FLORIDA Wildflower FOUNDATION

Unit 4

Seed Discovery

Overview

Seeds are remarkable packages of life, each containing everything needed to grow a new plant. They come in an astounding variety of shapes, sizes, and dispersal mechanisms—from dandelion seeds that float on the wind to beggarticks seeds that hitch rides on animal fur. In this unit, students will investigate seed structure and diversity, explore how seeds travel from parent plants to new locations, and discover the strategies plants use to ensure their seeds land in favorable growing conditions.

This unit builds directly on Unit 2's exploration of seed anatomy and germination, taking a deeper dive into seed diversity and dispersal. Students will apply their knowledge of adaptations to understand how seed structures help wildflowers reproduce successfully.

Activities

1. Wildflower Seed Investigation
2. Seed Sort
3. I'm a Traveling Wildflower Seed
4. Flung, Flown or Ferried
5. Make an Herbarium Seed Chart
6. Start a School Seed Library
7. Wake Up, Seeds!
8. Seed Germination Poem

Vocabulary

adaptation
germination
herbarium
observation
plant diversity
seed
seed bank
seed coat
seed dispersal
seed diversity
seed library
seedling
scarification
stratification

Vocabulary words are italicized within the introduction text and activities.

Standards

Grade 3: ELA.3.C.1.4, ELA.3.C.3.1, ELA.3.C.4.1, ELA.3.R.3.3, ELA.3.V.1.1, MA.3.M.1.1, MA.K12.MTR.1.1, MA.3.DP.1.1, MA.3.DP.1.2 SC.3.L.14.1, SC.3.N.1.1, SC.3.N.1.3, SC.3.N.1.5, SC.3.N.1.6, SC.3.N.1.7, SC.3.N.3.2, SC.3.N.3.3

Grade 4: ELA.4.C.3.1, ELA.4.C.4.1, ELA.4.V.1.1, MA.K12.MTR.1.1, MA.4.DP.1.1, SC.4.E.6.5, SC.4.L.16.1, SC.4.L.17.4, SC.4.N.1.1, SC.4.N.1.2, SC.4.N.1.4, SC.4.N.1.5, SC.4.N.1.6, SC.4.N.1.7, SC.4.N.1.8, SC.4.N.3.1

FLORIDA Wildflower FOUNDATION

Unit 4

Seed Discovery

Introduction

Seeds allow wildflowers and other plants to grow and spread. It's fun to find the seeds on a wildflower! When a flower finishes blooming, ***seeds*** will form in its place. When ready, some drop to the ground or are catapulted away from the plant. Other seeds have special wings that carry them on the wind to new homes, while some have tiny spines that attach to animals that walk by. These are all methods of ***seed dispersal***. For successful ***germination***, seeds need open soil, sunlight and rain to grow into new plants.

Discovering Wildflower Seeds and Their Adaptations

Florida is home to hundreds of wildflower species, each with its own unique seeds. Seeds are often stored in a special case where they develop, enlarge and wait for dispersal. This ***adaptation*** protects them from predators and changing weather until they are mature. Temperature, rain, wind and sunlight all affect whether a seed will grow. Seeds must also land on open ground without grass, leaves or weeds so they can germinate and send roots into the soil. Some seeds sprout within a few weeks, while others stay dormant through cold weather until conditions are just right for growth.

Different Kinds of Wildflower Seeds

Seeds come in many shapes, each helping plants survive and spread. Some grow in dry cones, like Black-eyed Susans, while others form inside pods, like Milkweed. Some seeds are hidden in berries, which animals eat and carry away, and others, like Aster seeds, have tiny bristles that hitch a ride on animals. Some seeds develop in a capsule, like Violets, which opens to release them into the world.

Saving Seeds to Grow New Wildflowers

When is a seed ripe? It is fun to collect seeds to start new plants in your garden, but seeds should only be collected when they are fully mature. In nature, the seed structure usually turns brown and begins to disintegrate, releasing the seeds. Observing plants carefully helps determine the perfect time for collection before seeds are naturally dispersed. Summer and fall are ideal times to harvest seeds from your garden.

Safety note: Only collect seeds from plants you know are safe to handle.

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Unit 4 Activity 1

Wildflower Seed Investigation

Objective

Students will be able to compare wildflower seed ***adaptations*** and relate those adaptations to reproduction and survival.

Directions

Students can work in pairs.

1. To each pair, provide one "Wildflower and Seed Structure" handout, one "Wildflower Seed Investigation" worksheet and several different mature seedheads.
2. Review the handout with students. Explain that mature seedheads are ready for collection when they are dry and seed structures are brown.
3. Have students pull apart seedheads to release the seeds onto paper. A pencil may be used to pry small seeds out of a flower cone or disc so students can see the different seed shapes.
4. Have students observe the different seed structures carefully using a hand lens. Seeds vary in size and appearance, even from the same plant family. For each seed type, record:
    - color, size and shape
    - how tightly the seed is held in the seedhead or cone
    - any special features, such as wings, bristles or hooks

Discussion

- Based on the seed shapes, how do you think each seed is dispersed?
- How easy or difficult was it to release the seeds from the seedheads? What might this tell you about what needs to happen before each seed can grow?
- How do the color, size, shape and other features of the seed give clues about the environment it needs to thrive? Where would this seed grow best, and what might the plant look like once it matures?

Materials

- "Wildflower Seed Structures" handouts (one per pair)
- "Wildflower Seed Investigation" worksheet (one per pair)
- dried, mature seedheads of various wildflower (3–5 species per pair)
- hand lens (1 per pair)
- white paper

Standards

Grade 3: SC.3.L.14.1, SC.3.N.1.1, SC.3.N.1.6

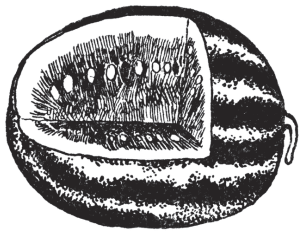
Grade 4: SC.4.L.16.1, SC.4.L.17.4, SC.4.N.1.1, SC.4.N.1.2

Tips

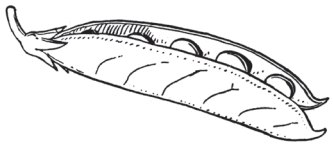
Mature seedheads are best for this activity. Look for seedheads that are dry with brown seed structures — these indicate the seeds are fully mature and ready for dispersal. Late summer to fall is the ideal time to collect wildflower seeds in Florida.

Wildflower Seed Structures

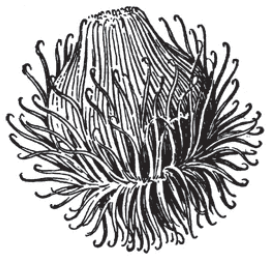
Some seeds are surrounded by colorful, juicy fruit that animals eat, carrying the seeds inside them to new places where they come out in droppings.



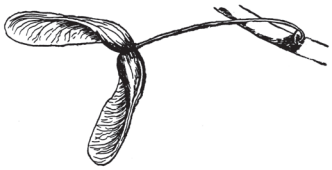
Some seeds grow inside a protective case that splits open or pops to scatter the seeds when they're ready.



