Lessons at a Glance

2nd Grade
Mighty Migrations: How Seeds and Pollen Travel

Overview:

Students investigate the driving question, "How do seeds and pollen travel?" After creating garden agreements together, students begin the unit by examining dispersal structures on diverse seeds in order to construct explanations for how seeds travel. Students continue investigating seed structures that allow them to cling to fur , soar through the air, or travel away from their parent plants in other ways. Students apply this knowledge to design a solution that allows a bean seed to soar for as long as possible. Then students investigate pollinators and determine how pollinators help plants reproduce. At the end of the unit, students design a pollinator wand based on the structures of, and systems connecting, flowers and pollinators. This unit is designed for students to make progress towards **Performance Expectation: 2-LS2-2. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants**.

Mighty Migrations: How Seeds and Pollen Travel	
NGSS Performance Expectation	**2-LS2-2. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.**
Driving Question	**How do seeds and pollen travel?**
Lesson 1	**Welcome to the Garden Classroom!** Students introduce themselves, create group agreements, and then go on a seed-focused scavenger hunt in order to begin to form a personal connection with the Garden Classroom.
Lesson 2	**Seed Ya Later** Students examine dispersal structures on diverse seeds in order to construct explanations based on evidence for how they think each seed travels.
Lesson 3	**Hitchhiker Seeds** Students make observations of seeds that cling to fur in order to construct explanations for how seeds' structures allow them to stick to things and travel.
Lesson 4	**Seeds that Soar** Students make observations of seeds that soar in order to develop a physical model of a seed dispersal structure.
Lesson 5	**Seed Engineers** Students plan and carry out investigations based on different structures of samaras in order to design a solution that allows bean seeds to soar for as long a time as possible.
Lesson 6	**From Flowers to Fruit** Students construct explanations based on evidence in order to determine how pollinators contribute to the changes in flowers and help a plant reproduce.
Lesson 7	**Pollinator Power** Students engage in argument from evidence in order to explore how flowers and pollinators work together in a system.
Lesson 8	**Designing Pollination Wands** Students design solutions to create pollination wands based on the structures of, and systems connecting, flowers and pollinators.

Seed Ya Later

Objective: Students examine dispersal structures on diverse seeds in order to construct explanations based on evidence for how they think each seed travels.

2nd GRADE OUTDOOR FALL 45 MIN

Lesson Summary

In this lesson, students observe different seeds and place them into groups based on how they think the seeds travel. Through discussion, students figure out the 5 main ways seeds travel. Then students search for seeds in the garden and classify them by their travel method.

Next Generation Science Standards

Disciplinary Core Idea

LS.2.A. Interdependent Relationships in Ecosystems - Plants depend on water and light to grow. Plants depend on animals for pollination or to move their seeds around.

Science and Engineering Practices

Constructing Explanations and Designing Solutions - Constructing explanations and designing solutions in K-2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.

Crosscutting Concepts

Structure and Function - The shape and stability of structures of natural and designed objects are related to their function(s).

Materials

- ❑ Whiteboard or chart paper
- ❑ Markers
- ❑ Pictures of seeds that travel in different ways (available at the end of the lesson)
- ❑ 1 envelope for each group of 4 students
- ❑ Photocopied sentence frames to display (available at the end of the lesson)
- ❑ Samples of real seeds. Examples include the following:
  - Soaring seeds: Ash, elm, linden, maple, dandelion, milkweed, goldenrod, thistle, columbine, etc.
  - Velcro seeds: Any burr that gets stuck to your sock in a grassy field (you or your students can use a blanket dragged over a grassy area or take a walk with big socks on over your shoes to gather these)
  - Seeds wrapped in an edible package: Seeds inside of fruits, and nuts
  - Floating seeds: palm, water lilies, coconuts
  - Explosive seeds: Seeds that spring away from their parent plants, like impatiens, sweet peas, lupines, California poppies, and pansies
- ❑ 1 bucket of water
- ❑ Seed Ya Later handout for each student
- ❑ Edible seeds to eat with students (i.e. pumpkin seeds, fava beans)

Preparation

- ❑ Write onto chart paper, "**Ways Seeds Travel**," leaving space underneath to record students' ideas.

