

THIRD GRADE CURRICULUM
TABLE OF CONTENTS:Unit 1: Plant Adaptations
Unit 2: Animal Adaptations

Third Grade Unit 1: Plant Adaptations**OVERVIEW:**

This unit introduces the idea of adaptations by highlighting how plants reproduce and create new plants that grow in a certain environment. Students deeply observe seeds and plant parts to understand how certain structures help plants survive. In lesson 1 (Plant Part Inquiry) students review plant parts and their functions. Lesson 2 (Seed Dissection) and 3 (Seed Dispersal) give an overview of how seeds are structured to travel to new locations and grow into plants, and lesson 4 (Adapt-A-Seed) allows students to share what they've learned through a creative activity. Lessons 5 (Leaf Structure and Drought Tolerant Adaptations) and 6 (Drought Tolerant Scavenger Hunt) underscore the structures of leaves that help them make energy and thrive in different environments. Lesson 7 (Invent a Plant) provides an opportunity for students to synthesize all that they've learned about plant adaptations. The unit concludes with students learning how to record and communicate their observations in lesson 8 (Field Journaling)

FOCUS QUESTIONS:

1. Which part of the plant is most important for the plant's survival?
2. What is the most important part of a seed?
3. If a seed wanted to travel, how would it do it?
4. How do seeds travel?
5. What environment is best for a leaf?
6. Which roots are good at getting water?
7. What does a plant perfectly adapted for its environment look like?
8. What makes an effective field journal entry?

NGSS:

[LS1.A] Structure and function: Organisms have both internal and external macroscopic structures that allow for growth, survival, behavior, and reproduction.

[LS2.A] Interdependent Relationships in Ecosystems: Plants depend on water and light to grow, and also depend on animals for pollination or to move their seeds around.

[LS2.C] Ecosystem dynamics, functioning, and resilience: When the environment changes some organisms survive and reproduce, some move to new locations, some move into the transformed environment, and some die.

[LS4.C] Adaptation: Particular organisms can only survive in particular environments.

[LS3.A] Inheritance of Traits: Many characteristics of organisms are inherited from their parents. (3-LS3-1). Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment. (3-LS3-2)

[LS3.B] Variation of Traits: Different organisms vary in how they look and function because they have different inherited information. (3-LS3-1) The environment also affects the traits that an organism develops. (3-LS3-2)

[LS4.C] Adaptation: For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)

Unit 1: Plant Adaptations

Lesson #	Title	In this lesson, students will...
1.	Plant Part Inquiry	Review the plant parts and their functions, as well as the plant life cycle. They will then practice scientifically drawing and labeling a chosen plant. As a class, students will graph the plant parts found on their plants.
2.	Seed Dissection	Learn how seeds survive by dissecting a bean seed and examining its parts. Each student will complete a scientific drawing and label the parts of a bean seed.
3.	Seed Dispersal	Learn about seed crowding through a skit and learn how seeds disperse themselves to avoid crowding. We will connect this to the concept of adaptations. Students will end by searching the garden for seeds and trying to identify how they travel.
4.	Adapt-a-Seed	Identify the main adaptations that enable seeds to travel in their unique way via a matching game. Then, students will use a variety of art materials to craft a seed that has special adaptations that allow it to travel. Students will test and share their models at the end of class.
5.	Leaf Structure and Drought Tolerant Adaptations	Learn about the similarities and differences between leaves by collecting and observing leaves, including succulent leaves. Students will learn what leaf adaptations help to make a plant drought-tolerant.
6.	Drought-Tolerant Scavenger Hunt	Complete a scavenger hunt searching for drought-tolerant leaf adaptations. Students will review the meaning of adaptations and various ways plant leaves have adapted to survive with limited water. Students will briefly discuss and observe root types and their drought-tolerant adaptations.
7.	Invent a Plant	Summarize all they have learned about plant adaptations by making a plant out of garden materials that is well suited for a particular environment.
8.	Field Journaling	Learn about how scientists use field journals to record and communicate observations of natural phenomena through drawings and writing. After looking at various sample scientific field journal pages, students will select a plant in the garden to be the subject of their own field journal page.

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TITLE | PLANT PART INQUIRY (ADAPTED FROM ANNETTE HUDDLE AT SAN FRANCISCO BOTANICAL GARDEN)

GRADE | Third Grade

UNIT | 1

LESSON | 1

OVERVIEW | In this lesson, students will review the plant parts and their functions, as well as the plant life cycle. They will then practice making a scientific drawing of a plant and labeling its parts. As a class, students will graph the plant parts found on their plants.

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Time: 45-55 minutes

Focus Question: What part of the plant is most important for the plant's survival?

Key Terms: ROOTS, STEM, LEAVES, FLOWERS, FRUIT, SEEDS, SCIENTIFIC DRAWING

Objectives: Students will be able to...

1. describe a plant and its parts.
2. practice the ABCDE's of Scientific Drawing.
3. create a graph as a class.

Materials/Prep Work:

- Parts of a Plant poster, available in Curriculum Visuals linked in the Table of Contents**
- ABCDE's of Scientific Drawing¹ poster** available in *Curriculum Visuals* linked in Table of Contents
- Plant Parts Graph**, clearly labeled (see blog links below for examples)
- Stickers, sticky notes, or pre-taped pieces of paper in 7 different colors;** identify which color will represent which plant part
- Data collection worksheet** for plant part hunt (attached)
- Clipboards, pencils**
- Crayons/colored pencils**
- Label plants** in your garden
- Write instructions on board:**
 1. Two minutes to select plant in garden
 2. Draw plant in pencil
 3. Come back to the table to add color and labels
 4. Add your plant parts to the class graph when it's your turn
 5. Write all questions and observations you have about your plant
 6. Finished early? Find a partner who is also finished and share your drawings/tell each other about your plant

Lesson Steps:

Introduction: (10 minutes)

- Exploration: Students have two minutes to walk around the garden and look for their favorite plant.

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Activity 1: Plant Part Review (10 minutes)

- **Ask:**
 - What is your favorite plant?
 - What are some things most plants need in order to grow?
 - Apples, oranges, bananas, and mangoes are examples of what plant part?
 - What part of the plant holds up the leaves, flowers, and fruits?
 - What job do roots do for a plant?
 - Can you name all 6 parts of a plant?
- **Review** plant parts using a labeled drawing.

Optional: Activity 1: Plant Part senses (5 minutes)

- *PREP: Prepare 6 different boxes with a different plant part in each box. For example add fibrous roots of a clump of grass into a box for roots, celery into a box for stems.*
- *Have students put their hands in each box and guess which plant part they are feeling without looking at the item.*
- *Encourage students to think about and discuss what part of the plant is in each box.*

Activity 2: Plant Part Functions Dress-Up (10-15 minutes)

- **Skit:** Dress up a student/teacher as a plant, discussing the **FUNCTION** of each part as you add it to the student. Other students are involved through actions indicated below. After you add new parts to the plant model, be sure to repeat the parts that came before to reinforce the idea of a cycle with sequential steps (See Life Lab video for an example: <https://www.youtube.com/watch?v=8R7fVI7esZE>).
- **ROOTS** (Wiggle toes like roots in the ground; make a sucking sound like you're drinking through a straw): Roots grow from the seed down into the ground, and absorb water and nutrients from the soil so the plant can grow strong.
- **STEM** (Stand up straight with arms down): The stem holds up the plant so it doesn't fall over and it is like a giant straw for the water and nutrients to travel up from the roots.
- **LEAVES** (Stretch out arms and face palms up): Leaves receive water and nutrients from the stem and use these, plus air and sunlight, to make food for the plant.
- **FLOWER** (Turn one hand into a cup shape, like a flower): Flowers attract pollinators to pollinate the flower.
- **FRUIT** (Use the other hand to pretend a pollinator visits your flower hand and it starts to turn into a juicy fruit): The fruit is a suitcase for seeds.

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- SEED (Curl up in a small ball like a seed underground): Inside the fruit are seeds, which will sprout and form new plants.

- Summarize the plant part review using the Parts of a Plant poster.

Activity 3: Plant Part Observations and Drawing (25 minutes)

- **Explain:** Students will select one plant in the garden to closely observe and draw. We're also going to make a graph of all the different plant parts we identify in our plant observations.

- **Review SCIENTIFIC DRAWING** using the ABCDEs poster.

