
TEACHING LEARNING COLLABORATIVE (TLC)**LIFE SCIENCE****Seed Dispersal****Grade 4**

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Science Content Standards: Grade 4, 3d — *Students know* many plants depend on animals for pollination and seed dispersal, and animals depend on plants for food and shelter.

Lesson Concept: Seeds can be dispersed in different ways. Some seeds are dispersed by animals.

Conceptual Flow:

- ▶ Seeds travel to new places, sometimes by being carried by animals.
- ▶ Many plants depend on animals for pollination and seed dispersal.
 - Pollination is necessary to make a baby plant.
 - Pollen is transferred to another plant via wind, water, or animals (insects, birds, bats).
 - The result of pollination is a seed.
 - Inside each seed is a baby plant.
 - The baby plant will grow once the seed germinates.
 - Dispersal is necessary to move a baby plant (in a seed) to a new place to grow.
 - Seeds are dispersed to a new place via wind, water, explosion, or animals (birds, mammals, etc.).
 - Seeds have special structures to allow them to be dispersed.
 - Once in the new location, the seed will germinate, and the baby plant will grow.
 - The structures on seeds indicate their mode of dispersal.

Teacher Background:

Pollination is part of plant reproduction and is necessary to make a baby plant. Pollen (containing sperm) is transferred to the egg in the ovary of another plant. This movement of pollen can be by wind (as in grasses), water (as in tape grass), or by animals (as in most showy flowers). The animals that carry pollen from one flower to another are insects, birds, and bats. The result of pollination is a seed. Inside every seed is a baby plant.

Dispersal is also a part of reproduction, because a seed must move to a suitable location (with water and light) before it can germinate (open up and allow the new plant to grow). Seeds are dispersed via wind (as in dandelions), water (as in coconuts), explosion (as in lupines), or animals (as in burs). Seeds have special structures to allow them to be dispersed, which are usually easy to observe and decipher.

“The idea of plants and animals being mutually dependent was a topic of discussion in grade one. The concept can now be discussed at a much deeper level because students will have an emerging grasp of ecology and natural history. Many plants depend on bees, birds, and bats to pollinate their flowers. The resulting seeds may be scattered away from the parent plant by becoming entangled in the fur of animals. Other seedpods are moved and stored by animals in seed caches; some are consumed and deposited (still fertile) in animal wastes. The fruits of some plants are attractive food sources for animals. Plants often provide shelter for animals, hiding them from predators.”

— *Science Framework for California Public Schools: Kindergarten Through Grade Twelve*

Useful Websites

Offwell Woodland and Wildlife Trust

www.countrysideinfo.co.uk/seed_dispersal/index.htm

This British conservation and education website includes several pages of photographs about wind, water, and animal dispersal of seeds.

Missouri Botanical Gardens

www.mbgnet.net/bioplants/seed.html

This website has a plant biology page with sections on seed dispersal, pollination, and plant adaptations.

Accountable Talk

In Accountable Talk, students are able to discuss with a partner or in groups, a topic they are studying. The “stems” help students to focus their discussions and may be selected by the teacher; but the students should carry on the discussion with minimal interference from the teacher. Students will need to practice to listen to each other.

Accountable Talk sharpens students’ thinking by reinforcing their ability to build and use their knowledge. Teachers create norms and skills of Accountable Talk in their classrooms by modeling appropriate forms of discussion and by questioning, probing, and leading conversations. (from K-12 Alliance/WestEd Accountable Talk)

Accountable Talk Stems useful for this lesson:

I think it is ____ because _____.

We chose these items to be a category because _____.

I agree because _____.

I disagree because _____.

I observe _____.

This is similar because _____.

This is different because _____.

Materials Needed for the Lesson:

Teacher Preparation

- Collect a variety of seeds; ask students to also bring seeds to class
 - Types of seeds for categorizing: Round, burrs, winged, buoyant in water
 - For Explore #1 you will need 10 different seeds for each pair of students (place these in ziplock baggies for easy distribution).
 - For Explore #2 you will need a class set of 4 types of seeds: one that floats, one that is moved by the wind, one that can stick to an animal's fur, and one that rolls or is in a pod.
- Obtain for each pair or group of three: a clean sock or fake fur; cardboard to simulate wind; and a small plastic bowl of water.
- Make a transparency of "Traveling Seeds."
- Make a transparency of the "Seed Lab Chart" or draw the chart on the board
- Go to www.mbgnet.net/bioplants/seed.html which shows a video clip of seeds moved by wind and another clip of seeds shooting out of a pod. Decide when in the lesson you would show this to students.

