

Seed Dispersal



Submitted By:

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Overview

Students will perform hand-on activities and experiments to learn about seed dispersal.

Grade Levels

3rd grade

Curriculum Correlation

3.L.2.1, 3.L.2.2

Duration

2 to 3 class periods

Location

Outdoors and Classroom

Materials

1. Where'd I put that acorn?: Objects to represent nuts (10 for each student) can be acorns, pasta, dried beans, etc.
2. Traveling Seeds: Seed bomb supplies (mixture of clay & potting soil, water, and wildflower seeds), 4 buckets to hold seed bombs, and an open space outside you can plant your seed bombs.
3. Seed Dispersal Walk: Magnifying lens and something to gather seeds in.
4. Floating Seeds: Large bowl, sink, tub or aquarium to fill with water, Seeds or fruits to test for ability to float: coconuts, cranberries, pinto bean or other dried bean, etc.
5. Wind Dispersal: 6 water balloons, funnel, straw, flour, knife, towel
6. Seed Dispersal Design Challenge: Any household & craft materials such as: scrap paper, cardboard boxes (cereal boxes, cracker boxes etc.) drinking straws, string, 3x5 index cards, rubberbands, paperclips and scissors. To make it more of a challenge do not include tape, glue or velcro in your supplies.

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Learning Targets

1. Students will be able to name the most common ways seeds disperse by wind, water and animals.

Educators Information

Educators Information is from Plant Adaptations for Pollination and Seed Dispersal by Exploring Nature, www.exploringnature.org

Plants and Animals

Plants and animals need each other. It's not hard to see why animals need plants – most animals eat plants and cannot live without them. Even animals that eat other animals are dependent on plants because without them their plant-eating prey would not exist. Plants, on the other hand, make their own food with photosynthesis – using sunlight, water and the carbon dioxide. Yet if all the animals disappeared from the planet, most plants would disappear as well. Why?

Plants need help to pollinate and spread their seeds. Some plants – about 10% – use the wind for pollination- from the mightiest redwood to the smallest blade of grass. Yet most plants need the help of animals to get the job done.

Spreading Seeds

Getting its seeds spread is even harder for plants, as they are much larger than pollen and need to move away from the parent plant to avoid competing for sunlight and water. Besides for pollination, the wind does help spread many seeds. Those plants have adapted seed shapes to ride the wind as far away from their parent plant as possible. It's fun to see how plants have adapted their seeds for wind dispersal.

The seeds of the sugar maple are built into a flat propeller, called a samara, that helicopter

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away from the parent tree. The elm has a round samara that works in much the same way, where the linden tree has a long, flat wing attached to its seed stem that spins it away like a wind-driven top.

Some plants – like fuzzy goats beard and dandelions – have a globe of fluff that break up into a mass of parachutes, each holding one seed, called an achene, spinning off far and wide in the wind.

Sometimes seeds burst from a pod, like the milkweed, and float off on silken strands. Fluffy seeds burst off the rod-like head of a cattail too – each spike releasing a million seeds. Even the giant cottonwoods release seeds attached to a tuft of fluff to float away on the breeze.

A few seeds are carried by water, like the mango or coconut. Others spread their seeds explosively with catapulting seedpods – like jewelweed.

Putting the Animals to Work

Plants are also tricky about getting animals to carry off their seeds. Many plants develop a fleshy fruit around their seeds to attract animals to eat them. The seeds are spit out nearby or can survive the animal's digestive tract. When they are “deposited” at the other end, they will sprout into seedlings. Plants like apples, pears, raspberries, and many, many others use this trick to get animals to help disperse their seeds. This works especially well with animals like squirrels and chipmunks that collect the seeds and “hide” them for later use. For an acorn, this is not only spreading the seed, but getting it planted in the ground as well.

A few plants even get their seeds spread by making them stick to whomever walks by. They use hooks, barbs, spurs and burs. You have probably seen the seeds of cockleburs, beggar's-ticks, or burdocks stuck in your dogs' fur or even on your own socks. Even many grasses, like foxtail barley and bur-grass, have hooked seeds.

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Seed Dispersal Walk:

Go outside for a nature walk and look for seeds, particularly in the fall. Observe them and try to figure out how their structure helps them get from place to place. Look at them through a magnifying glass. Toss them in the air. Blow on them. Put the seeds in a puddle. See if they will stick to your sleeve. Think about where you see seeds and how they got there. This is a great way to start your seed dispersal unit.

Seed Dispersal Activities: This is best done in the fall when seeds are present. Students will explore the way seeds are dispersed, you can make this a stations activity or divide these activities up so you do one a day.

1. Animal Dispersal:

Where'd I put that acorn?: Give each student ten “nuts” (e.g. dry pasta pieces, acorns, pasta, popcorn, dried beans) to hide around the school yard. You may want to lay out cones or signs to show students the perimeters of the playing field so they don't hide their “nuts” too far away.

Review strategies for seed dispersal, one of them being distributed by animals, such as squirrels and chipmunks.

Acting like squirrels, students should now try to hide their “nuts” without others seeing the hiding places. Explain that they will have a chance to retrieve their hidden “nuts” in a while.

This game is best started at the beginning of class /lesson and completed at the end, so around 30 minutes later.

Tell students they must now try to find their ten “nuts” that they hid. Give students 5 to 10

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minutes to find as many nuts as they can. Have students count how many nuts they found and you can tally the number of nuts they didn't find. You can discuss with students what might happen to the nuts (seeds) when not found. Explain that some may have been found and eaten by another animal, but that some will grow into an oak tree from that seed.