Some seeds are covered in stiff burrs that stick to animal fur and people's clothing for a ride to new locations.



Some seeds have thin, flat wings that spin like helicopter blades as they fall from trees.



Some seeds have feather-like fluff that catches the wind and floats through the air to new places.

Some seeds are round and heavy, so they drop straight down or are carried away and buried by animals like squirrels.

Wildflower Seed Investigation

Observe each seedhead carefully. Remove the seeds and record what you notice.

Seedhead number	Color	Size (S/M/L)	Special features (wings, hooks, etc.)

Sketch your favorite seed below and label its parts:

Based on what you observed, how do you think your favorite seed travels away from the parent plant?

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Unit 4 Activity 2

Seed Sort

Objective

Students will be able to collect, identify and sort seeds by size, shape, design and dispersal method.

Materials

- masking tape (one 12-inch piece per student)
- seed-sorting dish (one per team)

Standards

Grade 3: SC.3.N.1.1, SC.3.N.1.2, SC.3.N.1.5, SC.3.N.1.6, SC.3.N.1.7

Grade 4: SC.4.L.16.1, SC.4.L.17.4, SC 4.N.1.1, SC.4.N.1.2, SC.4.N.1.4, SC.4.N.1.5, SC.4.N.1.7

Directions

Students should work in pairs or teams.

1. Tell students they will be collecting and studying seeds to see how they are dispersed. Tell them they will be using two collection methods: their hands and a "seed collector."
2. Give each student a 12-inch long strip of masking tape. Tell students to wrap the tape, sticky side out, around their shoe or sock. These are the "seed collectors."
3. Take students to an area on campus where they may find wildflowers, grasses, and/or flowering vines, shrubs and trees that are producing seed. Explain that seeds have an important job to do, so they should only collect by hand one seed from each plant type.
4. Take students to a weedy patch, meadow or untended part of the school campus in order to collect seeds on their "seed collectors."

   Alternative: Have each student collect seeds by hand at home and bring them to class.
5. After the students bring their seeds back to the classroom, have the pairs/teams place them in the shallow dish where they can examine them to discuss possible dispersal methods.
6. Have the pairs/teams work to sort the seeds into the following categories:

   - seeds with stickers
   - seeds with wings
   - big seeds
   - small seeds
   - round, flat seeds
   - ball-shaped seeds
   - seeds from inside a fruit
   - seeds we eat
   - seeds from a pod
   - seeds from an underground root

Discussion

- Ask students if they had any seeds that they were unable to categorize. What categories, if any, are missing from the list?
- Have students identify any seeds that fall into more than one category, or did not fit into any of the categories.
- Have them hypothesize how the size, shape or design would affect how the seed is dispersed.

Extension

To extend this activity, have the students remove and plant the seeds that were collected on the masking tape — either in a window garden or in a designated and protected spot on campus — and discover what plant species they collected!

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Unit 4 Activity 3

I'm a Traveling Wildflower Seed

Objective

Students will be able to understand why and how seeds are adapted for dispersal.

Discussion

Wildflower seeds have a better chance for survival if they are scattered away from the parent plant where there is less competition for nutrients, sunlight, water and space. Wildflowers have ***adapted*** to use one or more method to ***disperse*** their seeds.

Seeds travel! They can't just get up and walk to a new location, but structures on the seed may allow it to move to a new location. Some of the moving forces might be wind, water or animals, while some seeds are propelled from an exploding seed pod. Other seeds may simply fall to the ground by way of gravity.

As a class, discuss and chart how a seed might be structured based on the following method of travel:

- wind
- exploding or bursting
- water
- animal

Materials

- "Wildflower Seed Dispersal Adaptations" worksheets (one set per pair)
- "Wildflower Seed Dispersal Adaptation Cards" (one card per pair)
- "I'm a Traveling Wildflower Seed" worksheet (one per pair)

Standards

Grade 3: SC.3.N.1.1, SC.3.N.1.2, SC.3.N.1.5

Grade 4: SC.4.L.16.1, SC.4.N.1.1, SC.4.N.1.2, SC.4.N.1.4, SC.4.N.1.5, SC.4.N.1.7

Directions

Students should work in pairs.

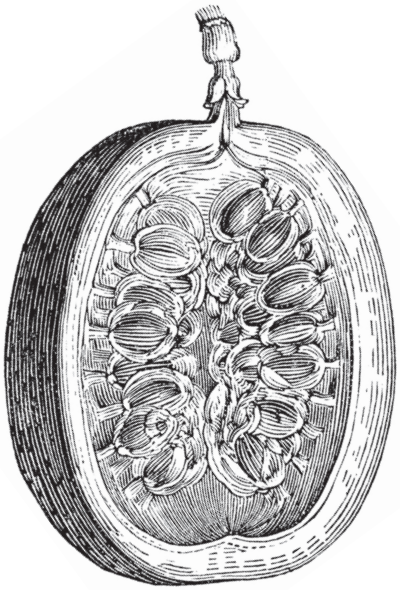
1. Give each pair one set of "Wildflower Seed Dispersal Adaptations" worksheets.
2. Have them guess by which method each seed is dispersed based on the clue and drawing. Students should write their guesses in the box next to each seed type.
3. Discuss the correct answers with the class. Give each pair of students at least one opportunity to discuss why they chose the method they did.
4. Now give each pair one "Wildflower Seed Dispersal Adaptation Card" and one "I'm a Traveling Wildflower Seed" worksheet.
5. Have them design and draw a seed that could travel by wind, water, gravity, bursting, or animal (eaten or carried), depending on the description found on the card they are given. Encourage the students to be creative.
6. Have students trade cards so they can design multiple seeds.
7. Once each pair of students has drawn at least two seeds (more if time permits), have them present their seeds to the class.

Wildflower Seed Dispersal Adaptations

Milkweed

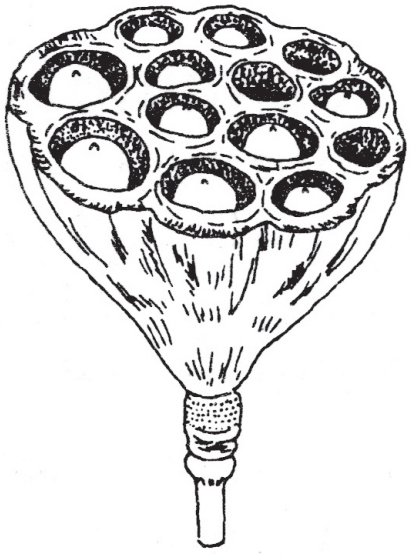
Milkweed seeds have fluffy hairs.