- Accurate, Big, Colorful, Detailed, Explained

- Demonstrate a weak scientific drawing, ask students what could make it stronger, and change the drawing based on their suggestions

- **Instructions:**

1. Two minutes to select a plant in the garden

2. Draw plant in pencil

3. Come back to the table to add color and labels

4. Add your plant parts to the class graph when it's your turn

5. Write all questions and observations you have about your plant on a sticky note

6. Finished early? Find a partner who is also finished and share your drawings/tell each other about your plants.

- **Distribute** worksheets to students and send them off to work.

- **Make Graph:** Draw a graph on a poster paper. (See blog links below for examples). Label the X-axis with each of the plant parts and the Y-axis with numbers. Choose a different color sticky note for each of the plant parts. Have students add a sticky note to the graph for each plant part that they observed on their plant.

Closing: (5 minutes)

- **Reflection:** Look at the graph as a class. Time permitting, discuss the results (continued in lesson 2). Relate different plant parts to seasonality/life cycles (i.e. apples (fruit) in the fall).

- **Key Questions:**

- What do you notice about the graph?

- Do you think this graph would look different during a different part of the year?

- What is the most common plant part in our garden? Does that mean it is the most important?

Additional Information:

NGSS:

[LS1.A] Structure and function: Organisms have both internal and external macroscopic structures that allow for growth, survival, behavior, and reproduction.

Blog links:

- K. Owyang. (2014, October 29). Roots, Stems, Leaves, Flowers, Fruits and Seeds! [Web log post]. Retrieved June 7, 2019, from <https://educationoutsideafy.wordpress.com/2014/10/29/roots-stems-leaves-flowers-fruits-and-seeds/>

- S. Flynn. (2014, September 4). "Wait...is this a fruit?" [Web log post]. Retrieved June 7, 2019, from <https://miralomagarden.wordpress.com/2014/09/04/waitis-this-a-fruit/>

References:

1. ABCDE's of Scientific Drawing. Full Option Science System, Lawrence Hall of Science, U.C. Berkeley. Science Notebooks In Grades 3-6, p. 16

2. L. (Director). (2010, November 30). 6 Plant Parts Skit [Video file]. Retrieved June 6, 2019, from <https://www.youtube.com/watch?v=8R7fVI7esZE>

Plant Part Inquiry

Name _____ Date _____

Meet A Plant!

Draw your plant below and identify its parts:

Circle the part on your plant that you think is most important for the plant to survive.

<p>1. Remember the ABCDE's</p> <ul style="list-style-type: none">AccurateBigColorfulDetailedExplained	<p>2. Which parts does your plant have?</p> <ul style="list-style-type: none"><input type="checkbox"/> Roots<input type="checkbox"/> Stems<input type="checkbox"/> Leaves<input type="checkbox"/> Flowers<input type="checkbox"/> Fruit<input type="checkbox"/> Seeds<input type="checkbox"/> Mystery
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TITLE | SEED DISSECTION

GRADE | Third Grade

UNIT | 1

LESSON | 2

OVERVIEW | In this lesson, students will learn how seeds survive by dissecting a bean seed and examining its parts. Each student will complete a scientific drawing and label the parts of a bean.

Time: 45-50 minutes

Focus Question: What is the most important part of a seed?

Key Terms: DISSECT, FUNCTION, EMBRYO, SEED COAT, FOOD STORAGE

Objectives: Students will be able to...

1. dissect a bean and use a hand lens to look closely at its parts.
2. make a scientific drawing of the inside of a bean and label the parts of the seed.
3. understand how a seed survives until it receives water and soil.

Materials/Prep Work:

- Large dry beans** (pinto, kidney, scarlet runner, etc.), one per student
- Beans soaked for 24 hrs**, one per student (plus extras)
- Beans that have begun sprouting** after soaking for a few days, one per student (plus extra)
- Set up seeds on **small trays** for students to do dissections
- Hand lenses**
- Large diagram of the inside of a seed** with parts labeled
- Bowl** to collect seed parts after dissection
- Seed Dissection Worksheet** or science notebooks
- ABCDE's of Scientific Drawing**¹ poster available in *Curriculum Visuals* linked in Table of Contents
- Clipboards, pencils**

Student Prior Knowledge:

- ABCDE's of scientific drawing

Lesson Steps:

Introduction: (5 minutes)

- **Distribute** dry beans
- **"I notice, I wonder, It reminds me of"**
 - **Record** some of the "I wonder" questions on the board.
- **Ask:** What is the most important part of a seed?

Activity 1: Seed Dissection (35 minutes)

- **Ask:** When you hear the word dissect, what do you think of?
 - Once students have answered, **Define** the word DISSECT (take apart).
 - **Ask:** What do you think we can figure out by dissecting a seed?
- **Instruct** students to try to DISSECT dry beans (students will be unable to)
 - **Ask:** Who is having trouble opening their seed? Why do you think that is?
 - **Ask:** What do you wear when it gets cold outside? (A coat)
 - **Explain:** Seeds also have coats (the hard outer layer)
 - **Think-pair-share:** What is the FUNCTION of this seed coat? Why is it important?
 - The seed coat protects the inside of the seed until it is in the proper conditions to grow/germinate.
- **Ask:** How can we make the seed coat easier to open? (Answer: Soak in water!)
 - **Distribute** soaked beans on a small tray to each student and collect dried seeds
 - **Key questions:**
 - What do you notice about this seed?
 - How does it look different from the dry seed? (The seed coat should come off)
 - **Brainstorm** ways to carefully DISSECT the bean.
 - **Review** how to use magnifying lenses
 - **Review** the ABCDE's of scientific drawing
 - **Challenge** students to DISSECT their beans (give them extra!) and record on their worksheets as many details and questions as they can about what's inside.
 - Prompt them to notice detail by writing words like texture, weight, color, pattern, etc. on the board
 - Have students come up with their own names for the different parts of a seed that they find and give their best idea for the function of each of the parts.
- **Record** student observations on the board.
 - **Review** the questions from the beginning of class. Were any answered? What would we need in order to answer our questions?
 - **Show** the labeled bean seed poster, matching their observations with the labels on the poster. Identify the main parts and their FUNCTIONS:
 - Seed coat: protection
 - Embryo (baby plant): first root that will grow into ground when seed is planted and the first leaves that will grow above ground when seed is planted
 - Endosperm (plant food): surrounds roots and seed leaves and provides food for seed until the plant can start to make its own food.
 - **Prompt** students to add labels to their scientific drawings.
 - **Ask** students to share any questions they wrote during the dissection.
- **Distribute** seeds that have started to germinate and ask students to DISSECT and scientifically draw the seed (with the main parts labeled).

Optional: If there is time, follow with a seed germination activity and observe changes as the plant grows. Alternatively, students can simply take the germinated seeds home as a gift.

Optional: Cut out construction paper seed coats, food, and baby plants and have students assemble "bean books" in the correct order.



Closing: (5 minutes)

- Reflection questions:

- If you were to watch the germinated seed over the next few weeks, what changes might you observe?
- What is the most important part of a seed?
- What might happen if seeds didn't have a seed coat? An endosperm?

Additional Information:

NGSS:

[LS1.A] Structure and function: Organisms have both internal and external macroscopic structures that allow for growth, survival, behavior, and reproduction.

[LS2.A] Interdependent Relationships in Ecosystems: Plants depend on water and light to grow, and also depend on animals for pollination or to move their seeds around.

