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# K-12 Partnership Lesson Plan

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# *How Seeds Get Around*

# *Inquiry learning about seed dispersal*

## Overview

In this lesson, students will learn the characteristics that help seeds to disperse and the variety of ways that seeds can get around! Dispersal is important for plants (and animals, too) because it helps young organisms to avoid competing with their parents for resources and to escape seed predators. Different species of plants produce seeds with different adaptations for dispersal. Some seeds, like those of the dandelion, rely on the wind to carry them. Other seeds are encased in fruit, and rely on animals to eat them and deposit their seeds elsewhere. This topic connects to many K-4 topics, including organism’s needs in their environments, competition, adaptation, survival, reproduction, and plant life cycles. Additionally, this lesson helps students practice multiple important inquiry skills that encompass many steps of the scientific method.

**Objectives**

At the conclusion of the lesson, students will be able to:

* Describe different adaptations seeds have that help them to disperse
* Make predictions about how a seed is likely to disperse
* Collect data and record findings in simple charts
* Summarize data from charts into sentences
* Compare findings among types of seeds
* Compare findings between groups that may have tested the same or different types of seeds
* Recognize that repeating a test should provide similar results to previous tests

**Length of Lesson**

Two 45-min class periods

**Grade Levels**

K-4

**Standards covered (NGSS)**

Disciplinary Core Ideas:

* **K-LS1-1**: use observations to describe patterns of what plants and animals (including humans) need to survive
* **2**-**LS2-2**: develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants
* **4-LS1-1**: construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction

Cross Cutting Concepts:

* Structure and function

Science and Engineering Practices

* Planning and carrying out investigations
* Analyzing and interpreting data
* Engaging in argument from evidence
* Obtaining, evaluating, and communicating information

***Previous Michigan Standards Met:***

* **S.IP.00.13**: plan and conduct simple investigations
* **S**.**IA.00.13**: communicate and present findings of observations
* **L**.**OL.02.14**: identify the needs of plants
* **L**.**OL.02.22**: describe the life cycle of familiar flowering plants including the following stages: seed, plant, flower, and fruit
* **L**.**HE.02.13**: identify characteristics of plants (for example: leaf shape, flower type, color, size) that are passed on from parents to young
* **L.OL.03.31**: describe the function of the following plant parts: flower, stem, root, and leaf
* **L**.**EV.04.22**: identify how variations in physical characteristics of individual organisms given them an advantage for survival and reproduction

**Materials**

* Colored pencils
* Cups of water
* Straws
* Meter sticks
* Magnifying glasses
* Felt fabric
* Scissors
* Different seed types (sunflower, bean, milkweed, prairie mix)
* Powerpoint on seed dispersal
* Dispersal worksheet
* Seed storybook (guided and blank versions)

**Background**

 Seeds have many characteristics that help them to disperse away from parent plants. Why is it so important that seeds disperse? By moving away from their parents, plants and animals can avoid competing with their parents for resources. Dispersal can also decrease predation risk for young plants and animals because predators often search for prey where they are most common. However, it is possible for a seed to disperse too far. If the seed needs specific conditions to grow, the farther away from the parental plant it moves, the less likely it is to grow in a good spot. Plants disperse as seeds because this is a plant’s one opportunity to move around; once it starts growing, plants don’t change locations. In contrast, dispersal in animals can happen early when young are still in eggs or late once young have reached maturity. We focus on plant dispersal in this lesson, but many of the ideas we cover apply similarly to animals.