Passionfruit



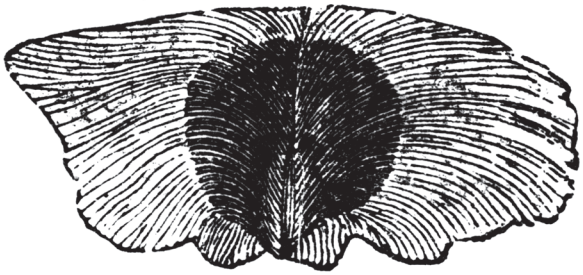
Passionfruit seeds are enclosed in a tasty, juicy pulp.

American lotus



American lotus grows along river and pond edges.

Trumpet creeper



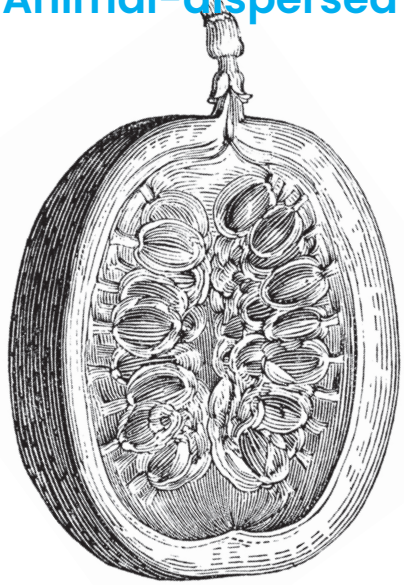
Trumpet creeper vine seeds have papery "wings."

Wildflower Seed Dispersal Adaptations

Milkweed
Air-dispersed

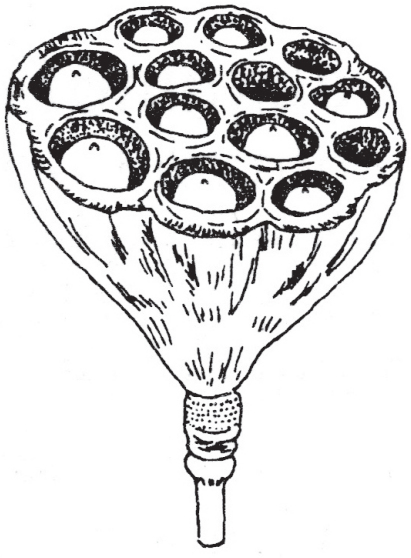
Milkweed seeds
have fluffy hairs.

Passionfruit
Animal-dispersed



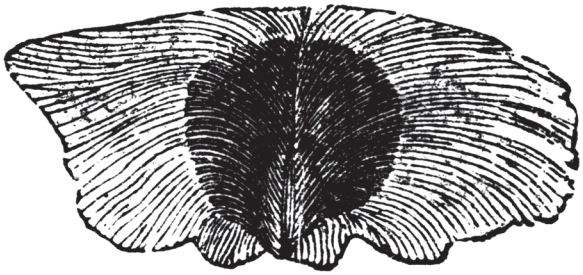
Passionfruit seeds are enclosed
in a tasty, juicy pulp.

American lotus
Water-dispersed



American lotus grows
along river and pond edges.

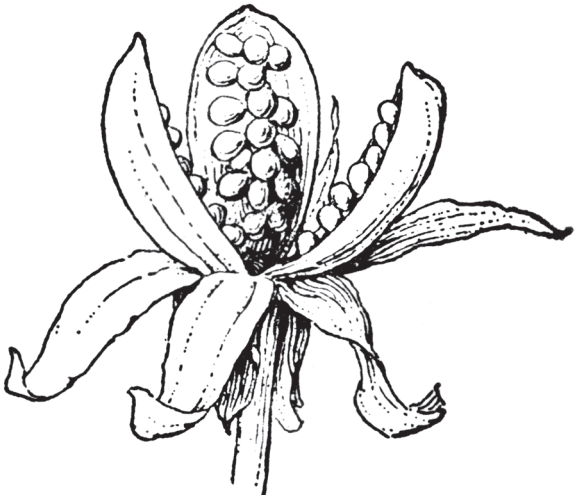
Trumpet creeper
WInd-dispersed



Trumpet creeper vine seeds
have papery “wings.”

Wildflower Seed Dispersal Adaptations

Violet

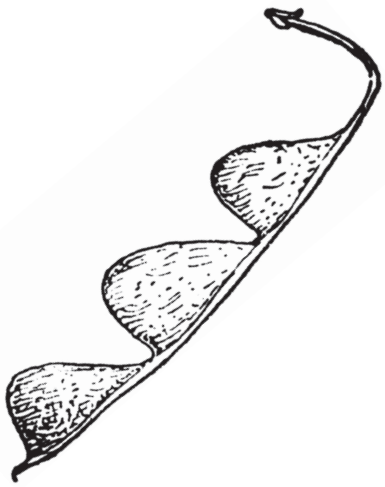


Violet seed pods
burst open when ripe.

Maple

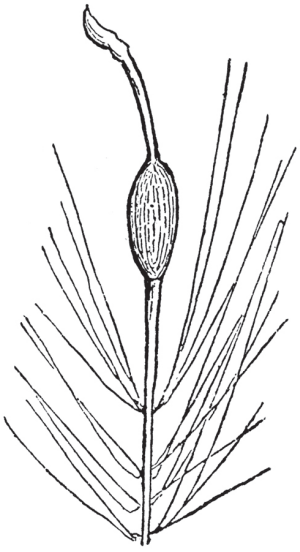
Maple seeds are winged
and twirl like a helicopter.

Ticktrefoil



Ticktrefoil seeds are covered
in tiny sticky hairs.

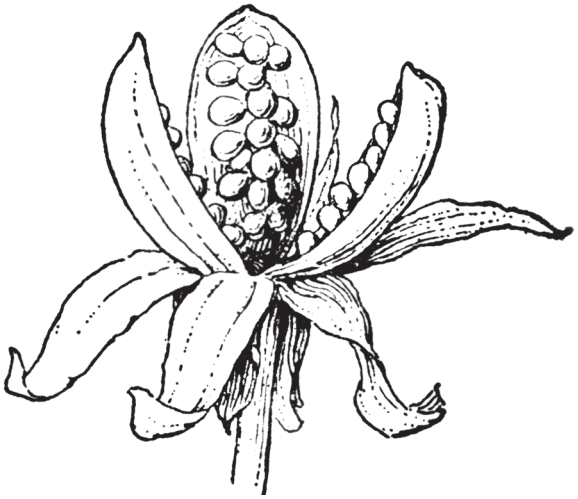
Cattail



Cattail seeds
have fine hairs.

Wildflower Seed Dispersal Adaptations

Violet
Burst-dispersed

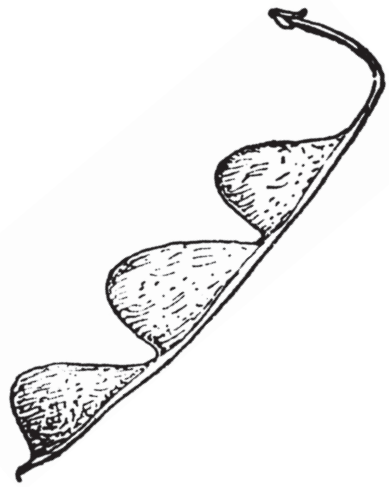


Violet seed pods
pop open when ripe.

