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Burlington County Parks

Have Seeds, Will Travel

All living things have some system for reproducing. By observing, collecting, and classifying seeds, students are introduced to one aspect of a plant's reproductive system. This lesson can be modified to fit grades K-8.

Objectives:

Students will observe the many kinds of seeds that plants have for reproduction.

Students will sort and classify plant seeds based on methods of seed dispersal.

Grades 3-8: Students will infer that knowledge to act out seed dispersal methods for others to guess.

Grades K-2: Students will demonstrate how they use their sense of touch to explore and respond to the environment around them.

Next Generation Science Standards:

K-ESS2-1, 1-LS1-1, 1-LS3-1, 2-PS1-1, 2-LS2-2, 2-LS4-1, 3-PS2-2, 3-LS4-3, 3-LS1-1, 4-LS1-1, 3-5-ETS1-2

MS-LS1-4, Extension: MS-ETS1-2, MS-ETS1-3, MS-ETS1-4

Description

Background info:

All living things have some system for reproducing. Most plants reproduce by seeds and require proper environmental conditions in order to grow and germinate. In order to have a better chance of growing and not competing with the parent plant, plants have developed ways to disperse their seeds. Some plants use wind to disperse their seeds. They have very light seeds that float on the wind. Maple, ash, tree of heaven and tulip trees have samaras, papery helicopter-like seeds that twirl. Others like dandelion and milkweed have fluffy parachute/umbrella-like seeds that drift on air currents.

Many plants use animals to disperse their seeds. Some have Velcro-like hooks called burs that attach to animal's fur or people's clothes. Examples of these plants in our area of NJ are tick trefoils, stickseed, beggar ticks, and burdock. Some have tasty fruit which animals eat and then poop out the seeds in a

different location. Others have nuts that are collected, stored, and subsequently buried by animals like squirrels and chipmunks.

Some plants eject their seeds by force. Witch hazel, jewelweed, and certain members of the pea family use this method. Certain types of pines have cones that are closed & sealed with resin until a forest fire occurs, such as pitch pine in the NJ Pinelands. The high temperature from the fire melts the resin on the cone and the seeds are released onto the ground. The newly-burned ground provides optimal conditions for growth.

Lesson plan:

For safety reasons, always check for nut allergies that students might have before picking up or touching nuts. Plastic replicas of certain common nuts can be purchased if necessary, or photos can be printed out. In the fall, tell students not to pick up fallen "oval" leaves which may be poison ivy leaves.

For students in grades K-2:

Preparation: find a natural area in autumn (best) or spring when seeds are likely to be on the ground. Collect a few of each kind of seed from the ground, making sure to find a variety of seed structures and textures. Place one of each seed type in a "mystery box." The mystery box can be any cardboard box with a hole cut into the side or top. The hole should be just big enough for a hand to fit comfortably through. The hole can be taped to make it smooth and prevent students from peeking in. Also label a 2nd plain cardboard box marked "WIND", and a 3rd cardboard box marked "ANIMALS."

Activity: If possible, take students to the natural area you previously visited to collect the seeds. If this is not possible, the extra seeds that were collected can be brought into the classroom. Ask one student at a time to reach into the mystery box to feel one of the seeds. Ask them to describe how it feels. Can they identify the objects using only their sense of touch?

Give each student a bag. Have each student search for the seeds that they think matched the seed they felt in the mystery box. Once they have some seeds, pull one object out at a time from the mystery box. Have the students hold up the object they collected that they think matches the seed they touched. Once the match is made, try to match the seed to the actual tree or other plant that it belongs to. Students can then proceed to pick up other seeds they might find on the ground and put them in their bag.

Either at a picnic table or back in the classroom, have each student dump out their seeds. Have the students sort out the seeds that are the same into piles for 1 class collection. Once the seeds are sorted, they can be classified again by the way they are dispersed. Have the students find all the seeds that are light and would float on the wind and put them into the box marked "WIND". Then have the students find the seeds that they think would be spread by animals and put them in the "ANIMALS" box. (Some seeds like sycamore and sweetgum might be both). Discuss as a group how the seeds are spread by animals in different ways.

Possible extensions:

- Students can plant some of the seeds they collected to see if they grow
- Set up a bird feeder on a window sill or close to the window to see which kind of seeds birds like best

For students in grades 3-8:

Preparation: find a natural area in autumn (best) or spring when seeds are likely to be on the ground. Mark a plain cardboard box with the words "WIND", and a second cardboard box labeled "ANIMALS." For older students in middle school, make a third box marked "OTHER." Print out copies of the seed dispersal methods list and photos of the jewelweed seeds & tick trefoil seeds (provided). Cut each of the seed dispersal methods into single strips.

Activity: Take students to the natural area you previously visited to find seeds. If this is not possible, the seeds can be collected ahead of time brought into the classroom.

Give each student a bag. Have each student search for different kinds of seeds on the ground and put them in their bag. Try to match the seed to the actual tree or other plant that it belongs to. Older students should use field guides to figure out the species.

Either at a picnic table or back in the classroom, have each student dump out their seeds. Have the students sort out the seeds that are the same into piles for 1 class collection. Once the seeds are sorted, they can be classified again by the way they are dispersed. Have the students find all the seeds that are light and would float in the wind and put them into the box marked "WIND". Then have the students find the seeds that they think would be spread by animals and put them in the "ANIMALS" box. (Some seeds like sycamore and sweetgum might be both). Discuss as a group how the seeds are spread by animals in different ways. Come up with subcategories for animal seed dispersal (eaten by animals, stored by animals, stick to animals). If there are some strange seeds that are ejected or cones that open with fire, they can be placed in the box marked "OTHER." Show the students a picture of the jewelweed seeds as an example of seeds that are ejected by force, and the burs if none were found.

Divide students into groups of 6. Now place the 6 seed dispersal method paper strips upside down on a table or hand them out randomly to the student groups. Give the students time to come up with a way to act out or personify the seed dispersal method they were given, without the other groups hearing what they are saying. This involves teamwork and cooperation! Once the groups are ready, have one team go at a time and have the other students try to guess which seed dispersal method they are acting out.

As a conclusion, ask students: How does a seed's shape and size affect its dispersal? Why is it important for seeds to be dispersed in different ways? Can some seeds spread farther than others?

Middle school students can further research the seed structure and learn about seed-bearing plants vs. those that do not have seeds to reproduce (spores) like ferns, mosses, and horsetails. This can connect with **NGSS MS-LS3-2**.

Possible extensions:

- Students can plant some of the seeds they collected to see if they grow
- Set up a bird feeder on a window sill or close to the window to see which kind of seeds birds like best
- Students can design their own seeds with specialized dispersal mechanisms, which involves engineering concepts. (**MS-ETS1-2, MS-ETS1-3, MS-ETS1-4**)