate pattern on the *Lunaria* seed, the soft feather-like plant tissue attached to the *Clematis* seed, and tiny barbs on the spikes in the wheat seed head, etc.).
4. Students will select four seed types and use an activity sheet to record the name of the plant, draw the seed and other plant parts, and tape a few seeds to the sheet. Students will record how the seeds are dispersed.

Closure Discussion

Review how plants, fruits and seeds represent incredible diversity. Discuss how seeds vary in their size, texture, color, and shape. Discuss how this diversity helps seeds to be dispersed (travel) in different ways and survive under different environmental conditions. Review the parts of a seed and how seeds travel.

References

1. [e.encyclopedia Science](#), Google. 2004. Seed Plants, pp. 262-263, DK Publishing Inc.
2. <http://www.urbanext.uiuc.edu/gpe/case3/c3facts2.html> University of Illinois Extension, [Seed structure].
3. <http://www.cas.vanderbilt.edu/bioimages/pages/fruit-seed-dispersal.htm> Department of Biological Sciences, Vanderbilt University, Images copyright 2002 Steve Baskauf, [Fruit and seed dispersal, includes photo images].
4. http://en.wikipedia.org/wiki/Biological_dispersal Wikipedia, the free encyclopedia, [Biological dispersal].

Teacher Assessment of Learning

1. How well did students complete the worksheet? Were they able to record plant names, attach the plant seed samples, and make an accurate prediction as to how their chosen seeds might travel? Can they identify the parts of a seed and the function of each part?
2. Observe students as they participate in the lesson. Was each student able to work cooperatively in his/her group? Did he or she stay focused and engaged during whole group and small group discussions?

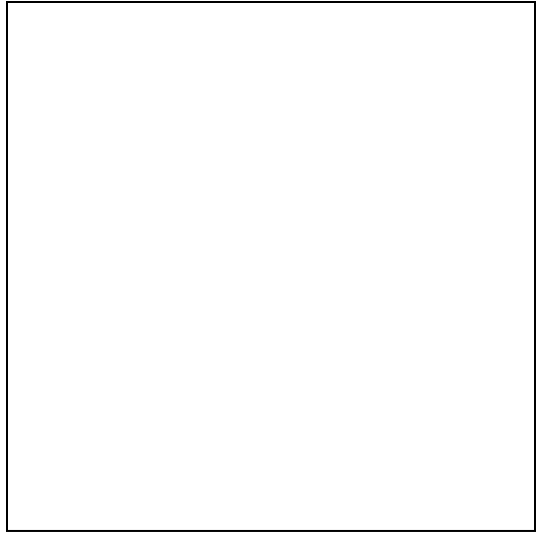
Extension of Lesson Plan

Students can collect and examine seeds. Can they apply the same learning to these new seeds? Ask them to explain orally or in writing how the characteristics of a given seed might help the plant species to survive.

Different Types of Seeds

Name of Scientist _____

1

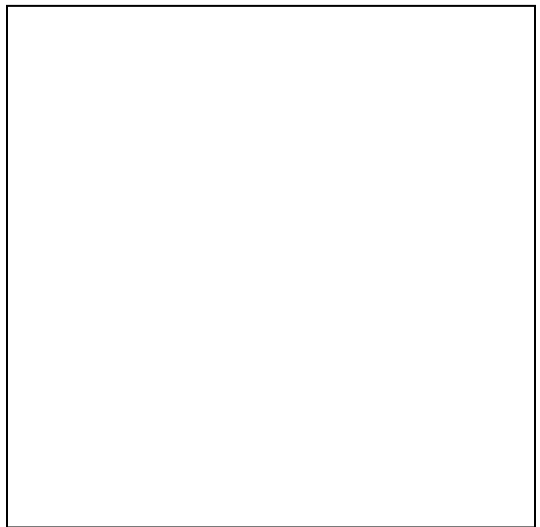
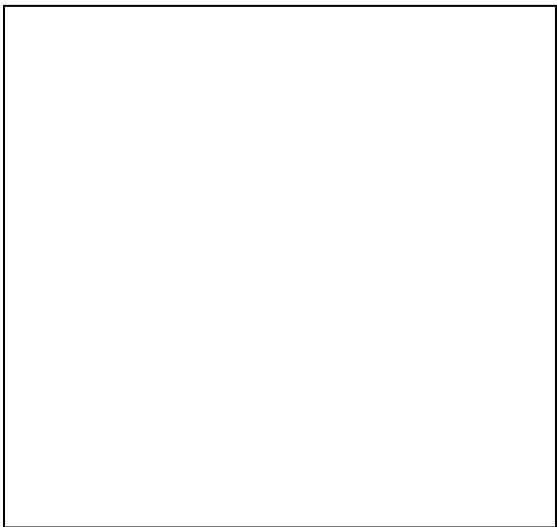


Name of Plant _____

My Observations _____

This seed travels by _____

2

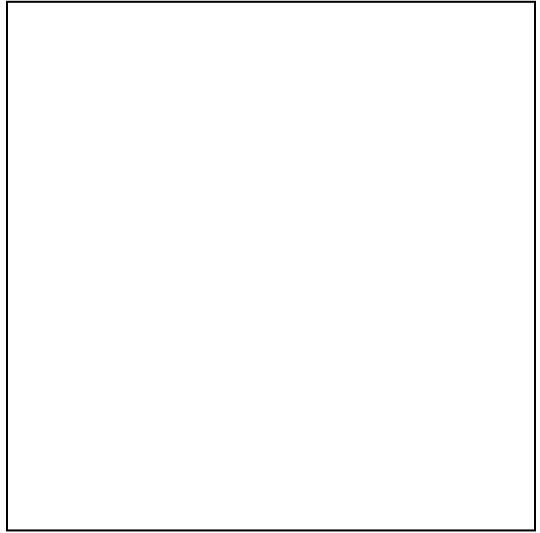
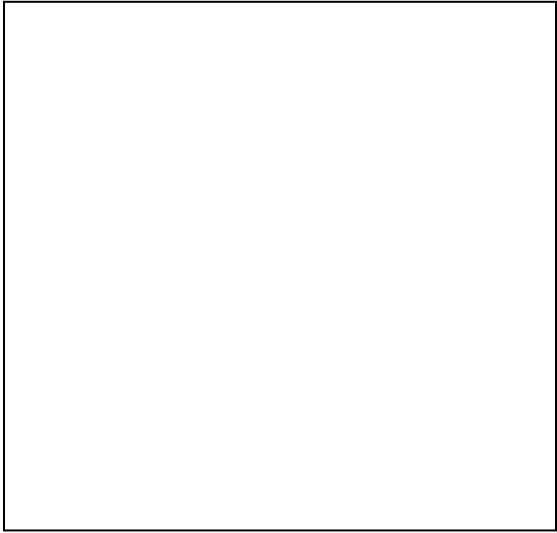


Name of Plant _____

My Observations _____

This seed travels by _____

3



Name of Plant _____

My Observations _____

This seed travels by _____

4