Maple
Wind-dispersed

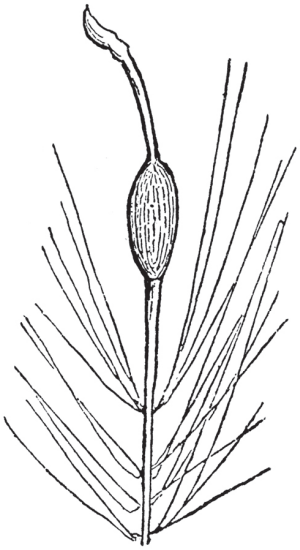
Maple seeds are winged
and twirl like a helicopter.

Ticktrefoil
Animal-dispersed



Ticktrefoil seeds are covered
in tiny sticky hairs.

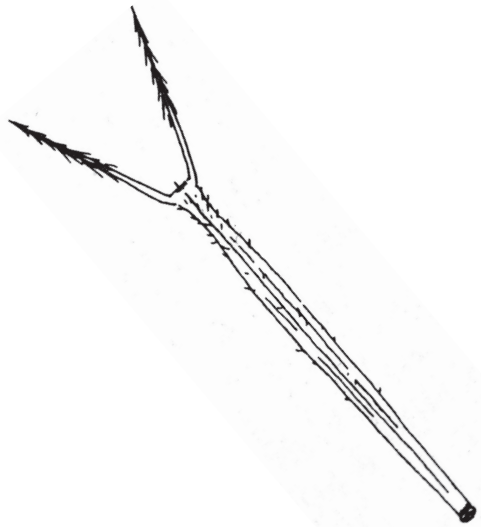
Cattail
WInd- and Water-dispersed



Cattail seeds
have fine hairs.

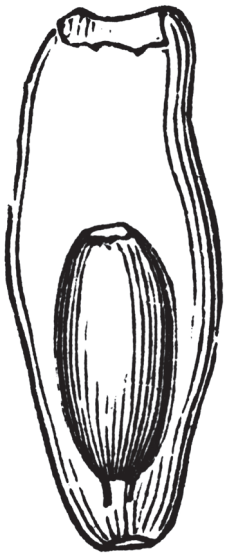
Wildflower Seed Dispersal Adaptations

Beggarticks



Beggarticks seeds
have tiny barbed hooks.

Water lily

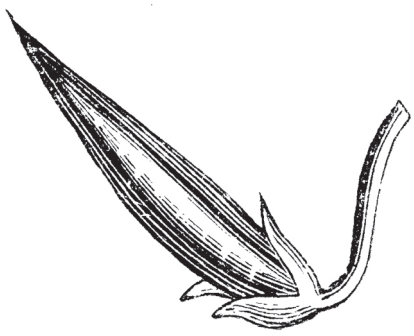


Water lily seeds
are filled with air.

Dandelion

Dandelion seeds
have feather-like bristles.

Woodsorrel



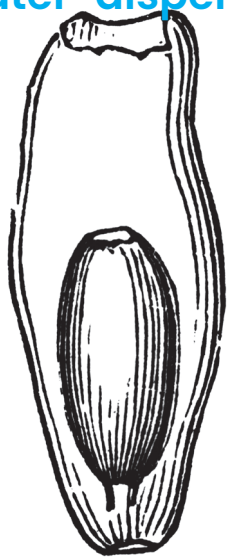
Woodsorrel seed pods
explode when touched.

Wildflower Seed Dispersal Adaptations

Beggarticks
Animal-dispersed

Beggarticks seeds
have tiny barbed hooks.

Water lily
Water-dispersed



Water lily seeds
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Dandelion
Animal-dispersed

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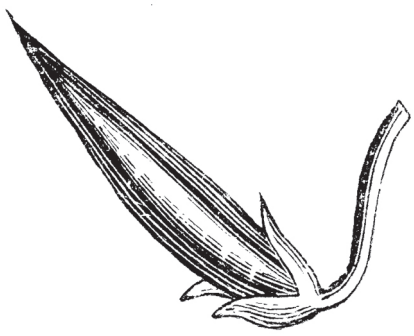
have feather-like bristles.

Woodsorrel
Burst-dispersed



Woodsorrel seed pods
explode when touched.

Seed Dispersal Adaptation Cards

Cut into separate cards. Print enough for each pair to have a card.

Adapt your wildflower seed so that it can shoot into the air at least two feet.	Adapt your wildflower seed so that it can stick on an animal or person.
Adapt your wildflower seed to be eaten by a bird or other animal.	Adapt your wildflower seed so that wind can carry it at least two feet.
Adapt your wildflower seed so that it can fall and roll to a place two feet away from the parent wildflower.	Adapt your wildflower seed to float on water to a new location.

I'm a Traveling Wildflower Seed

Read the description on the Adaptation Card. In the space below, draw and describe your seed and its adaptation.

Draw	Describe

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Unit 4 Activity 4

Flung, Flown or Ferried

Objective

Students will be able to compare and measure how far seeds travel using different dispersal methods.

Discussion

Explain to students that just as different kinds of plants use different methods to disperse their pollen, they also use different methods to disperse their seeds. Some have built-in catapults to propel their seeds; others use the wind, water, birds or other animals to carry their seeds away.

Directions

Students should work in pairs or groups.

1. Provide student pairs or groups with one set of "Flung, Flown or Ferried" worksheets and appropriate supplies.
2. Have students use the instructions that follow to create a "catapult," a "whirligig" (or helicopter) and an airplane to simulate different seed dispersal methods. (Teachers may need to demonstrate each process.) Tell students the catapult will represent seeds that are dispersed by exploding or bursting seed pods; the whirligig will represent winged seeds; and the plane will represent seeds that are blown by the wind.
3. Have students measure how far the "flung" and "flown" seeds can travel and record the distances on the worksheet.
4. Next, have students use the Internet or other reference and resource materials to research the distances that animals can travel. Specifically, have them take note of how far birds such as mockingbirds, blue jays and cardinals, and mammals such as opposums, raccoons and deer travel.
5. Students can now compare the distances seeds can travel depending upon whether they are dispersed by catapult, wind, bird or other animal.
6. Have students graph the differences using various types of graphs (e.g. bar graph, line graph, pie chart).

Materials

- "Flung, Flown or Ferried" worksheets (one set per pair/group)
- 1/2" pom-poms (several per pair/group)
- craft sticks (eight per pair/group)
- graph or plain paper (one sheet per student)
- 1/2 or 1/4 sheet of paper (one per pair/group)
- measuring tape (one per pair/group)
- plastic spoon (one per pair/group)
- plasti-bands (several per pair/group)
- scissors (one pair per pair/group)
- paper clips (one per pair/group)

Standards

Grade 3: MA.3.M.1.1, MA.3.DP.1.1,† MA.K12.MTR.1.1, SC.3.N.1.1, SC.3.N.1.2, SC.3.N.1.3, SC.3.N.1.7, SC.3.N.3.2, SC.3.N.3.3

Grade 4: MA.4.DP.1.1, MA.K12.MTR.1.1, SC.4.E.6.5, SC.4.L.16.1, SC.4.N.1.1, SC.4.N.1.2, SC.4.N.1.4, SC.4.N.1.5, SC.4.N.1.6, SC.4.N.1.7, SC.4.N.1.8, SC.4.N.3.1

Discussion

- Which method of dispersal is more effective and why?
- When might one method be better than another?
- What conditions are necessary for each to be successful?
- What might happen when an animal such as a bird carries a seed to a very different habitat?

