Outdoor School at Home

Calapooia Watershed Council

Title: Seed Design
Grade: 6
Duration: 60 minutes
Location: Home/Backyard/Park

Materials:

- Journals/paper
- Pen/Pencil
- Colored Pencils or Crayons
- Clay/Playdough (Optional, Recipes provided online)
- Pipe Cleaners (Optional)
- Construction Paper
- Scissors
- Tape or Glue
- 5 Containers (tupperware, cups, etc.)
- Dispersal visuals (provided online)
- Seed Visuals (provided online)
- Seeds you collect (Optional)
- Computer/Tablet

Lesson Preparation:

- Print out and cut dispersal and seed visuals or have them readily available on a computer/tablet
- Collect a variety of seeds (if available) around your neighborhood. Seeds could also be collected from the kitchen (beans, sunflower seeds, etc.). Put aside for lesson use
    - If seeds are unavailable, print out or open on a computer/tablet the seed dispersal and plant visuals
- Label each container with one dispersal method (Wind, Water, Animal, Explosion, Fire). Set aside for activity.
- Ensure paper, writing materials, and craft materials are available for the students

Objectives: Students will

- Identify characteristics of four different seeds by sharing their observations
- Arrange seeds according to their dispersal adaptation by placing or recording the seed visuals with the correct dispersal type.
- Design a seed that has at least two dispersal adaptations using provided materials
- Determine the importance of multiple dispersal adaptations of seeds through discussion

Introduction (5 minutes)	**Hook:** Ask students to name all of the different ways human travel. (boat, plane, etc.) ● Ask students "do other organisms have as many ways to travel like us?" ● Share that plants have adapted to a lot of different ways of travelling through seed dispersal. Ask students how seeds disperse. ○ Have students share as many dispersal adaptations that they know, and share the remaining dispersal types if needed.
Body (50 minutes)	● Inform students that today they will face three challenges about seeds. ● <u>First challenge</u>: Have students collect as many seeds as they can find/use some from your home/yard/park or observe the plant and seed visuals provided ○ Time students for 5-10 minutes ○ Allow students to share how many different seeds they collected or observed and share what makes the seeds unique ■ Ask students where they were found and/or where the seeds in the visuals could be found. How did/would they end up there? ● <u>Second Challenge:</u> Seed Dispersal Match Quest ■ Tell students that their second challenge is to determine how different seeds disperse ■ Use the seeds collected or seed visuals. Students must decide how the seed disperses and match it with the correct dispersal method. ■ Have the student(s) organize seeds into the labeled dispersal containers ■ Allow students to justify answers (some seeds can disperse multiple ways!) ○ After the matching challenge is complete, review the seeds and the correct dispersal methods (**see background information for correct answers**) ■ Have students return their seeds to nature or collect the dispersal visuals ● <u>Third Challenge</u>: Seed Design ○ Tell students that their final challenge is to design a seed that is adapted at least <u>2 types</u> of dispersal methods ■ Students can sketch the seed design in their journal, labelling structures and describing its dispersal

	adaptations OR ■ Each student will receive a small amount of clay/playdough and materials to build a model seed. ○ Once students are finished, allow students to share their designs
Closing (5 minutes)	● After sharing designs, have students discuss why it is important to have so many types of dispersal adaptations. ○ What would happen if there was only one type of dispersal adaptation? ○ Allow students to share their answers ● Thank students for their hard work and completing all 3 challenges!

Modifications:

- Inclement Weather: This lesson can be moved indoors. Use the seed dispersal visuals for students to conduct activity.

Background Information:

Adaptation- changes in the structure or behavior or an organism to become better fitted for survival and reproduction in its current environment

There are 5 types of seed dispersal Mechanisms.

1. Wind- Seeds from plants like dandelions and cottonwood trees are light and have feathery bristles and can be carried long distances by the wind. Some plants, like maple trees, have 'winged' seeds. They don't float away but flutter to the ground. With wind dispersal, the seeds are simply blown about and land in all kinds of places. To help their chances that at least some of the seeds land in a place suitable for growth, these plants have to produce lots of seeds.

2. Water- The seeds float away from the parent plant. Mangrove trees live in estuaries. If a mangrove seed falls during low tide, it can begin to root in the soil. If the seeds fall in the water, they are carried away by the tide to grow somewhere else. Pond lilies and lotuses also use water dispersal. They have a hard seed coat that allows them to float.

3. Animal- Animals disperse seeds in two ways: ingestion and travel. Animals that feed on seeds and fruits of trees may ingest seeds that animals may later excrete in other areas, providing nutrients for that seed to germinate. Some plants also have "poky" or sticky seeds that can attach to fur, feathers, skin, and clothing which also transports seeds to new areas.

4. Explosion- Some plants, like peas, gorse and flax, have seed pods that dry out once the seeds are ripe. When dry, the pods split open and the seeds scatter.

5. Fire/Heat- There are some species of coniferous trees that require the heat from a fire before their cones will open and release seeds. The intensity and timing of the fire is important. It needs to be hot enough to trigger the cones to open, but if fires are too frequent, there is not enough time for the plants to grow big enough to make new seeds.

Watch how heat opens a cone to release seeds!
Youtube: Serotinous Cone in Toaster Oven Time Lapse Video (Time: 1:46)
https://www.youtube.com/watch?v=KSiqZ-Asp3c

Watch how explosive seed dispersal works!
https://thekidshouldseethis.com/post/exploding-plants-spread-their-seeds-with-high-pressure-bursts

Seed Matching Answers:

Wind Dispersal
- Big Leaf Maple
- Black Cottonwood
- Dandelion
- Mountain Mahogany

Water Dispersal
- Lotus species
- Black Cottonwood
- Dandelion
- Yellow Pond Lily

Animal Dispersal
- White Oak
- Houndstongue
- Thimbleberry

Fire/Heat Dispersal
- Knobcone Pine
- Sequoia
- Lodgepole Pine

Explosive Dispersal

- Pea Species
- Violet Species
- Cobra Lily

Seeds

What type of Dispersal Adaptation does each seed Use?

Wind, Water, Animal, Explosion, or Fire/Heat

(Hint: Some seeds use more than one dispersal adaptation.)

Big Leaf Maple 	**Knobcone Pine** 	**Lotus Species** 
White Oak 	**Pea species** 	**Black Cottonwood** 

Dandelion	**Sequoia**	**Violet Species**
		
Cobra Lily	**Mountain Mahogany**	**Houndstongue**
		
Lodgepole Pine	**Thimbleberry**	**Yellow Pond Lily**