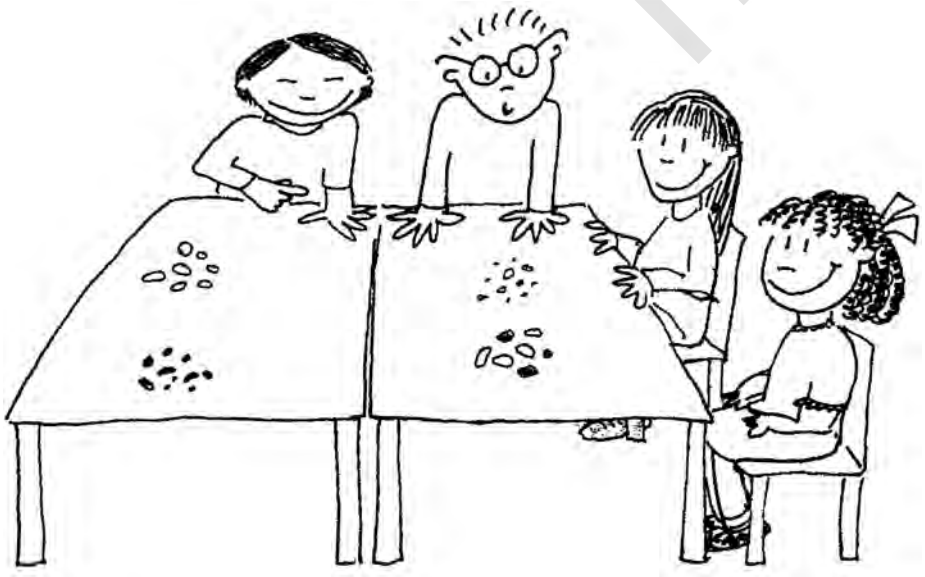
❑ Create a set of 8 seed pictures for each group of 4 students. To do this, photocopy pictures of seeds (available at the end of the lesson), cut along dotted lines, and place all 8 pictures into an envelope for each group.

Engage

1. Invite your students thinking about travel. ***Some people grow up and live in the same place their whole lives. Other people travel away and settle in new neighborhoods, cities, and even sometimes in new countries! Let's think about how people travel. Turn to your neighbor and work together to create a list as long as you can of all the ways that you can think of that humans travel.*** Have students share their answers out to the whole group.
2. Connect this concept of travel with the topic of today's lesson: seeds. ***Now we are going to talk about how seeds travel. A seed has a baby plant inside of it, and for that baby plant to grow, it needs to land in a place where it won't have too much competition from other plants for water and nutrients. Since a parent plant can drop thousands of seeds at a time, many seeds will need to end up at some distance from their parent plant to survive. But seeds aren't like us. They can't take walks or drive cars or travel in many of the ways we travel. Today we are going to look at a variety of seeds and try to figure out how they are able to travel away from their parent plant.***

Explore

1. Demonstrate how to sort seeds by placing a piece of chart paper on a table or the ground, dumping seeds and/or seed pictures in the middle, and then sorting them into piles based on how you think they travel. In order to ensure that you don't give away all of the answers, focus on just one method of travel, by saying something like: ***Hmm, these two seeds are shaped like boats, so I'm going to put them together because my guess is that they float on water.*** Demonstate how students can test this idea by floating their seeds in the bucket of water. Then put those seeds together on the chart paper, and then use your marker to label that pile of seeds with the words "Float on water." Make sure your students know they should not taste any of these seeds, and also let them know that any given seed could travel in more than one way.
2. Get students into teams of four. Give each team of four a piece of blank chart paper, a marker, and an envelope of seeds or pictures of seeds.
3. Have them look at the seeds carefully and group them together and label them based on how they think they travel. Using the word "**structure**," encourage your students to look for clues on the seeds themselves, such as structures that look like hooks or wings, or a structure with the shape of a boat.



Explain

1. Read the sentence frame aloud:
   We think this seed travels by _____. We think this because _____.
2. Ask everyone in the class to prepare with their team to hold up one seed and share how they think it travels and why, using the sentence frame. Explain that you might call on anyone in the group, so they should make sure every person in their group feels prepared to share. Give them a few minutes to discus and prepare.
3. Call on one representative from each team to use the sentence frame on the chart paper to share one seed, making a claim regarding how they think that seed travels, and supporting their claim with evidence. Use their ideas to create a list on the chart paper labeled "How Seeds Travel.".

Relevant Common Core English Language Arts Standards

CCSS.ELA-LITERACY.SL.2.1

Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.

CCSS.ELA-LITERACY.SL.2.6

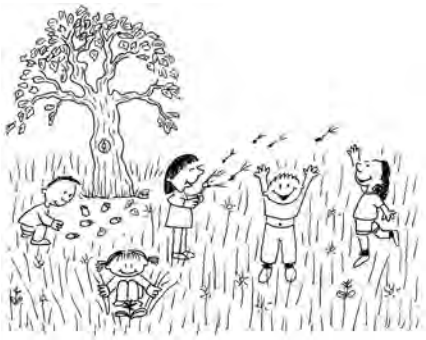
Produce complete sentences when appropriate to task and situation in order to provide requested detail or clarification.