† For MA.3.M.1.1, MA.3.DP.1.1 and MA.K12.MTR.1.1, have students graph the differences on a line plot.

Flung, Flown or Ferried

Record and compare the distances that seeds travel when catapulted, air-lifted and wind-blown.

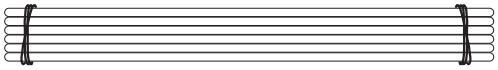
Distance for catapulted "seed"	Distance for air-lifted "seed"	Distance for wind-blown "seed"

When seeds travel in the fur or guts of moving animals, how much farther can they go?

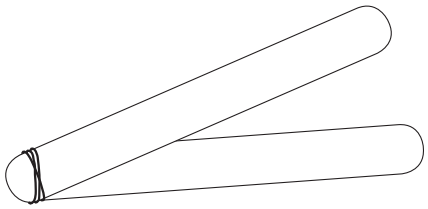
Animal	Distance traveled	Seed dispersal method

Flung, Flown or Ferried — Catapult

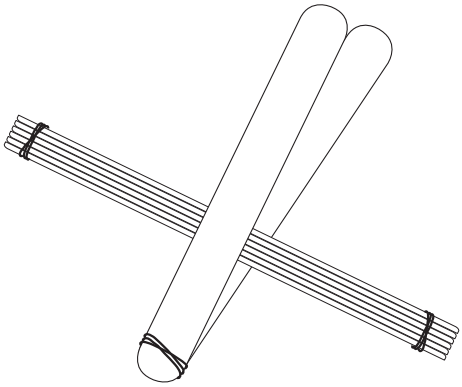
1. Bind 6 craft sticks by wrapping a plasti-band around each end.



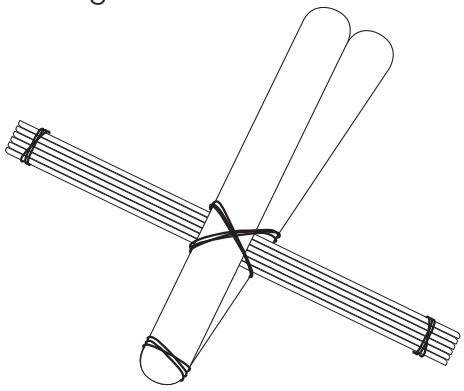
2. Bind the remaining 2 craft sticks at one end by wrapping a plasti-band around one end.



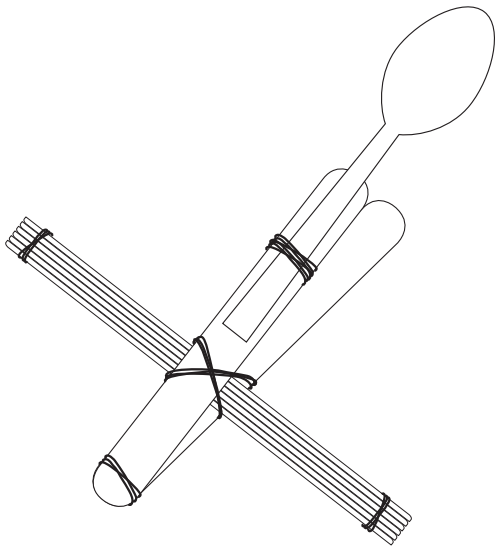
3. Carefully insert the 6-stick bundle in between the 2-stick bundle.



4. Join the two bundles together by wrapping 1–2 plasti-bands around where they intersect. The closer the 6-stick bundle is to the base of the 2-stick bundle, the more leverage you will get.



5. Attach the plastic spoon to the upper craft stick with one or more plasti-bands.



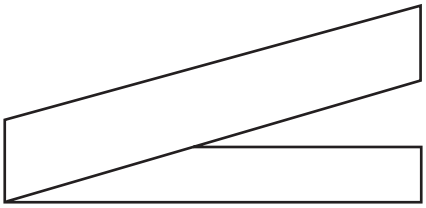
6. Place a pom-pom on the spoon.

7. Hold the catapult with one hand, and use the other hand to pull the spoon down.

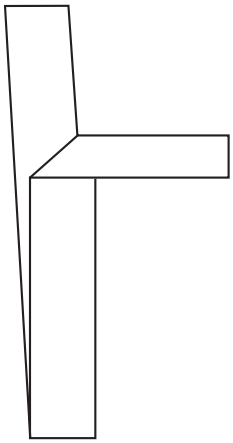
8. Release the spoon to launch your pom pom!

Flung, Flown or Ferried — Whirligig

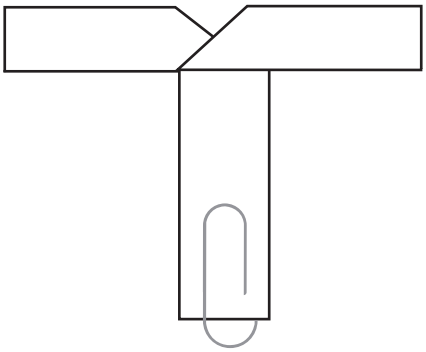
1. Cut out the large strip of paper.
2. Fold the strip of paper in half.



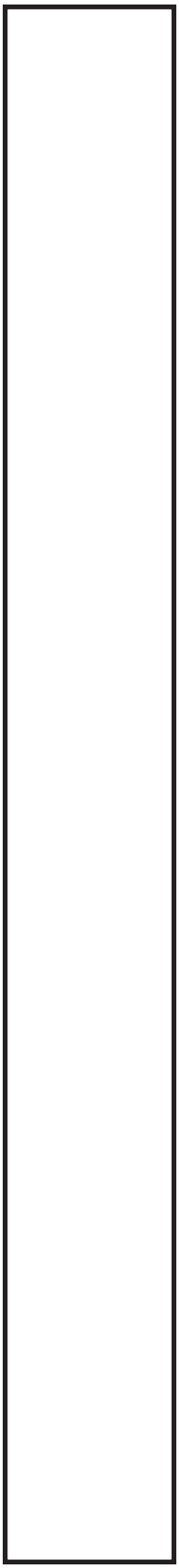
3. Fold one side to the right half way. Then fold the other side to the left half way.



