



SEEDS OF WETLAND LIFE

Summary

How do seeds travel? Students investigate the adaptations different plants have made in order to spread their seed. Students make connections between seed dispersal and native and non-native plant populations, and also participate in hands-on seed propagation. Other activities include a seed race, seed collection, a computer game, and a craft activity.

Objectives

Students will:

- know why it is important for a plant to disperse its seed.
- name some adaptations plants have made so that their seed can disperse.
- know that local plants disperse seeds by wind, water, or animals.
- understand that seed dispersal is important to wetland habitat restoration.

California Content Standards Addressed

Grade Five- *Investigation and Experimentation 6.a.* Classify objects in accordance with appropriate criteria.

Grade Six – *Life Sciences 5.e.* Students know the number and type of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as soil composition.

Grade Six- *Investigation and Experimentation 7.h.* Identify changes in natural phenomena over time without manipulating the phenomena.

Grade Seven - *Investigation and Experimentation 7.b.* Use a variety of print and electronic resources to collect information and evidence as part of a research project.

Grade Eight- *Investigation and Experimentation 9.a.* Plan and conduct a scientific investigation to test a hypothesis.

The Basics

Grade Level:

5 – 8

Subject areas:

Life science

Duration:

95 to 115 minutes

Number of Docents Needed: 1-2

Materials:

1. *for introduction and seed race:*
Assortment of seeds. Collect these before hand either from the wetlands or your own garden.

3. *Seed dispersal exploration and Seed Collection:*

1 Wetland Plants Get Around

handout per student. This can be found at bottom of this lesson.

1 clipboard per student

1 pencil per student

Tape for each group

Clippers (1 per group)

Buckets (1 per group)

Paper bags

Markers

5. *Seed Dispersal Computer Game*

Have Seed Dispersal Game loaded on all classroom computers; found on WERC website.

6a. *Propagation*

Seed flats

native seeds

potting soil

label tabs

markers

6b. *Create your own seed*

Beans, construction paper, tape,

past. All or some of: rubber bands,

toothpicks, balloons, scissors,

pencils, plastic bags, cork,

cotton, feathers, wire, metal

springs

Outline

There are seven parts to this lesson:

- 1) Seed Race (10 minutes)
- 2) Instruction on Seed Dispersal (5 minutes)
- 3) Fieldwork: Seed Dispersal and Seed Collection (30 minutes)
- 4) Travel from Department of Fish and Game Property to WERC (10 minutes)
- 5) Seed Dispersal Computer Game (5 minutes)
- 6a) Propagate Seeds (25 minutes)
- 6b) Create your own Seed Competition (40 minutes)
- 7) Closing Circle (5 minutes)

Vocabulary

seed dispersal, adaptation, non-native plants, native plants, restoration

Background Material

Healthy adult plants have all the resources they need to survive- light, water, nutrients in the soil, and space to grow. They produce seeds on a regular basis to guarantee the continued survival of the species. A seed is a very young plant in some form of casing, like a shell or piece of fruit, or attached to some device to help it move around. Seeds contain enough food for a new plant to grow until it starts growing its own leaves to make food. An adult plant cannot move or change any conditions to help the survival of its seeds. If all its seeds just dropped to the ground, there would not be enough resources for any of them to grow into new plants. So, to make sure that their seeds have a better chance of finding a location suitable for growth plants have ways of scattering, or dispersing, its seeds. There are four basic methods of seed dispersal: wind, mechanical, water, and animals.

Wind dispersal

Some plant seeds that disperse by wind have a “parachute,” or some kind of extension that catches air and increases its chances of being picked up and carried away. These seeds are fairly light and have some sort of feathery extension. Some examples are dandelion, milkweed, and thistle.

Larger seeds can disperse via a “helicopter” motion. These seeds have an extension that act like the wing of helicopter. Instead of falling to the ground, they catch the wind and twirl, sometimes traveling half of a mile or more. Examples of plants that disperse their seeds using a helicopter motion are maple seeds, pine seeds, and box elder seeds.

Mechanical dispersal

Some plants have evolved a mechanical way for their seeds to disperse, making it seem as if the seed “pops” or jumps out from its pod.

Water dispersal

Wetland plants and other water-loving plants have adapted to their proximity to the water by evolving seeds with air pockets that float on the surface of the water. Sedges and rushes (and of course, coconuts!) all disperse by water.

Dispersal by animal

Some seeds are “hitchhikers” that travel ON animals. They have some sort of prickly extension that catches onto an animal as the animal passes by and goes along for the ride. Bur-clover and many types of grasses all travel on animals. Other seeds travel IN animals. These seeds, like those of strawberries and tomatoes, are eaten with the surrounding fruit and expelled in the animal’s feces. These seeds sometimes require traveling through the digestive system of an animal in order to germinate.