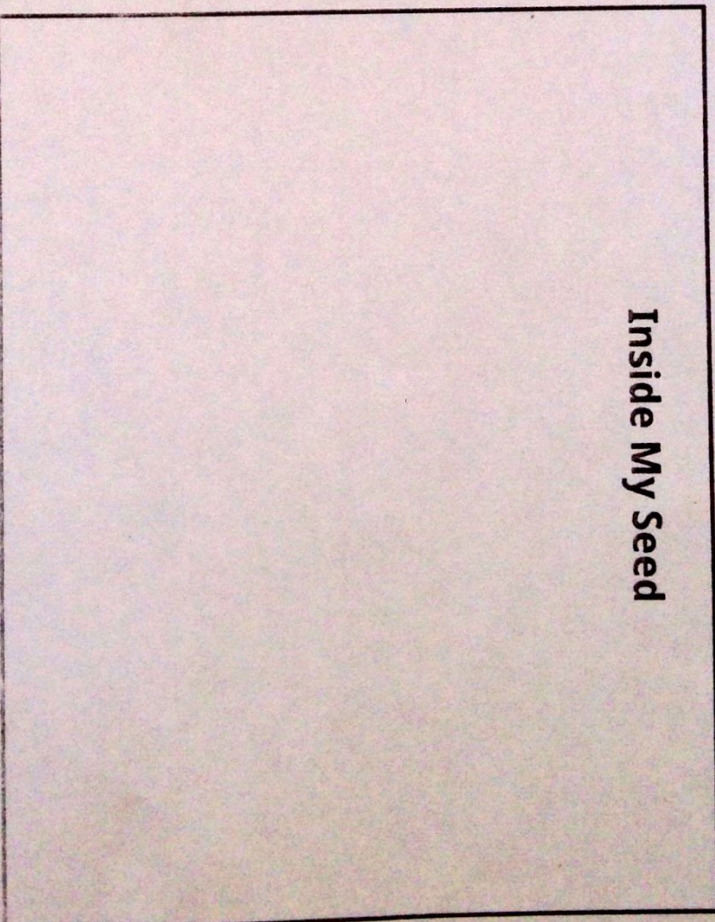
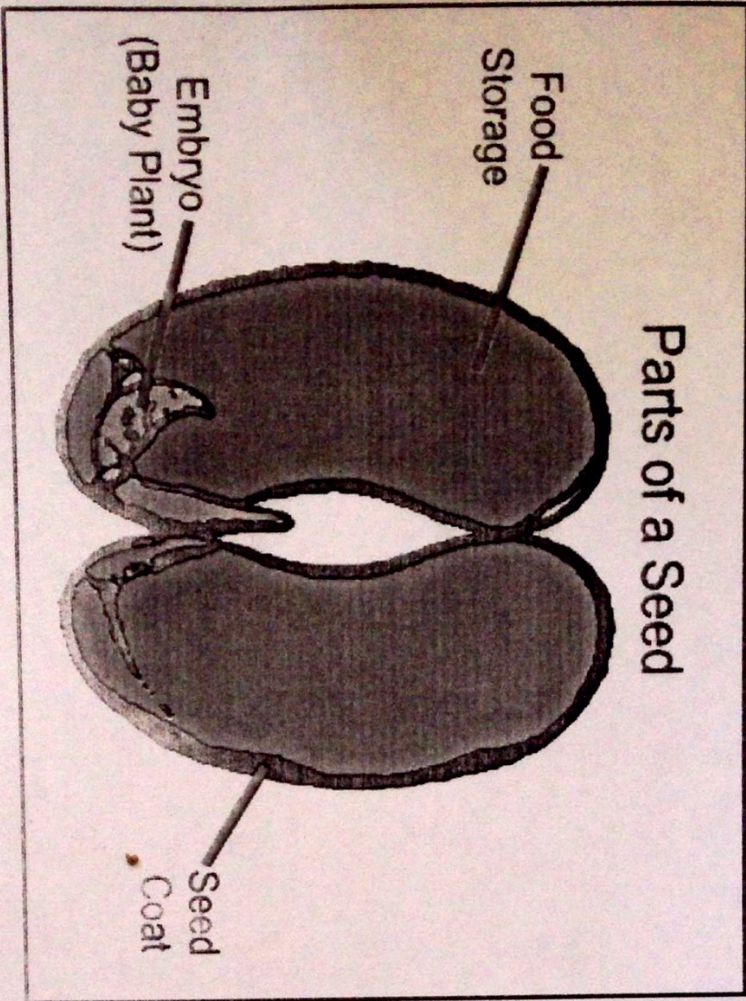
References:

1. ABCDE's of Scientific Drawing. Full Option Science System, Lawrence Hall of Science, U.C. Berkeley. Science Notebooks In Grades 3-6, p. 16

Name: _____

Date: _____

Inside a Bean Seed



Check Yes or No:

My Seed Has:	Yes	No
A Seed Coat		
An Embryo		
Food Storage		

TITLE | SEED DISPERSAL

GRADE | Third Grade

UNIT | 1

LESSON | 3

OVERVIEW | In this lesson, students will learn about seed crowding through a skit and learn how seeds disperse themselves to avoid crowding. We will connect this to the concept of adaptations. Students will end by searching the garden for seeds and trying to identify how they travel.

Time: 45 minutes

Focus Question: If a seed wanted to travel, how would it do it?

Key Terms: SEED/PLANT CROWDING, DISPERSE, REPRODUCE

Objectives: Students will be able to...

1. visualize seed crowding and understand why seeds need to travel/disperse from their parent plant.
2. name and explain the different ways that seeds travel (floaters, fliers, hitchhikers, etc.), connecting this to the concept of plant adaptations.
3. identify seeds in the garden and brainstorm how they might travel.

Materials/Prep Work:

- A fruit that has visible seeds inside** as a snack for each student (i.e. snap peas, apple slices, cherries)
- Coconut** (or another type of seed that students find interesting)
- Bright yarn or chalk** to mark out rectangular “bed”
- How Seeds Travel poster**, available in Curriculum Visuals linked in the Table of Contents.
- Examples of different seeds:** floaters (coconut), fliers (maple seeds), hitchhikers (burrs as stickers, berries as poopers), and drop and rollers. (Ask your local nursery to cut seeds from their plants)
- Images of different seeds** (*Seeds: Pop, Stick, Glide by Patricia Lauber*) (Examples: Blueberry, maple seed, coconut, acorn, jewelweed, sand burr)
- Science notebooks or data collection worksheet** for seed hunt (attached)
- Clipboards, pencils**

Lesson Steps:

Introduction: (5 minutes)

- **Engage** students by showing them a coconut and asking “If this coconut wanted to go on a trip, how would it travel?”

Activity 1: Seed Crowding Skit (15 minutes)

- **Explain** that fruits carry seeds, sometimes we eat seeds, and sometimes we plant seeds to grow more plants or REPRODUCE.
- **Skit:** Tell the story of a tree’s life cycle (seed→ plant→ flower→ fruit→ seeds), with all students participating.
 - Ask one student to be the “parent tree” and act out the lifecycle in a ~ 2’x3’ “bed”. As the plant life cycle story is retold, involve other students by asking for sound effects of rain, sending out sunbeams, etc.

- When ready to drop seeds, two “children trees” join the first in the bed as new seeds.
- Continue to act out until bed is too crowded for new seeds to grow.
- **Key Questions:**
 - Is there enough room for you (trees) to spread out your branches?
 - Are your leaves getting enough sunlight?
 - Is there space for more seeds to grow?
- **Introduce** the term SEED/PLANT CROWDING and relate it to personal space.
- **Exploration:** Students have two minutes to search for crowded plants in the garden.

Activity 2: How and Why Seeds Travel (10 minutes)

- **Think-pair-share:** What do plants do to prevent seed crowding?
 - Seeds travel or DISPERSE, away from their parent plant, so they have enough space to grow.
- Create a story of students on an epic adventure that interacts with the seed dispersal types. Students can act it out when their part is read OR you can ask your students to wait to eat their snack until they hear their name read in the story.
- - Distribute the chosen fruit snack to students (snap pea, apple slice, cherry, etc)