4. Attach a paper clip to the bottom where the paper was first folded.

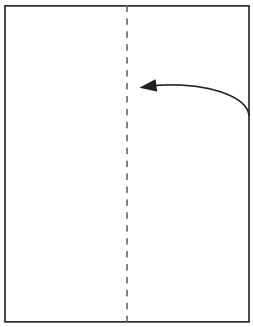


5. Throw it in the air and see how far it flies. Record your distance on the worksheet.
6. Repeat steps 1–5 with the small strip of paper. Compare and record the difference.

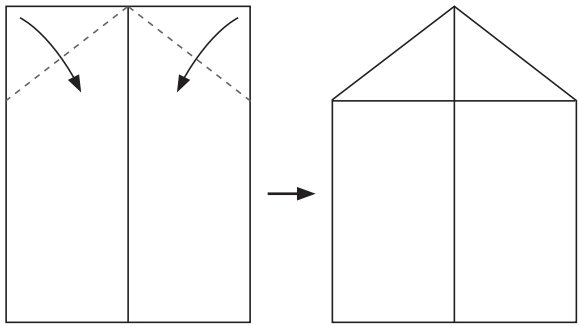


Flung, Flown or Ferried — Airplane

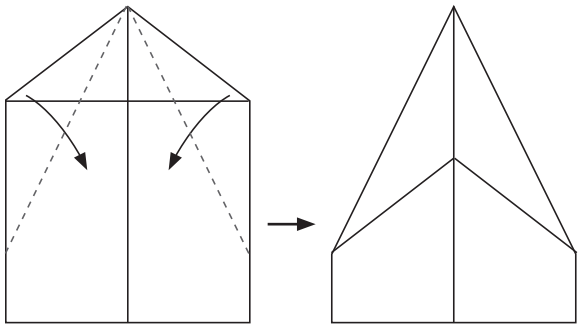
1. Fold the paper in half lengthwise.



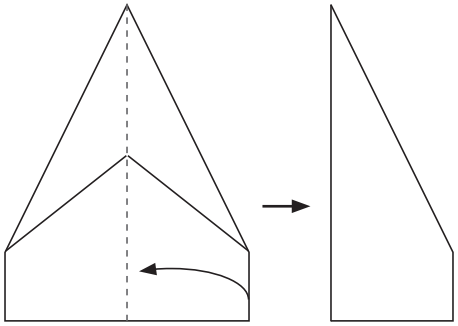
2. Open the paper, then fold the top two corners in toward the center crease. The edges should meet in the middle and form a triangle at the top.



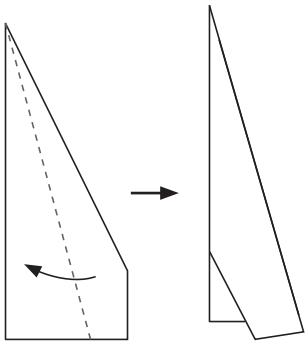
3. Take the top corners and fold them toward the middle. Just like in step 2, the edges should meet in the middle. The top should be pointed.



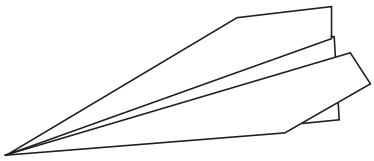
4. Fold the paper in half lengthwise again.



5. Starting from the tip, fold the sides ("wings") down so the edges meet the bottom edge of the airplane.



6. To launch, open the wings, hold the airplane by its bottom edge and throw straight ahead.



FLORIDA Wildflower FOUNDATION

Unit 4 Activity 5

Make an Herbarium Seed Chart

Objective

Students will be able to define and create an herbarium.

Discussion

Explain to students that an herbarium is like a plant library made from dried plant specimens. Scientists and students use herbaria to help identify and classify plants. Today, students will make their own "seed ***herbarium***."

Materials

- Dried seedheads from 3-5 labeled wildflower species
- "Herbarium Seed Chart" worksheet (3-5 per student or pair)
- drayons, colored pencils or markers
- Scoth tape
- paper envelopes or small paper bags for storing extra seeds (optional)

Standards

Grade 3: SC.3.L.14.1, SC.3.N.1.3

Grade 4: SC.4.N.1.6

Directions

Students should work individually or in pairs.

1. Provide each student or pair with labeled wildflower seedheads (3–5 species). Be sure each seedhead is clearly identified with the wildflower's common name (and scientific name, if known).
2. Have students carefully remove 2-3 seeds from the seedhead and place them on an Herbarium worksheet. Use Scotch tape to attach the seeds securely.
3. On the worksheet, students should record:
   - the name of the wildflower
   - today's date (when collected)
   - where the seeds came from (schoolyard, garden, etc.)
   - a description of the seed (size, color, special features)
   - how they think the seed disperses (wind, animal, water, etc.)
4. Have students draw a picture of what the flower looks like when blooming. (Provide reference photos if students haven't seen the flowers.)
5. Have students label the parts of the seed and flower that they can see.
6. Keep these pages in a folder or binder to build a class seed herbarium. Students can add more species throughout the year as different wildflowers go to seed.

Discussion

As a class, compare the different seeds and flowers. Ask:

- What similarities and differences are noticed?
- How does ***seed diversity*** help wildflowers survive and spread to new places?
- Why might scientists want to keep collections of seeds from different plants and different places?
- What can seeds tell us about the plants they came from?

Herbarium Seed Chart

Collector's name _____ Date _____

Wildflower name: _____

Collection location: _____

_____

Seed description:

Size: ☐ Tiny ☐ Small ☐ Medium ☐ Large

Color: _____

Special features (wings, hooks, fluff, etc.):

_____

_____

How I think this seed disperses:

☐ Wind ☐ Water

☐ Eaten by animals ☐ Animal fur

☐ Exploding pod ☐ Falls to ground

Seed specimen:

Wildflower drawing:

Label the parts you know.

One interesting thing I learned about this wildflower: _____

_____

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Unit 4 Activity 6

Start a School Seed Library

Objective

Students will be able to collect, save and share wildflower seeds for future planting. Students will also be able to define what a ***seed library*** (or ***seed bank***) is and how it helps conserve ***plant diversity***.

Discussion

Explain to students that a seed library is like a collection of living "books" made from seeds. People save seeds, label them, and share them so others can "check them out" to grow in their own gardens. This way, plants can keep growing year after year. Scientists also use seed banks (large-scale collections, sometimes frozen in vaults) to make sure rare or important plants aren't lost forever.

Today, students will start their own school seed library by collecting, saving, and labeling wildflower seeds.

Directions

Students may work individually or in pairs or groups.

- Provide each pair or group with 3–5 dried seedheads and each student with 3–5 Seed Packet templates.
- Have students gently remove the seeds from the seedheads onto large sheets of paper. Use a spoon or pencil if needed to loosen them.
- Place the seeds into small envelopes labeled with the plant's name and the date collected. Wash hands after handling, and compost or discard leftover seedhead debris.
- Create artistic seed packets using the "Seed Packet" templates.
- Once the packets are ready, measure ½–1 teaspoon of seeds into each. Fold the flaps toward the center and seal with tape or stickers.
- Store the packets together in a box or binder to begin your class seed library. Add more seeds each season, and consider sharing with other classes or school gardens.
- Encourage students to "check out" seed packets in spring to plant at home or in the school garden, then return new seeds in the fall.