4. If the class list doesn't yet mention any of the following categories for seed dispersal, add them at this time (the specific term for each category is not important, as long as they have each general concept represented on the class list):
   - Soaring/Flying: ***Some seeds soar on the wind. Has anyone ever blown a dandelion flower that has gone to seed and watched the seeds fly away?*** Demonstrate, if you have soaring seeds.
   - Fur/velcro: ***Some have little hooks that allow them to stick to the fur of animals that are passing by. The seeds fall off much later in faraway places. Has anyone ever had a seed stuck to their sock?*** (Show an example). ***Did you know that Velcro was, in fact, invented in 1941 by a Swiss engineer named George de Mestral, who was inspired by the way the seeds stuck in his dog's fur after a hunting trip? He looked carefully at the hook-and-loop design of the seeds and fur, and mimicked this natural model to make Velcro! Does anyone have a pet at home that brings home seeds in their fur?***
   - Getting Eaten: ***Other seeds travel by being stored or eaten by a bird or other animal, and then being deposited somewhere else. Has anyone ever seen a squirrel bury a nut somewhere? Or has anyone seen a bird eat a berry and then deposit it (or poop it out) in another location? Did you realize that that bird might have been planting a berry bush?***
   - Floating on water: ***Some float on water, like coconuts.*** Float an example on water, if you have one.
   - Explosive: ***Other plants disperse their seeds by ejecting them forcefully so that they fall well away from their parent plant. When a sweet pea pod dries in the sun, for example, it opens up in a tight spiral, pushing the seeds away.***

Elaborate and Evaluate

1. Demonstrate for students how to find seeds in the garden. One great place to look is at the base of dead flowers.
2. Send students out into the garden or other outdoor areas to collect seeds. When they bring the seeds back, have students look at them together and use the sentence frame to share evidence-based theories about how each one travels.

3. Distrubute one Seed Ya Later handout to each student. Have them each choose one seed to illustrate. Review the ABC's (Accurate, Big & Colorful) of Scientific Illustration from **G1, L3: Illustrating Plant Structures**. Have them illustrate their seed and make an evidence-based claim regarding how they think it travels.



Celebrate

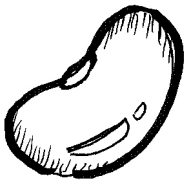
Eat seeds! Check for allergies first. Some great, edible seed options include:

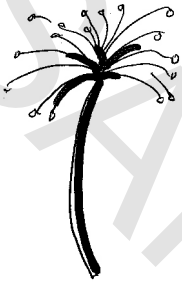
- Harvesting dry sunflower seeds from a sunflower to enjoy together.
- Harvesting or purchasing shelling peas and have students pop them out of their pods to enjoy them together.
- Harvesting or purchasing an ear of corn, cut the kernels off the cob and enjoy them together.
- Bringing in a coconut, floating it in a bucket of water, discussing how coconuts travel between islands in the ocean, and then eating pieces of the coconut or dehydrated coconut chips.
- Eating pumpkin seeds, popped popcorn or amaranth, or fava beans.
- Making a seedy trail mix.

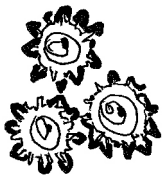
Extensions

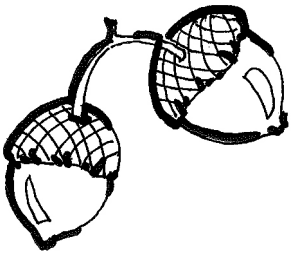
- Ask students to discuss: ***How do you think habitat might impact seed adaptations?***
- Read aloud or have students read a relevant informational text about seed dispersal, such as **A Fruit is a Suitcase for Seeds** by Jean Richards.
- You can also find texts by using a free, searchable online library of nonfiction books and articles categorized by grade-level, such as that found at **readworks.org** or using your school's language arts resource. As they read, have students pause regularly to identify the main topic of specific paragraphs. As they finish, have students work together to identify the main purpose of the entire book.
  - *CCSS.ELA-LITERACY.RI.2.6* - Identify the main purpose of a text, including what the author wants to answer, explain, or describe.
  - *CCSS.ELA-LITERACY.RI.2.2* - Recount stories, including fables and folktales from diverse cultures, and determine their central message, lesson, or moral.
- Read aloud or invite students to read a relevant literature book, such as **Who Will Plant a Tree?** by Jerry Pallotta. Pause regularly to have students ask and answer questions such as who, what, where, when, why and how.
  - *CCSS.ELA-LITERACY.RL.2.1* - Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.
- Read students a literature book about human immigration, such as **Pancho Rabbit and the Coyote** by Duncan Tonatiuh or **All the Way to America: The Story of a Big Italian Family and a Little Shovel** by Dan Yaccarino. Have students recount the story and determine the central message. Then have students discuss the parallels between human immigration and plant migration.
  - *CCSS.ELA-LITERACY.RI.2.2* - Recount stories, including fables and folktales from diverse cultures, and determine their central message, lesson, or moral.

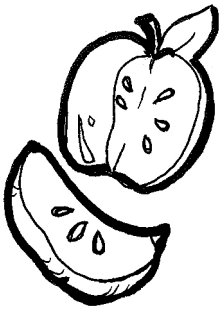
Seed Types











Name:_____ ***Date:***_____

Seed Ya Later

Scientific Illustration of My Seed

ABC's of Drawing

A – Accurate

B – Big

C – Colorful

Seed Claim

I think this seed travels by

_____

_____

I think this because

_____

_____

We think this seed travels by _____.

We think this because

_____.