The Mystery of the Traveling Seed

Once upon a time there was a classroom of 3rd grade scientists. They had been studying a large apple tree that grew nearby their school. They talked about how the tree had grown roots, how it had grown branches, and how it had grown leaves. They talked about how it was once a tiny seed, made by another tree. **Elliot** piped up, “Well, if it was a tiny seed on another tree, how did that tiny seed get all the way over here?” “Yeah!” said **Cameron**. “And how did the seed of that bush get here?! And that flower? And that shrub?!” “It’s a mystery!” **Angus** shouted. “The mystery of the travelling seed!” And so, the class of 3rd graders decided to journey into a forest to try and solve the mystery of the travelling seeds. They brought their science clipboards, their magnifying glasses, and their special scientist hats (everyone takes out their imaginary science clipboard and magnifying glasses, and puts on their imaginary hat). They started walking and soon enough came to a small stream. Next to this stream, there was a big coconut tree with some delicious looking coconuts high in the branches. The students were drinking water from the stream when suddenly (sound effect), **Sophia** heard a loud splash. She looked up and saw that one of the coconuts had fallen from the branches and landed smack dab in the middle of the water. “Look!” she said to her classmates! And they all gathered around to watch as the coconut floated down the stream, washing up on the side of the stream. Now, **Omar** had magical goggles that allowed him to speed up or slow down time. He put them on, (sound effect), and watched as that coconut sprouted, grew roots, and grew into a beautiful, tall tree. He took the goggles off and told the other student’s what he saw. “Hmm,” **Hannah** said, “we should call these kinds of seeds FLOATERS.” So, everyone wrote FLOATER down in their science notebooks and the students continued on their journey. As they walked away from the stream, the third grade students stumbled upon a large grassy field dotted with beautiful flowers. **Venus** pointed and exclaimed: “Check it out!” “Dandelions!” **Isabella** shouted. Just then, an enormous gust of wind blew through the meadow. At that moment, the fluffy dandelion seeds blew way up into the air and floated on until they landed in another meadow far, far away. **Joshua** yelled: “Make a wish!” and he decided the scientists should call those kinds of seeds FLIERS, so everyone wrote that down in their science notebooks. **Elliott** decided that it was time for the scientists to move on so he led the third grade scientists under a beautiful waterfall to a hidden rainforest. As the scientists entered the rainforest, he pointed to a very large tree and cried, “It’s a rubber tree!” All of a sudden the scientists heard a large popping noise. “Whoa!” **Carson** shouted “the rubber seed pods just literally exploded and their seeds flew into the air,” “Interesting,” **Nehemiah** observed, “I think we should call these kinds of seeds POPPERS.” So all of the scientists wrote down POPPERS in their science notebooks. Out of nowhere, an adorable little wolf pup came running up to the scientists. “Awww!” **Anson** exclaimed. “Look how cute he is!” As he bent down to pet the pup, he noticed the little guy had burrs all over his fur. **Anson** called **Fiona** over to check it out and **Vivienne** explained- “Each of these little burrs actually contains a seed.”

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“Exactly,” **Fiona** added “The seed coat clings, much like Velcro, to animal fur or skin so that the seeds can be carried to a spot far away from the mother plant.” “Wow!” **Ella** said. “We should call these kinds of seeds HITCHHIKERS” So the scientists wrote HITCHHIKERS in their science notebooks. As they were writing, the pup gave a big tail wag and ran off. In the distance, they could see him rolling around in the soil. **Zoey** declared: “I bet that’s making some of those hitchhiker seeds fall off into the ground.” “Definitely,” **Chloe** added, “We’d probably see new plants in that very spot if we were to return in a few months!” The scientists nodded in agreement, and continued on to a beautiful orange grove. They entered the orange grove, took a deep inhale of the citrus scent and looked around. “OMG! Did you see that?!?” **Anya** shouted, “I just saw 5 oranges with seeds in them drop off the tree and roll down the hill.” “Hmm,” **Tristan** chimed in: “We should definitely call these types of seeds DROPPERS” The rest of the class nodded their heads in agreement and wrote down DROPPERS in their science notebooks. Out of nowhere, a pack of baboons scurried from underneath a very large blackberry bush. They climbed up some trees and ate their blackberries while looking down on the scientists. “Uh oh!” **Hugo** shrieked, “I think I know what’s going to happen next.” **Clarisse** yelled: “Bombs away!” **Leung Losi** warned: “Everybody duck!!” At that moment, the baboons started pooping. Fortunately, no one was hit, but it was certainly a close call. “Well,” **Mr. Leung** stated, “I think we should call those kinds of seeds POOPERS.” So the scientists wrote POOPERS in their notebooks. After that, the scientists decided they had had enough with their adventure and that it was time to go back to the garden. So, one by one, they marched back thinking about the six different types of seeds they had observed on their adventure: FLOATERS, DROPPERS, POPPERS, HITCHHIKERS, FLIERS AND POOPERS.

The End.

- **Explain** the different methods of seed dispersal using photo visuals and real examples. Have students act out a movement related to each method.

1. Floater (pretend to swim): Seeds float on water until they arrive on land by waves or water movement in streams.
2. Flier (pretend to fly): Seeds are light and blow around in the wind.
3. Exploder (pretend to pop out of a pod and make bubble popping sound): Seed pods explode and send seeds flying through the air.
4. Hitchhiker (pretend to look for someone to pick up; latch onto something you see): Seeds have rough sides that get stuck to an animal’s fur and are carried until they fall off of the animal: like Velcro, with hooks at the end.
5. Pooper (pretend to poop): Animals swallow whole seeds so the seeds pass through their body and are returned to the ground in a new place through an animal’s droppings.
6. Drop and Roller (pretend hand is a fruit dropping from a tree and rolling down hill): Some fruits are round so when they fall off the plant they will roll away.
7. Human Helpers (pretend to plant seeds): We plant seeds; seeds can also get stuck to our clothes just like they get stuck to an animal’s fur.

Activity 3: Seed Scavenger Hunt (10 minutes)

- **Distribute** worksheets to students (or have students set up a chart in their science notebooks).
- **Demonstrate** how to fill out the worksheet with labeled drawings.
- **Application:** Students search for seeds in the garden and record how they think they disperse.

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Closing: (5 minutes)

- Reflection questions:

- If a seed wanted to travel, how would it do it?
- Which sort of seed dispersal is best in a desert environment? On an island?
- What do humans use that are similar to seed dispersal methods?
- How would you explain to someone else how/why seeds move around?

Optional: You can teach and sing this song with your students.

Seed Travelers

Sung to the tune of "Wheels on the Bus"

The birds eat the seeds and **POOP** them out
POOP them out, **POOP** them out
The birds eat the seeds and **POOP** them out
All through the garden

The seeds in the **POPPERS** go pop, pop, pop
Pop, pop pop, pop, pop, pop
The seeds in the **POPPERS** go pop, pop, pop
All through the garden

The **FLOATERS** and the **FLYERS** use wind and water
Wind and water, wind and water
The **FLOATERS** and the **FLYERS** use wind and water
All through the garden

The **HITCH-HIKER** grabs and holds on tight
Holds on tight, holds on tight
All through the garden
All through the garden

Additional Information:

NGSS:

[LS1.A] Structure and function: Organisms have both internal and external macroscopic structures that allow for growth, survival, behavior, and reproduction.

Blog Links:

- S. Flynn. (2014, September 18). ← "Smell my plant!" "It's an insect. Like me!" → "Should we do exploding or pooping?" [Web log post]. Retrieved June 7, 2019, from <https://miralomagarden.wordpress.com/2014/09/18/should-we-do-exploding-or-pooing/>

Classroom Extension:

- Water dispersal video: Globalzoo. (2010, June 21). Retrieved June 07, 2019, from <https://www.youtube.com/watch?v=7UTWMhFhMFc>
- Animal dispersal video: Globalzoo. (2010, June 21). Retrieved June 07, 2019, from <https://www.youtube.com/watch?v=8ZLv3xAjH3Q>

Name _____ Date _____

Seeds around our Garden

Different types of seed dispersal:

1. **Floater** (on water)
2. **Flier** (in the wind)
3. **Exploder**
4. **Hitchhiker** (on an animal's fur)
5. **Pooper** (travel in animal's stomach)
6. **Drop and Roller**

Can you find seeds around our garden and figure out how they travel?

DRAW the seed you find here	How do you think it travels?

Name _____ Date _____

Seeds around our Garden

Semillas en nuestra Jardín

Types of seed travel/*Tipos de viaje de las semillas...*

1. **Float** on water/**Flotar** en el agua
2. **Fly** in the wind/**Volar** en el viento
3. **Explode/Explotar**
4. **Hitchhike** (on an animal's fur or inside an animal's stomach!)/**Hacer dedo** (en el pelo o el estómago de un animal)
5. **Drop and Roll/Caer y Rodar**

Can you find seeds around our garden and figure out how they travel?

¿Puedes buscar semillas alrededor nuestra jardín y resolver como viajar?

DRAW the seed you find here <i>DIBUJA la semilla que encuentres aquí</i>	How do you think it travels? <i>¿Cómo piensas que viaje la semilla?</i>

.....

TITLE | ADAPT-A-SEED (ADAPTED FROM THE "ADAPT -A-SEED" LESSON IN LIFE LAB'S *THE GROWING CLASSROOM* ACTIVITY GUIDE¹)

GRADE | Third Grade

UNIT | 1

LESSON | 4

OVERVIEW | In this lesson, students will review the main modes of seed dispersal. We will identify the main adaptations that enable seeds to travel in their unique way (ex: flier seeds have to be light and have parts that can catch the wind) via a matching game. Then, students will use a variety of art materials to craft a seed that has special adaptations that allow it to travel. Students will test and share their models at the end of class.

.....

Time: 45 minutes

Focus Question: How do seeds travel?