Materials

- dried seedheads of various wildflower (3–5 per pair/group)
- paper (large sheets if possible)
- paper envelopes or small bags
- "Make Your Own Seed Packet" printed on paper or light card stock (3–5 per student)
- crayons, colored pencils or markers
- Scotch tape or stickers
- teaspoon (one per pair/group)

Standards

Grade 3: SC.3.N.1.3

Grade 4: SC.4.N.1.6

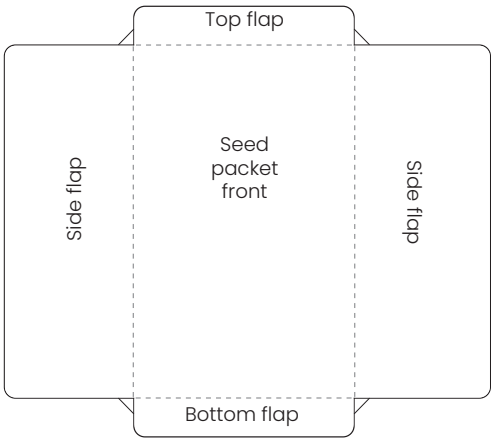
Tips

If seedheads are collected fresh, allow them to dry in paper bags for at least a week before the activity.

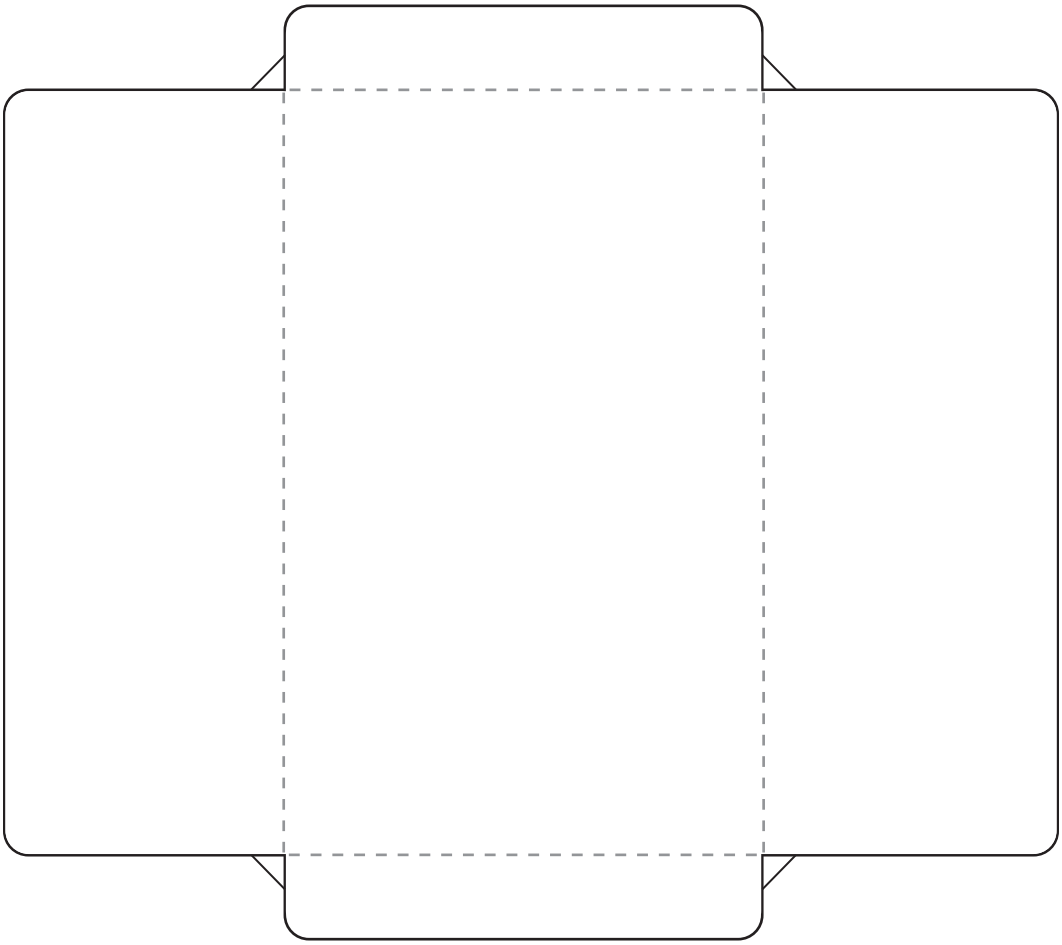
Choose species that are safe and easy for students to handle (e.g., *Coreopsis*, Blanketflower, Black-eyed Susan).

Partner with a local native nursery, wildflower group or garden club if you need seedheads.

Make Your Own Seed Packet



1. On the seed packet front, write the name of the wildflower your seeds will grow into. Draw and color a picture of the wildflower. Be creative!
2. Cut the template out along the solid lines. Do not cut the dotted lines.
3. Fold the small corner flaps inward first — these reinforce the corners and prevent seeds from escaping.
4. Fold in the side flaps — they should overlap — and tape one over the other. This will become the back of your seed packet.
5. Fold up the bottom flap and tape it so it closes the bottom of the packet.
6. On the seed packet back, write the color and full-grown height of the wildflower, when it blooms, where to plant the seed (sun or shade), and the date the seeds were collected.
7. Place seeds in the packet.
8. Fold down the top flap and seal with tape or a decorative sticker.



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Unit 4 Activity 7

Wake Up, Seeds!

Objective

Students will be able to explain that some seeds need special treatments, such as ***scarification*** and ***stratification***, in order to ***germinate***.

Materials

- Mimosa (Powderpuff) or similar hard-coated seeds
- sandpaper
- small container of water
- photos (or teacher-provided examples) of seeds that require stratification (e.g., Milkweed, Violet)

Standards

Grade 3: SC.3.N.1.3

Grade 4: SC.4.N.1.6

Discussion

Explain that gardeners and scientists often use scarification and stratification to "wake up" seeds. These ***adaptations*** help wildflowers survive and thrive in nature.

Directions

1. Show students two Mimosa seeds. Lightly rub one seed on sandpaper or nick it with a nail file. Leave the other seed untreated.
2. Place both seeds in water. Observe which seed sinks faster (the scarified seed absorbs water more easily).
3. Explain that this process is called scarification — it scratches or thins the ***seed coat*** so water can get in.
4. Show photos or describe how some seeds (like violets) must spend winter in the soil before they sprout. Explain that this process is called stratification — it's like seeds waiting out the cold until the right season arrives.

Discussion

- Why do you think some seeds might "wait" to sprout? How might these strategies help them survive in nature?
- How does scratching or chilling a seed help it "wake up"?
- If you were a seed, would you rather sprout right away or wait? Why?

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Unit 4 Activity 8

Seed Germination Poem

Objective

Students will be able to use knowledge of plant needs and seed germination to write a poem using key terms.