Procedure

1) Introduction (preferably on the DFG straw bale circles) (10 minutes)

- Sitting in a circle, lead a brief discussion on wetland plants.
- Pass around the jars of seeds for students to look at as you chat. Students should understand that as they walk through the wetlands they will encounter many different types of plants. Ask the students if any come to mind. Some of them are native to the Watsonville wetlands and wildlife rely on them for food and shelter. Others are non-native and were brought here several hundred years ago by humans from different countries to feed their livestock and for other reasons. All of these plants produce seeds that have the potential to grow into new plants and keep the species populations strong. Every plant has a special way of spreading (or dispersing) its seed.
- Today we will explore these different methods and see which ones we think are most successful in the wetlands.

2) Seed race (10 minutes) On the Department of Fish and Game Property

- Give each student a seed. Ask students to see how far they can make their seed go without letting it drop to the ground or use their hands.
- Race a couple times and discuss which methods for keeping the seeds were the most effective.

3) Fieldwork: Seed examination and collection. (30 minutes) On DFG Property

- *Before the field trip:* Take the mentors down to the DFG Preserve about 20 minutes early to get acquainted with the plants they will be working with during the field trip. They are: coyote brush, bristly ox-tongue, nut sedge, curly dock, and common rush. Each mentor should be assigned a native plant that his/her group will collect seeds from. They should be able to easily identify this plant, so have them spend a few minutes examining it. They may choose to take a sample along with them.
- *The activity:* Divide students into as many small groups as there are high school mentors. Give each student the Wetland Plants Get Around handout on a clipboard and a pencil.
- Each mentor should have a bucket, a pair of clippers and two small brown paper bags or small brown envelopes.
- Draw or collect a seed or seed head of each plant on the handout. If collecting the seed, use tape to stick it to handout. The mentor should lead a brief discussion about the possible dispersal method of each seed and write it down

on the handout. Note to mentor: Seeds may have more than one method of dispersal.

- Once all groups are done with the handout, they will collect seed from their assigned native plant for propagation or to add to our seed library. To do this students should clip a long stem from a plant that contains seeds and shake the seeds off the stem and into the bucket. Empty the contents of the bucket into brown paper bags or envelopes. They should label the envelopes with the name of the plant (common and scientific), the date, location of collection, and the name of the collectors (Collected by:)

5) Move from DFG Property to WERC (10 minutes)

6) Seed Dispersal Computer Game (10 minutes)

- Have students work in pairs or in groups to play the WERC Seed Dispersal Computer Game found on the WERC website. Use the time that the students are on the computers to do last minute set up for either seed propagation or create your own seed competition.

The following are alternate ending activities based on how much time you have left on the field trip, how many materials you have, or weather conditions. If you have time, do both.

At the WERC:

7a) Propagate Native Seeds in Greenhouse from Seed Library (25 minutes)

- Each group gets a flat and fills their flat with soil. Then they plant the native seed, label the flats, and water them in the greenhouse. Find out the specific planting requirements for each seed ahead of time.

7b) "Create your own Seed" Contest (40 minutes)

- Each group gets a few dry beans and a portion of art materials listed in the materials section.
- Each group has the mission to alter their bean so that it is great at dispersing. Using some of the art materials on hand, each group will add on to the bean to make it float, fly, or stick to clothes or fur.
- To be considered successful, a floating bean must float for a minute. A flying bean must soar for five feet. A sticky bean must stick to a person that walks the length of the classroom without falling.
- (OPTIONAL) Winning groups get a prize.

8) Closing circle (5 minutes)

- Pass a rock around the circle and ask each student to say one interesting thing they discovered today. Collect science handouts with all the students' work.

Extensions

- Show students the fourteen-minute excerpt from David Attenborough's *The Secret Life of Plants* called "seed clip.mov" located in the lesson folder.
- WERC extension: Hands-on restoration gardening project.

Resources:

Attenborough, David. 1995. The private life of plants. Princeton: Princeton University Press.

Carolina Biological Supply Company. Learning about seeds that travel. 2007.

URL: www.carolina.com/manuals/index.asp.

Lingelback, Jennifer and Edward Epstein. 2000. Hands-on nature: Information and activities for exploring the environment with children. Vermont Institute of Natural Sciences, Vermont.

North Mississippi GK-8 Project. Seed Dispersal. 2007. URL:

<http://72.14.253.104/search?q=cache:mfe5CzqR6QQJ:smartweed.olemiss.edu/nmgk12/curriculum/elementary/second/Seed%2520Dispersal%2520notes.doc>.



Name _____

Wetland Plants Get Around!

Plant Name	Native or Non-Native Plant	Seed of Plant (Draw or tape in box)	Guess the Dispersal Method
Coyote Brush <i>Baccharus pilularis</i>	Native		
Bristly Ox-Tongue <i>Picris echioides</i>	Non-Native		
Nut Sedge <i>Cyperus esculentas</i>	Native		
Curly Dock <i>Rumex crispus</i>	Non-Native		
Common Rush <i>Juncus patens</i>	Native		