Key Terms: ADAPTATION, FLOATER, FLIER, HITCHHIKER, EXPLODER, DROP, ROLLERS

Objectives: Students will be able to...

1. recall the main modes of seed dispersal.
2. connect structural adaptations to each mode of seed dispersal.
3. design a seed able to travel in one of the dispersal methods.

Materials/Prep Work:

- How Seeds Travel poster**, available in Curriculum Visuals linked in the Table of Contents
- Trays** for holding materials
- Glue**
- Tape**
- Craft Materials, including Cotton balls, bubble wrap, rubber bands, toothpicks, paper clips, napkins, tissue paper, string, cloth, construction paper, feathers, aluminum foil, balloons, metal springs, cork, plastic bags**
- Seeds to adapt - **bean seeds** work best
- Bucket** filled with water for testing floaters
- Fan** for testing fliers
- Match Game Cards** (Below)

Student Prior Knowledge: Students should be familiar with seed dispersal methods as taught in L3: Seed Dispersal

Lesson Steps:

Introduction: Thumb Game (5 minutes)

- **Challenge** students to untie and tie their shoes/take off their watch/unzip and zip their jacket without using their thumbs.
- **Class Discussion:** Why was it so hard to complete the challenge without a thumb? How do thumbs help us survive?
- **Say:** ADAPTATION is a trait or behavior that helps a plant or animal survive and reproduce.

.....

Activity 1: Matching Game or Charades (10 minutes for each activity, 20 if you do both)

- **Explain** matching game, using image below. Each group will get 1 set of cards. One set is of the dispersal methods, the other set is of different structural adaptations that help a seed travel in a certain way. The goal is to match each of the adaptations with the correct dispersal method (ex: matching hooked ends of a seed to a hitchhiker).
- **Distribute** cards. Allow 5 minutes to complete the game.
- **Review** answers as a class. Show poster with answers written up, hang on board for reference during seed adaptation creation

OR

- Charades

- Use the seed dispersal adaptation cards for a game of charades. Have students select a seed dispersal type to act out, and have the rest of the students guess.

Activity 2: Adapting Our Seeds (20 minutes)

- *Note: Be sure to frame this activity in the light of being an “imagination creation” and not necessarily something that would/could exist in nature.*
- **Explain:** Each student will use craft materials to add adaptations to an existing seed. Students will pick one structure they will change in order for the seed to be able to travel in one of the five ways. *(Optional: Give students the challenge to make a hitchhiker seed that is able to stick to the teacher, a floater that can sail across a tub of water without sinking, a flier that can travel from the “tree” (student) out of the “shade zone” (a few feet away from the student so it wouldn’t be in the tree’s shadow), etc. Alternatively, students draw from a hat which travel method they have to adapt their seed to fit.)*
- **Distribute** materials. Circulate to help students get on the right track and create a clear goal for how that structural adaptation will help the seed travel.

Closing: (10 minutes)

- **Gallery walk:** Each student must give their reasoning for how their seed’s structural adaptation will help the seed travel while other students ask questions. *(Optional: Divide students into small groups to shorten the amount of time this takes.)*

Additional Information:

NGSS

[LS1.A] Structure and function: Organisms have both internal and external macroscopic structures that allow for growth, survival, behavior, and reproduction.

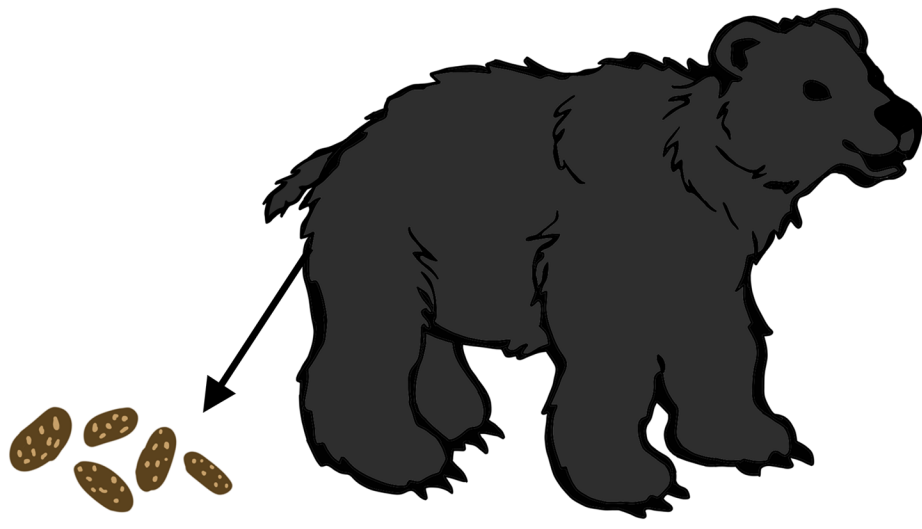
[LS2.A] Interdependent Relationships in Ecosystems: Plants depend on water and light to grow, and also depend on animals for pollination or to move their seeds around.

[LS4.C] Adaptation: Particular organisms can only survive in particular environments.

References:

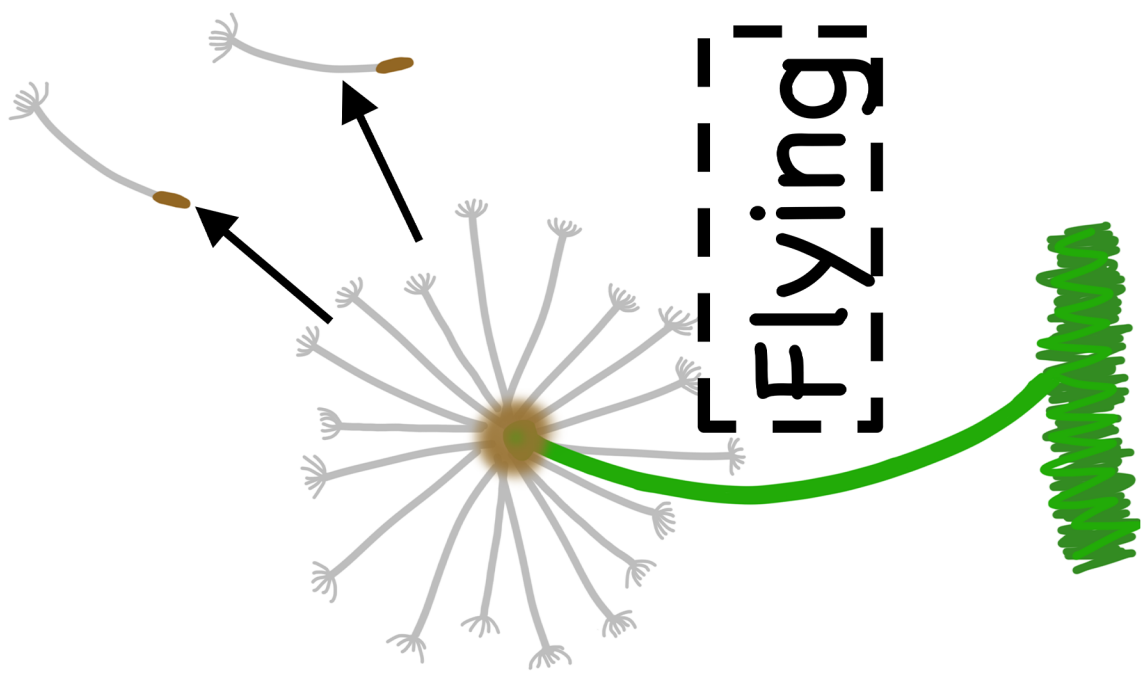
1. Jaffe, A., Appel, G. (2007) The Growing Classroom. South Burlington, Vermont: National Gardening Association.
2. E. (2014, September 18). ← “Smell my plant!” “It’s an insect. Like me!” → “Should we do exploding or pooping?” [Web log post]. Retrieved June 7, 2019, from <https://miralomagarden.wordpress.com/2014/09/18/should-we-do-exploding-or-pooing/>

[Pooping]