### Activities of the session

**PART 1** (first 45-min class period)

1. Introduction
	1. Present PowerPoint to introduce students to different adaptations seeds have for dispersal and why it’s important to disperse. PowerPoint also includes animal dispersal examples.
2. Exploring and experimenting with seed dispersal.
	1. Students use the “Dispersal Worksheet” to record what they learned from the PowerPoint and to guide them through the experiment.
	2. The following steps are also on the worksheet. Students can work in small groups.
		1. Collect seeds: 3 seeds of each of 3 different types (change the numbers based on the # of seeds and seed types you can access).
		2. Predict how seeds will disperse.
			1. Describe what seeds look like.
			2. Predict how they will disperse.
			3. Explain your prediction using what the seed looks like.
		3. Experiment!
			1. Test each seed by the following methods: wind, air, animal fur, (likelihood of being) eaten, water.
			2. Students record findings in provided data table.
			3. Students summarize findings under data table through questions provided.
	3. Have a class discussion of students’ findings.
		1. Did results match their predictions? Why or why not? If not, this is a totally acceptable part of the scientific process. Predictions give scientists something direct they can test. The results are still interesting regardless of whether the results match the prediction or not. Let your students feel comfortable sharing predictions that weren’t supported by the data. Have them explain their reasoning before the experiment and how they think differently after the experiment.
		2. It is also okay if students find that some seeds succeed using multiple methods. It’s likely that the seed adaptations maximize the success of dispersal by one method. However, being adapted for one method doesn’t mean seeds couldn’t be dispersed by another method. You could discuss some unexpected successes (e.g., maybe a berry we’d expect to get eaten also floats).
		3. How did the experiment change what they think about how seeds look? Will they be more likely to look at seeds the next time they go outside?
		4. The experiment focuses on major differences between seed types, but you can also talk about how seeds within groups might look different from each other. Have students describe any differences they notice.
		5. It would be great to take notes of the discussion on the board so you can revisit students’ ideas at the start of the next class period.

**PART 2** (second 45-minute class period)

1. Revisit the data or summarize the class discussion from the previous class.
2. Have students create “Seed Storybooks” that connect the scientific process with writing.
	1. Students pick a seed and write about how the seed disperses based on their experiences with the experiment.
	2. Here are the core elements that should be included in the book.
		1. What the seed looks like.
		2. The seed starts on the parent plant, and there are other seeds there, too.
		3. Two (or more) methods of dispersal are tried by the seed’s “brother and sister” seeds, but these methods don’t work. Ex: if a seed is encased in a berry, it will sink in water and is too heavy to be blown by the wind. Students should explain why the seed’s characteristics made it unsuccessful by this method.
		4. One method of dispersal that the “main character” seed of the story tries, which is successful (e.g., the berry is eaten by a bird, and the seed is deposited elsewhere.) Students should explain why the seed’s characteristics made it successful by this method.
		5. Show the seed that used the successful dispersal method developing into a plant in a new location.
	3. Two storybook templates are available (Feel free to create your own!)
		1. Guided: This instructs students on what to draw on each of 8 pages and provides “starter” sentences to guide them to write about specific ideas.
		2. Blank: This provides the 8-page book structure with space for drawing and writing but doesn’t include any prompts.

**Resources**

* Dispersal powerpoint, student worksheet, and seed book (guided and blank) available on the “How Seeds Get Around” lesson page on the KBS GK-12 website.

**Extensions and Modifications**

Instead of writing individual stories, you could write one story as a class. Then make copies of the story and let students complete the illustrations. Read the class book aloud as each student reads along in their own illustrated book.

Collect seeds from outside and test these using the different dispersal methods.

Review the animal examples of dispersal and have students come up with examples of animals and how they might disperse. It would also be interesting to discuss how old they think those animals need to be before they can disperse. Animals with lots of parental care (many mammals and birds, like dolphins, bears, rabbits, robins and eagles) don’t leave their parents until months or years after they are born. Other animals, like insects, leave as soon as they hatch from eggs. And some animals, like sea urchins, send eggs and sperm out to sea before they even become fertilized eggs!

Have students collect seeds from habitats they are familiar with, such as their backyard.

**Assessment**

 Have students imagine their own seed, predict how it will disperse, and describe how its physical characteristics make that dispersal method most likely.

 Have students collect household objects that share certain characteristics with different seed types (e.g., a cotton ball could be similar to a wind-dispersed seed, a bright red ball might be similar to a seed that gets eaten by animals, Velcro could be similar to seeds with hooks that attach to animal fur.) Bring in those objects and test them by the different methods of dispersal (wind, water, etc.). Students should make predictions before testing and record their data in the data table. Remove “seed type 1”, etc, so students can write in the objects they pick.