Student Material and Handout

- Science Notebook (or a plain piece of paper for each pair of students for sorting seeds and one for each student for the evaluation)
- Student Handout: "Seed Lab Chart"

5E Lesson: Seed Dispersal

Teacher Does	Student Does	Concept
<p><u>ENGAGE:</u></p> <p>Write the following prompt on the board: “What do you know about seeds?”</p> <p>Ask students to think about the prompt for 45 seconds and then to talk with talking partner about the prompt. Then share with class.</p> <p>How might we describe some seeds? List these on the board: round, light, heavy, sticky, winged, feathery</p>	<p>Students think for 45 seconds about the prompt. Students talk with partner about the prompt. Then they share with the class.</p> <p>Expected Student Response (ESR): They are small; they grow into plants; there are many types of seeds; seeds have different shapes and sizes</p> <p>ESR: round, light, heavy, sticky, winged, feathery</p>	<p>Seeds are used for plant reproduction.</p>
<p><u>EXPLORE #1:</u></p> <p>Provide 8-10 seeds to each pair of students.</p> <p>Distribute blank paper to teams. Ask students to sort seeds into groups.</p> <ul style="list-style-type: none"> ▶ <i>Describe why you chose the categories. Be ready to share with another team. Use descriptive words – see some words such as, round, light, heavy, sticky, winged, feathery that are written on the board.</i> ▶ <i>Use Accountable Talk (AT) stem, “We chose these seeds to be a category because_____.”</i> <p>Ask teams:</p> <ul style="list-style-type: none"> ▶ <i>How did you group your seeds?</i> ▶ <i>What characteristics do the seeds in each category have in common?</i> ▶ <i>What advantage would it be for a seed to have a specific characteristic?</i> 	<p>Students work with their partner to sort the seeds.</p> <p>Explain to another team... students use AT stems when talking with each other and when talking to another team.</p> <p>AT stem “We chose these seeds to be a category because_____.”</p> <p>ESR: By color, by size, by shape, whether it sticks to things.</p> <p>ESR: These are all round; these are all dark, these are very light in weight.</p> <p>ESR: If it blends in then animals won’t eat see it to eat it; if it is sticky it could get on an animal; if it doesn’t weight much it could float.</p>	<p>Seeds have characteristics that can be described.</p>
<p><u>EXPLORE #2:</u></p> <ul style="list-style-type: none"> ▶ <i>Let’s look at characteristics of specific seeds.</i> <p>Model how to observe a seed and write characteristics on the “Seed Lab Chart.”</p>		<p>Seeds can be dispersed in different ways.</p>

Teacher Does	Student Does	Concept
<p>Provide Seed #1 and “Seed Lab Chart” to each student.</p> <p>Ask students to observe Seed #1 and to record characteristics in the first column on their charts.</p> <p>Have students share characteristics they observed. Record their observations on the transparency or on the board for Seed #1. Students can add to their charts any characteristics noticed by other students.</p> <p>Then distribute Seed #2; continue in the same manner as Seed #1 until all 4 seeds have been observed and characteristics recorded. All students should have completed the first column of their charts.</p> <p>▶ <i>You will test each of the seeds and record your findings on your “Seed Lab Chart”.</i></p> <p>Have students work in pairs or threes. Provide each group with a clean sock or fake fur; cardboard to simulate wind; and a small plastic bowl of water.</p> <p>Ask student groups to test each seed (#1, #2, #3, and #4) for each category: sticks to things, blown by wind, floats on water and to complete their “Seed Lab Chart.”</p> <p>Students could use the following AT stem during experiment: “I observe___” “I notice that _____” “I agree because _____”</p> <p>Ask students:</p> <p>▶ <i>Which of the four seeds would be most likely to be dispersed by an animal? Why?</i></p> <p>Go to www.mbgnet.net/bioplants/seed.html and show a video clip of seeds moved by wind and another clip of seeds shooting out of a pod.</p> <p>Show the transparency of “Traveling Seeds.”</p> <p>▶ <i>Look at the transparency – are there any illustrations showing a type of seed dispersal that we haven’t talked about?</i></p>	<p>Students follow directions.</p> <p>Students test each seed and complete their “Seed Lab Chart.”</p> <p>ESR: (Depends on what seeds were provided to students.) Those with stickers or barbs because it would stick or attach to an animal's fur.</p> <p>ESR: An animal eating seeds.</p>	