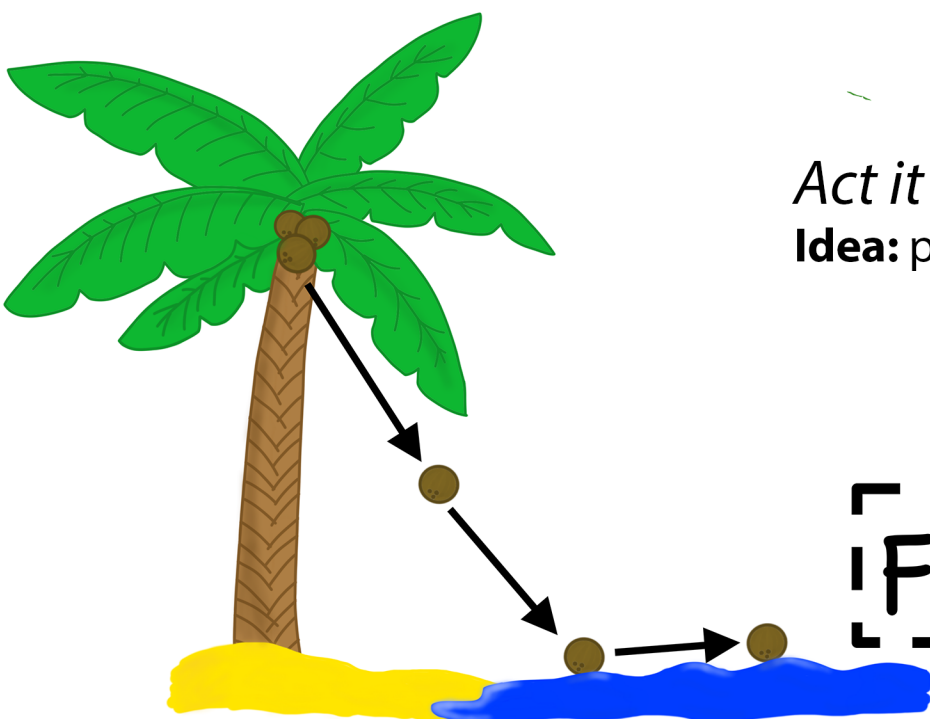


Act it out!
Idea: pretend to poop

[Flying]



Act it out!
Idea: pretend to fly



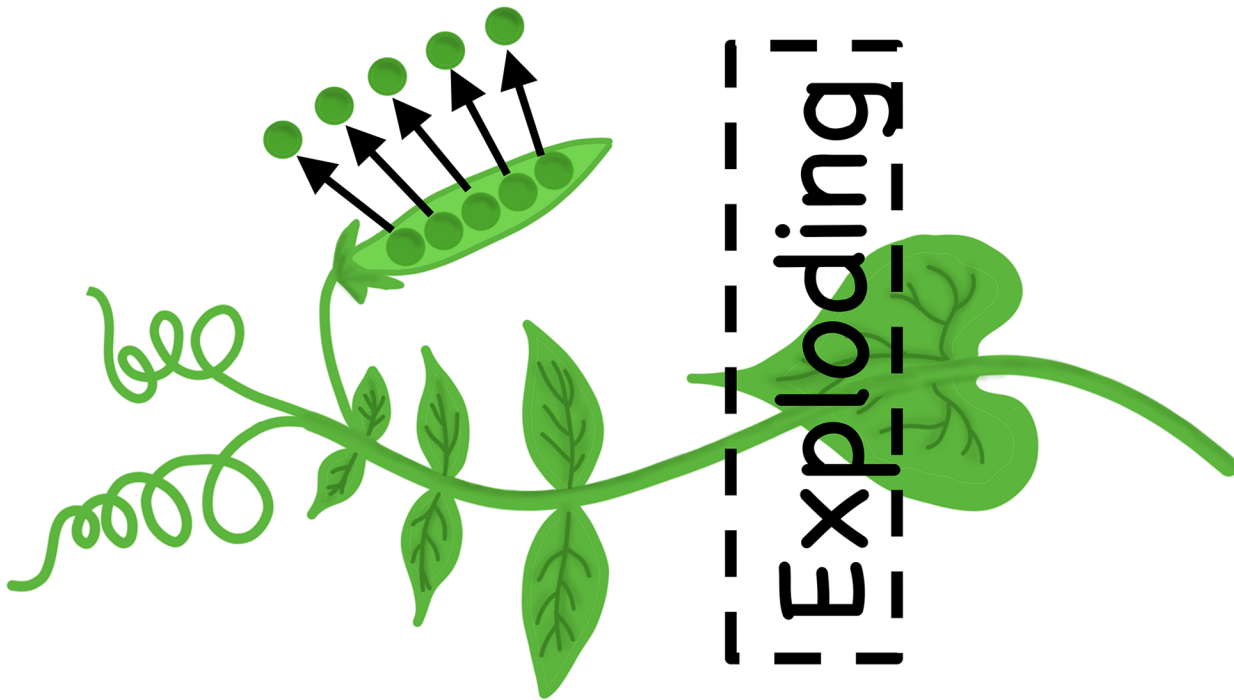
Act it out!
Idea: pretend to swim

[Floating]

Dropping and Rolling

Act it out!

Idea: pretend hand is a fruit
dropping from a tree and rolling down hill



Exploding!

Act it out!
Idea: pretend to pop out of a
pod and make bubble popping
sound

Act it out!

Idea: latch onto something / someone
you see

Hitchhiking



Seed Dispersal Cards

Blueberry



Maple Seed



Coconut



Acorn



Seed Dispersal Cards

Jewelweed



Sand Burr



TITLE | LEAF STRUCTURE AND DROUGHT-TOLERANT ADAPTATIONS

GRADE | Third Grade

UNIT | 1

LESSON | 5

OVERVIEW | In this lesson, students will learn about the similarities and differences between leaves. Each student will collect a leaf from the garden. We will discuss what parts they all have, focusing on veins and their function. Then we will sort leaves to fit their environment/biome based on their adaptations.

Time: 45-50 minutes

Focus Question: What environment is best for a leaf?

Key Terms: VEIN, DROUGHT-TOLERANT, ADAPTATION, DROUGHT

Objectives: Students will be able to...

1. identify the main characteristics common to most leaves.
2. compare succulent and non-succulent plant leaves.
3. understand that there are a variety of common adaptations enabling plants to survive with little water.

Materials/Prep Work:

- Image** of leaf (draw on board or print)
- Biome Images:** Find images of: Tundra, Tropical Rainforest, Grassland, Wetland, Temperate Forest, Desert
- Bucket** to collect leaves after investigation
- Samples** or **images** of drought-tolerant leaf adaptations (thick and waxy leaves, leaves with thorns, white-green leaves, short and thin leaves)

Student Prior Knowledge: Students should have a basic understanding of the term ADAPTATION as introduced in L4: Adapt-a-Seed.

Lesson Steps:

Introduction: (5 minutes)

- **Two-minute challenge:** Students observe leaves in the garden and pick one they think is interesting to bring back to the outdoor classroom.

Activity 1: Leaf Structure (10 minutes)

- Pair-share about your leaf with a partner - Why do you think it is interesting? How are your leaves similar/different?
- Group share the similarities between the leaves that everyone picked; garden educator can write a list on board. (As students list their similarities, use the image of a leaf as a visual.)

.....

- Topics to hit:

- Leaves have veins to carry water/nutrients and give structure to the leaf; most leaves have a midrib (main vein down the middle)
- Most leaves are green (chlorophyll) This green is produced through a pigment called chlorophyll. Chlorophyll is what helps leaves capture light in order for plants to make their own food.
- **Show** other leaves with different characteristics/textures (hairy, spiky, thick, light/dark green, small/big)

Activity 2: Leaf Adaptation Sort (10-15 minutes)

- **Show** students images of different environments. Instruct students to place their leaf on top of the image of the environment that they think their leaf is best adapted for. Have students explain what characteristics of the leaf influenced their answer (i.e. thick skin, water inside of the leaves, etc.).
- **Collect** all leaves to put in the compost bin.
- **Review** ADAPTATION (a trait or behavior that allows a living thing to survive and reproduce in its environment).
- **Discuss** how leaves have adapted to survive with little water (thick leaves store water, prevent evaporation). Based on what you know about the climate of California, why might succulents grow well here?
- **Brainstorm** other leaf adaptations that might make plants more likely to survive in their environment, based on earlier leaf observations. **Introduce** and provide examples of adaptations students may not identify:
 - Hold water
 - Thick and waxy skin
 - Fuzzy hair
 - Light green/white in color
 - Small and thin
 - Spikes for protection
- **Explain:** There is a lot of evidence of these adaptations around our garden - we'll be looking for them next week. Time permitting, have students go out into the garden to identify 1-2 examples of these adaptations.

Note: You can also begin the leaf adaptations scavenger hunt (in the next lesson) and complete it during the following lesson. There will likely be additional time for garden maintenance at the end of the next lesson.