Materials

- chart paper or whiteboard
- blank paper

Standards

Grade 3: ELA.3.C.1.4, ELA.3.C.3.1, ELA.3.C.4.1, ELA.3.R.3.3, ELA.3.V.1.1, SC.3.L.14.1, SC.3.N.1.3

Grade 4: ELA.4.C.3.1, ELA.4.C.4.1, ELA.4.V.1.1, SC.4.L.16.1, SC.4.L.17.4, SC.4.N.1.6

Directions

1. Have students work together to make a list of everything a plant needs to grow from a seed (e.g., soil, water, sunlight, warm temperature). Include key vocabulary terms such as ***germination***, ***scarification***, ***stratification***, etc.
2. Have students write a poem about planting a seed using words from the list.
3. Allow students to share poems in whole or small groups. Have them discuss the similarities and differences between their poems and the variety of ways seed germination can occur.

Discussion

- How did you decide which words to include in your poem?
- What feelings or images came up as you thought about seeds growing?
- Why do you think seeds have different needs before they can grow?

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Unit 4

Glossary

adaptation: a change or feature that helps a plant live and grow better in its environment ; anything that helps an organism survive and successfully reproduce in an ecosystem

germination: process by which a seed comes to life and produces a plant

herbarium: a collection of dried plants and seeds that people use to study and identify plants

observation: the act of looking at something carefully to learn more about it

plant diversity: the wide variety of plants that occur on Earth

seed: small part of a flowering plant that is capable of growing a new plant

seed bank: a collection of seeds stored for future planting; can refer to a natural collection of seeds in soil or a human-created seed library

seed coat: protective outer layer of a seed; also called a testa

seed dispersal: the scattering or movement of seeds away from the parent plant to grow in new places

seed diversity: the many different kinds of seeds, with different sizes, shapes and ways of growing

seed library: a place where people save and share seeds so plants can grow again

seedling: a young plant that has grown from a seed

scarification: when a seed's hard coat has to be scratched or broken so the seed can grow

stratification: when a seed needs to spend time in the cold before it can start to grow

Tip

Turn the vocabulary words into a Jeopardy-style game for a fun, interactive way to review with your students. Free online templates are available at JeopardyLabs.com, or you can download templates for PowerPoint or Google Slides.

Seed Discovery Definition Match

Match the vocabulary words in the Word Bank to their definitions.

Word Bank

adaptation	plant diversity	seed dispersal	scarification
germination	seed	seed diversity	stratification
herbarium	seed bank	seed library	
observation	seed coat	seedling	

_____ when a seed's hard coat has to be scratched or broken so the seed can grow

_____ the wide variety of plants that occur on Earthr

_____ a young plant that has grown from a seed

_____ a change or feature that helps a plant live and grow better in its environment; anything that helps an organism survive and successfully reproduce in an ecosystem

_____ the act of looking at something carefully to learn more about it

_____ protective outer layer of a seed; also called a testa

_____ the many different kinds of seeds, with different sizes, shapes and ways of growing

_____ process by which a seed comes to life and produces a plant

_____ when a seed needs to spend time in the cold before it can start to grow

_____ a collection of dried plants and seeds that people use to study and identify plants

_____ small part of a flowering plant that is capable of growing a new plant

_____ a place where people save and share seeds so plants can grow again

_____ a collection of seeds stored for future planting; can refer to a natural collection of seeds in soil or a human-created seed library

_____ the scattering or movement of seeds away from the parent plant to grow in new places

Seed Discovery Definition Match

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adaptation	plant diversity	seed dispersal	scarification
germination	seed	seed diversity	stratification
herbarium	seed bank	seed library	
observation	seed coat	seedling	

scarification	when a seed's hard coat has to be scratched or broken so the seed can grow
plant diversity	the wide variety of plants that occur on Earthr
seedling	a young plant that has grown from a seed
adaptation	a change or feature that helps a plant live and grow better in its environment
observation	the act of looking at something carefully to learn more about it
seed coat	protective outer layer of a seed; also called a testa
seed diversity	the many different kinds of seeds, with different sizes, shapes and ways of growing
germination	process by which a seed comes to life and produces a plant
stratification	when a seed needs to spend time in the cold before it can start to grow
herbarium	a collection of dried plants and seeds that people use to study and identify plants
seed	small part of a flowering plant that is capable of growing a new plant
seed library	a place where people save and share seeds so plants can grow again
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Resources

Literary connections

A Seed is Sleepy by Dianna Hutt Aston

Big Yellow Sunflower by Frances Barry

Claire Goes Foraging by Margaret Aycock

The Curious Garden by Peter Brown

Flip, Float, Fly: Seeds on the Move by JoAnn Early Macken

From Flower to Fruit by Anne Ophelia Downden

From Seed to Plant by Gail Gibbons

The Garden Next Door by Collin Pine

How Seeds Travel (A Lerner Natural Science Book) by Cynthia Overbeck

Jack's Garden by Henry Cole

Lily's Pesky Plant by Kirsten Larsen

The Life Cycle of a Flower by Molly Aloian

The Magic School Bus Plants Seeds: A Book About How Living Things Grow by Joanna Cole

Miss Maple's Seeds by Eliza Wheeler

Mother Earth and Her Children by Sybil Van Offers and S. Shoen-Smith

Oh Say Can You Seed? Cat in the Hat Learning Library

On Meadowview Street by Henry Cole

Once Around the Sun by Bobbi Katz and LeUyen Pham

Seed Surprises by Andrew Willett

Seeds And Seedlings (Nature Close-Up) by Elaine Pascoe

Seeds, Bees, Butterflies, and More! Poems for Two Voices by Carole Gerber

Seeds Pop-Stick-Glide by Patricia Lauber

The Tiny Seed by Eric Carle

We are the Gardeners by Joanna Gaines

What Does the Bunny See? by Linda Sue Park

Reference books

Complete Guide to Florida Wildflowers by Roger Hammer

Florida Wildflowers in Their Natural Communities by Walter Kingsley Taylor

Plant Life Cycles (Building Blocks of Science), World Book, Inc.

Websites and other web resources

Florida Wildflower Foundation
(plant profiles, photos and other resources on Florida natives)
www.FlaWildflowers.org

Florida's Wildflowers and Butterflies
(Florida Museum of Natural History)
www.FloridaMuseum.ufl.edu/wildflowers/wildflower-search

From Seed to Fruit (PBS LearningMedia)
(interactive resource that guides students through the stages of a plant's life cycle)
florida.pbslearningmedia.org/resource/evscps.sci.life.seed/from-seed-to-fruit/

iNaturalist SEEK (image recognition app for identifying plants and animals)
www.iNaturalist.org/pages/seek_app

Lady Bird Johnson Wildflower Center
(national database; search by state, family or habitat)
www.Wildflower.org/plants-main

Seed Dispersal (Science Learning Hub)
(activities and resources to teach students about how seeds are dispersed in nature)
www.sciencelearn.org.nz/resources/103-seed-dispersal