Squirrels find about 75% of the nuts that they hide and store. But what they do not find either becomes food for another animal or a new tree. Squirrels are nature's foresters, planting new trees each season.

Traveling Seeds: In this game students will first make wildflower seed bombs (2 days ahead of time) and disperse the seeds much like an animals does when they poop.

You can have a lot of fun with this concept. After students have made the seed bombs (see directions following) and they are dry, you can play this fun relay race to disperse them.

Making Seed Bombs

Materials: wildflower seeds, air dry clay, garden or potting soil, water, cookie sheet and parchment paper for drying the seed bombs

This project can get a little messy, so go outside to mix everything, or at the very least make sure you're near a sink so you can clean up when you're done!

Start by mixing about 5 parts clay to 2 parts dirt in a large mixing bowl. Pour in the seeds, and a tiny amount of water, and start mixing it all together with your hands. The exact proportions aren't super important here, but start with just a small amount of water and add more later if needed. I used about a third of my 2.2 pound block of red air dry clay, two small handfuls of dirt, about a quarter cup of water, and four packets of wildflower seeds, and it made about 15 seed bombs.

Keep mixing the dirt/clay mixture with your hands, making sure to break up any chunks of clay or dirt as you go. If it's too wet, add a little more dirt; if it's too dry, add a little more water. You want it to end up like cookie dough; not too sticky, but not dry either.

Once your mixture looks like cookie dough, grab small handfuls and roll them into balls. Set them aside to dry on a cookie sheet lined with parchment paper. Unlike balls of actual cookie dough, these don't expand or change shape at all as they dry, so you can put

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them close together if you need to!

The seed bombs might take a day or two to dry, depending on the humidity in your area.

Ready to Start the Game:

Head out to an open field where it is ok to disperse some seed bombs. You will be setting up a relay race with 2 buckets full of seed bombs at one end of the playing field and 2 empty buckets at the other end. Explain that students will be demonstrating one way that animals help disperse seeds, by eating fruit, digesting the seeds, and pooping them out later in a different area.

Students are to form 2 lines behind the filled seed bomb buckets. One at a time students are to try and get the seed bombs to the empty buckets on the other side of the open field. The catch is that students will be transporting the seed bombs either between their legs or balanced between their feet.

On your signal, start the relay race. There should be lots of giggles and if a student drops a seed bomb that is OK, they are dispersing the seeds and should just continue to the other side. Once all seed bombs have either made it to the other side or been dispersed along the way, have students gather up. You can now disperse all the remaining seed bombs in an open field, seeing how far students can throw them.

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2. Water Dispersal

Floating Seeds: This activity idea is from Growing with Science, <http://blog.growingwithscience.com/2015/09/plant-science-seed-dispersal/>

Seeds - like the sea bean - can float from place to place. They don't have to be in a big body of water like the ocean, either. A small trickle created by a downpour of rain may be enough to float seeds away.

Gather: Large bowl, sink, tub or aquarium to fill with water, Seeds or fruits to test for ability to float: coconuts, cranberries, a pinto bean or other dried bean, etc.

Predict what will happen to each item and then test each item. Let the seeds or fruit float as long as possible to show that they might reach land without sinking. You might want to cut open a cranberry to show the seeds inside. (Remember that cranberries are harvested by floating them in ponds). Is a cranberry that has been cut open still able to float?

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3. Wind Dispersal

Balloon Seed Pod Dispersal:

Activity idea and photo from LittleBlast Blog,

<http://www.littleblastblog.com/2015/04/spreading-seeds-from-pods-second-water.html?m=1>

Supplies: 6 water balloons, funnel, straw, flour, knife, towel

Attach the water balloon to a funnel. Place about half a teaspoon of flour in the funnel and force into the balloon using a straw. Remove the water balloon from the funnel and carefully inflate and tie off. Make 2 balloons very big, 2 medium, and 2 smaller. Launch your balloons onto grass and see what happens. If you can launch the balloons from a balcony or 2nd story window you can simulate a tree dropping seed pods a bit better. Take a balloon that did not pop and place it on a surface, such as a towel and pop with a knife to see the seed dispersal.



Record with students what each balloon did and if the size (small, medium, or large) of the balloon effected how to popped. Did the seed pod balloon pop on impact or roll on the ground first? Does this happen in nature too?

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Seed Dispersal Design Challenge

This engineering challenge will be to design three different seeds and test out their abilities. Students will design one that is meant to fly in the breeze, one that will float in water, and another that will stick to something fuzzy.

Students can use any household and craft materials for their design challenge. I suggest items such as: scrap paper, cardboard boxes (cereal boxes, cracker boxes etc.) drinking straws, string, 3x5 index cards, rubberbands, paperclips and scissors. To make it more of a challenge do not include tape, glue or velcro in your supplies.

Although most seeds are fairly small, student's designs can be as big as they'd like, as long as they float, fly and stick you've accomplished your goal! Students can work individually or as teams.

Once students have created a seed that they think will fly, test it out! If it is a dry day you can take their seed outside, or (keeping safety in mind) drop it out an upstairs window. You can also set up a fan and test it indoors. (Please watch out for little fingers!)

How did their seed do? Do they need to redesign and try again?

You can test floating seed in the sink, a basin or stream.

Find a fuzzy blanket, fleece jacket, or tall sock to test your sticky seed out. How well do they work? It is okay to tweak their design, that is what professional engineers do!

Once you are finished, you might want to learn more about seed adaptations. What different shapes do seeds come in? Can students find any that look like the seeds they created?



Supplemental Reading

[Flip, Float, Fly: Seeds on the Move](#) by Joann Early Macken

[The Dandelion Seed](#) by Joseph P. Anthony, Cris Arbo