Activity 3: Garden Maintenance (10-15 minutes)

- **Garden Jobs** with students - responsible watering is a good fit if needed in your garden.

Closing: (2 minutes)

- **Challenge** students to find or recall at least two examples of leaf adaptations in the garden.
- **Ask:** What environment is best for a leaf?

Additional Information:

NGSS

[LS1.A] Structure and function: Organisms have both internal and external macroscopic structures that allow for growth, survival, behavior, and reproduction.

[LS2.C] Ecosystem dynamics, functioning, and resilience: When the environment changes some organisms survive and reproduce, some move to new locations, some move into the transformed environment, and some die

[LS4.C] Adaptation: Particular organisms can only survive in particular environments.

Blog Links:

1. T. Connery. (2014, October 31). Let's Talk about Water [Web log post]. Retrieved June 7, 2019, from <https://springvalleygreenschoolyard.wordpress.com/2014/10/31/lets-talk-about-water/>

TITLE | DROUGHT-TOLERANT SCAVENGER HUNT

GRADE | Third Grade

UNIT | 1

LESSON | 6

OVERVIEW | In this lesson, students will complete a scavenger hunt searching for drought-tolerant leaf adaptations. Students will review the meaning of adaptation and various ways plant leaves have adapted to survive with limited water. Students will briefly discuss and observe root types and their drought-tolerant adaptations. Finally, they will steward the garden with responsible watering.

Time: 45 minutes

Focus Question: Which roots are good at getting water?

Key Terms: ADAPTATION, DROUGHT-TOLERANT, TAPROOT, FIBROUS ROOT

Objectives: Students will be able to...

1. identify common leaf adaptations of drought-tolerant plants.
2. understand plant roots have also adapted to be able to survive with limited water.
3. steward the garden by practicing responsible watering techniques.

Materials/Prep Work:

- Drought-Tolerant Scavenger Hunt worksheet** (example attached - adapt the clues to fit the plants in your garden)
- Clipboards, pencils**
- Labels** in the garden for plants included in the scavenger hunt
- Crayons/colored pencils**
- Images** of root types (attached)
- Images** of drought-tolerant roots (attached)
- Various root samples** (taproot and fibrous), examples include: tap:carrot and dandelion, fibrous:onion and corn
- Watering cans** (optional)

Student Prior Knowledge: Students should have some knowledge of drought-tolerant leaf adaptations as introduced in **L5: Leaf Structure and Drought- Tolerant Adaptations**.

Lesson Steps:

Introduction: (5 minutes)

- **Show** students two different root systems: a taproot (like a carrot) and roots that spread out (most weeds from the garden) and ask which roots are best at getting water?
- **Challenge** students to recall at least 3 leaf adaptations that make plants more drought tolerant. Can show them sample leaves or photos as clues.

Activity 1: Leaf Adaptation Scavenger Hunt (23 minutes)

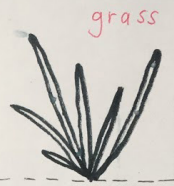
- **Explain** scavenger hunt activity (or continue the scavenger hunt if started during the previous lesson).
- **Demonstrate** how to fill in the scavenger hunt with a scientific drawing of the plant that matches the clue. Emphasize the ABCDEs of scientific drawing (as discussed in earlier lessons in the Education Outside curriculum).
- **Distribute** scavenger hunt pages and pencils.
- **Provide** crayons/colored pencils for students to add colors to their drawings at the end.
- **Regroup** to review the scavenger hunt. **Review** that the bolded words in the clues are leaf adaptations, **discuss** how these adaptations help plants conserve water. It may be helpful to draw a cross-section of a leaf on the board to show how each adaptation helps.
 - Water storage - spikes for protection so water can't be stolen by animals
 - Thick and waxy skin to prevent water from evaporating
 - Fuzzy hairs to prevent water from evaporating (briefly introduce structure of stomata)
 - Light green, small and thin - less surface for sun to make leaf hot and evaporate water

Activity 2: Root Systems (15 minutes)

- **Show** “mystery object” (a root) and have students **pair-share** their observations.
- **Recall** plant structures that obtain water (roots), which is carried to the leaves via the stem.
- **Introduce** different types of roots, showing an image and giving an example for each:
 - TAPROOT (carrot):
 - Storage roots, hold food and water for the plant
 - Generally, grow straight down, can go very deep to reach groundwater
 - FIBROUS ROOT (mangrove):
 - A single plant can have as many as 14 million roots in a fibrous root system!
 - Generally, grow down (relatively shallow) and spread out, to pick up water from near the surface of the soil
- **Ask:** Which kinds of roots do you think drought-tolerant plants are *more likely* to have?
 - **Provide** students with time to explore/observe close up different root types and brainstorm in small groups.
 - **Set** up stations with different types of roots (fibrous or taproot).
 - **Have** students go through the different stations and sketch the 4 roots on 4 different sticky notes. In their groups, they should decide whether each root would rather live in a wet place or a dry place. After students have been through all 4 stations, have them vote with their sticky notes on a class poster to answer the question: In which environment would these roots would work best?
- **Discuss** their responses. Most drought-tolerant plants have deep taproots to access the groundwater and also some shallow, fibrous roots to pick up the small amounts of water that might fall on the surface of the soil (like after a fog or light drizzle) before it evaporates in the sun (i.e. not enough rainfall or fog drip to go deeply into the soil for the taproot to access)
 - **Show** images of drought-tolerant plants vs. grass

Roots: Tap ^(or) Fibrous?

Directions: Draw the bottom half of the plants below.
Write whether you think they are tap or fibrous roots



Optional worksheet: Have students draw/guess what types of root each plant has and defend why.

Closing: (2 minutes)

- Ask: Which roots are good at getting water?
- Challenge: With a partner, can you come up with 5 different ways plants have adapted to survive with little water?

Additional Information

- NGSS:**
- [LS1.A] Structure and function: Organisms have both internal and external macroscopic structures that allow for growth, survival, behavior, and reproduction.
 - [LS4.C] Adaptation: Particular organisms can only survive in particular environments.

Name _____ Date _____

Drought-Tolerant Plants in Our GardenAn **adaptation** is _____

Many of the plants in our garden are drought-tolerant. That means the plants have **adaptations** to survive with small amounts of water. The **bolded words** in the clues are the common **leaf adaptations** of many drought-tolerant plants.

Can you find all of these plants around our garden? Write the NAME and do a quick DRAWING of each plant you find! You do not have to go in order.

Clue	Name and Drawing of Plant
This plant's light green leaves are covered in fuzzy hairs . The leaves are low to the ground.	Plant name _____ Draw the plant:
People do not like to touch this plant! It has very large and thick leaves that hold	Plant name _____ Draw the plant:

<p>water. The leaves are covered in sharp spikes for protection.</p>	
<p>This plant has small, waxy leaves that are dark green. This is the shape and size of the leaves:</p>	<p>Plant name _____</p> <p>Draw the plant:</p> <p>What do you see on the bottom of each leaf?</p> <p>_____</p>
<p>This plant is a type of tree and it has short, thin, spiky, dark-green leaves. These leaves help the plant stay cool in the hot sun.</p>	<p>Plant name _____</p> <p>Draw the plant:</p>
<p>The leaves of this plant are smooth and waxy. The leaves are a different color than most other leaves. They are shaped like this:</p>	<p>Plant name _____</p> <p>Draw the plant:</p>

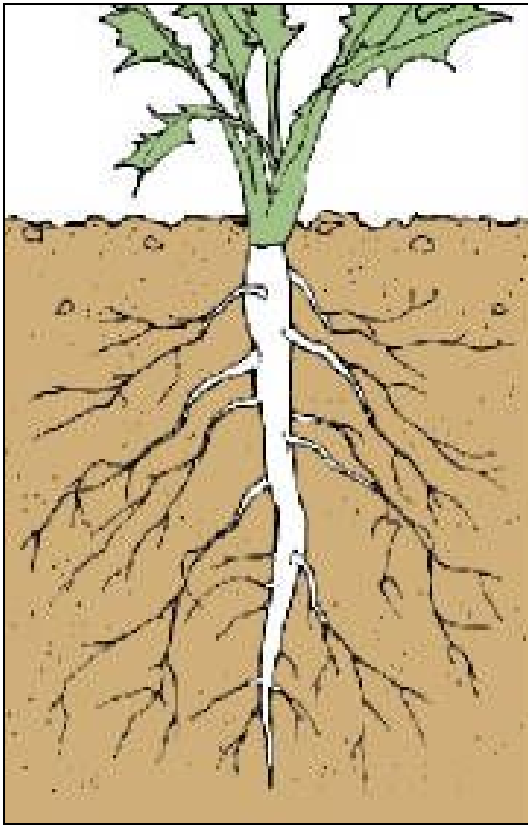
The leaves of this plant look like beans!
They are **small, waxy, and full of water.**