Teacher Does	Student Does	Concept
<p><u>EXPLAIN:</u></p> <ul style="list-style-type: none"> ▶ <i>What characteristics do seeds have that allow them to be moved to another location to grow?</i> ▶ <i>Why is seed dispersal important to a plant?</i> ▶ <i>Why couldn't all seeds just drop by the parent plant and grow there? What would be the disadvantage?</i> 	<p>ESR: With stickers to grab on animals and then fall off somewhere else; be moved by water and wind to another location to grow.</p> <p>ESR: It provides another (better) place for the seed to grow.</p> <p>ESR: Not enough water or sun for the plant; competition among plants.</p>	<p>Characteristics of a seed determine method of dispersal.</p>
<p><u>EVALUATE:</u></p> <p>Have students write in their science notebooks or on a piece of paper using the following 4 prompts:</p> <ol style="list-style-type: none"> 1. Characteristics that would help seeds to be moved by the wind are _____. 2. Characteristics that would help seeds to be moved by water are _____. 3. Characteristics that would help seeds to be moved by animals or people are _____. 4. How does seed dispersal affect plant survival? <ul style="list-style-type: none"> ▶ Use the characteristics you recorded on your lab sheet to help you answer the prompts. 	<p>ESR: Light in weight, has wings, has a parachute, etc.</p> <p>ESR: Floats in water.</p> <p>ESR: Has stickers, has barbs, is sticky, sticks to fur; seed is good to eat then goes through an animal</p> <p>ESR: The seed needs to get away from the parent plant to grow so when it is dispersed it has a better chance to grow.</p>	
<p><u>EXTEND:</u></p> <p>Develop a lesson on ways plants are pollinated to focus on the concept that pollen dispersal is necessary for some plants to reproduce.</p> <p>This website of the Missouri Botanical Gardens has a plant biology page with sections on seed dispersal, pollination, and plant adaptations: http://www.mbgnet.net/bioplants/seed.html</p>		

Input Question: Describe why you chose the categories. (Explore #1)

Process Question: How did you group your seeds? (Explore #1)

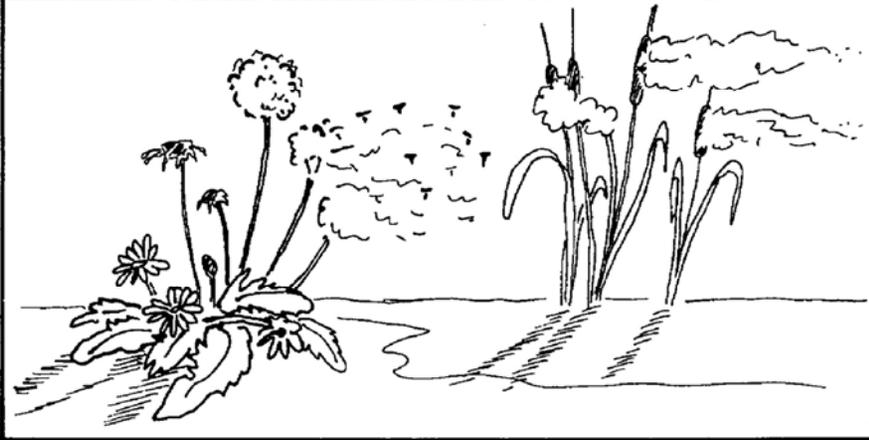
Output Question: What characteristics do the seeds in each category have in common? (Explore #1)

STUDENT HANDOUT
Seed Lab Chart

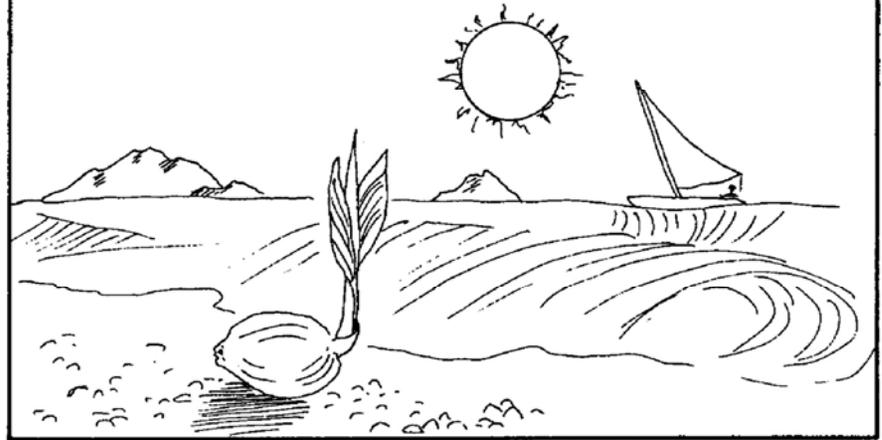
Seed #	Characteristics (Description of seed)	Sticks to things	Moved by wind	Floats in water	Possible way it moves to another place	Characteristic I used to determine how it may move
1						
2						
3						
4						

Transparency
TRAVELING SEEDS

WIND



WATER



ANIMALS



BY ITSELF