Plant name _____

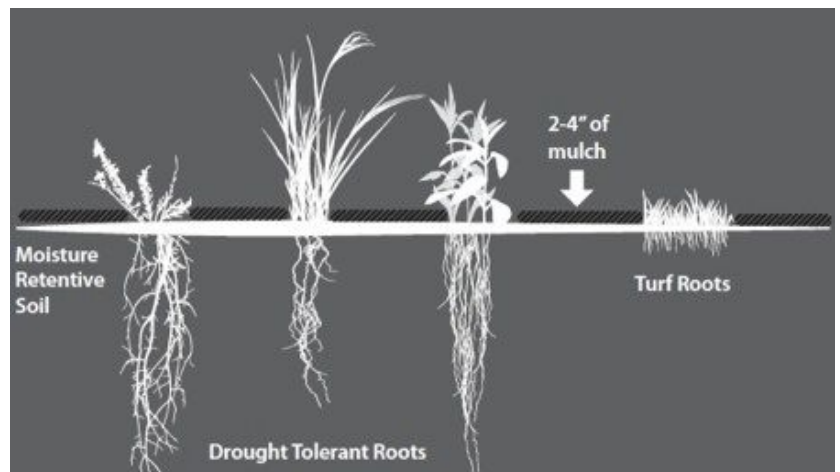
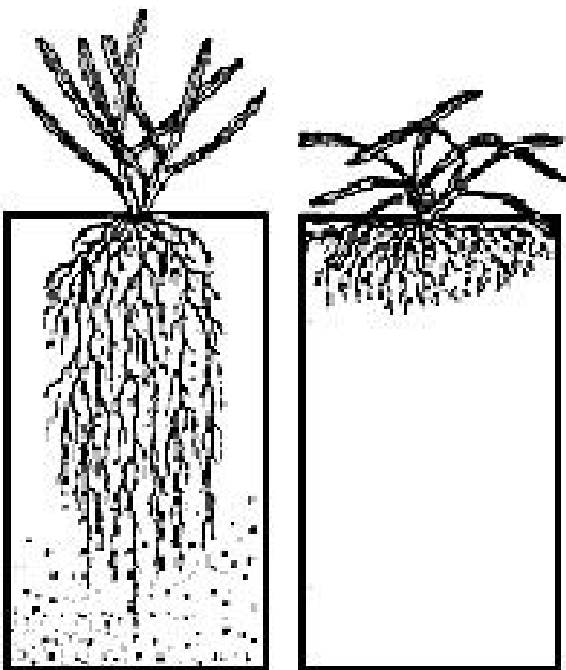
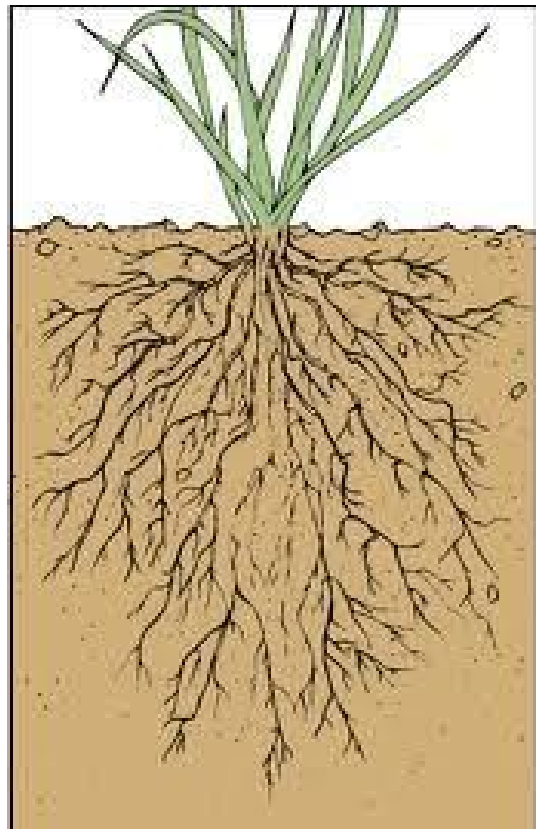
Draw the plant:

Root Types

Tap root



Fibrous roots



TITLE | INVENT A PLANT

GRADE | Third Grade

UNIT | 1

LESSON | 7

OVERVIEW | In this lesson, students will summarize all they have learned about plant adaptations by making a plant out of garden materials that is well suited for a particular environment.

Time: 45 minutes

Focus Question: What does a plant perfectly adapted for its environment look like?

Key Terms: ADAPTATION, ENVIRONMENT, SURVIVAL

Objectives: Students will be able to...

1. create examples of adaptations that would help a plant live in a particular environment.
2. work in a team to create a final product.

Materials/Prep Work:

- Prepare **story**
- Find images of a desert, rainforest and prairie
- Science Notebooks or Invent a Plant worksheet** for mounting art
- Nature materials for nature art plants
- Tape**
- Clipboards, pencils**
- Post-its**

Lesson Steps:

Introduction: Plant Adaptation Story (10 minutes)

Story: I'm going to tell you a story about some third-grade scientists. These third-grade scientists were supposed to be studying plant adaptations, but instead, they were running through the halls and screaming and disrupting the class. The principal warned them that if they kept misbehaving they'd use their magic to transform them into the plants they were supposed to be studying. They didn't listen. The principal warned again. The students still didn't listen so the principal cast a spell. The principal turned them all into plants, but something in the spell went terribly wrong. Instead of landing in the garden, the class of plants landed in a mysterious place that was very hot and humid. The soil was really hard and not healthy. (Name of student) and _____ and _____ were little broccoli plants. As time went on they started looking weaker and weaker. They weren't getting the nutrients they needed! _____ and _____ and _____ were little nasturtiums and they too, started looking weaker and weaker. They all thought "We need healthy soil, or else we're going to DIE!" All of the student plants were looking weak. All except _____ and _____. They had a special adaptation that looked just like this (show picture) And when flies and mosquitoes and insects touched the little hairs, the leaves closed together and trapped them. So as the other plants were looking weaker and weaker, _____ and _____ were surviving okay. All of the other plants thought, "I wish I had that adaptation- without it I'm going to die!" Three days passed, and many of the student plants were so so weak, they thought _____ and _____ would be the only student plants to survive!

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But finally the principal started to feel bad. They talked to (insert name of other school person) _____, and they both thought the students had learned their lesson. So they cast their spell and turned them back into students in the garden.

- **Key questions**

- In the story what was the challenge for the plants?
- What did _____ and _____ do that helped them survive? What is the science word we use to describe how plants have changed to survive?
- What would happen to the plants in the story that don't have this adaptation?

Activity 1: Adapt a Plant (25 minutes)

- *Note: Be sure to frame this activity in the light of being an "imagination creation" and not necessarily something that would/could exist in nature.*
- **Hide** images of a desert, rainforest and prairie in the garden. Hide enough for each student to find one image. Ask students to explore the garden to find an image and return to the seating circle.
- **Have** students tell you what they know about each environment (desert, rainforest, prairie) and write notes on the board.
- **Explain** the following:
 - Desert: This climate has little water and a few thirsty predators. Water can be found deep below the ground. There is abundant sun that can sometimes be harmful to plants if they get too hot.
 - Rainforest: This is a habitat with many plants growing year round. It stays warm but the plants have to compete for light with other plants. Many animal predators attempt to eat plants in this environment
 - Prairie: This climate gets a lot of ice and snow. Many predators like to eat the roots of plants here. During the spring, there is much rain and plenty of insects buzzing there.
- **Introduce** students to a design challenge. Give students a worksheet to design a plant for their environment.
- **Have** students build or draw their "adapt a plant" using materials from the garden. They can work individually or in groups with others who have the same environment card as them. Taping natural materials onto a piece of paper, students will create a plant with at least 3 specific adaptations to help their plant survive in its environment. They will label these adaptations with sticky notes.
- **Demonstrate** the process of adapting a plant and adding labels.

Closing: (10 minutes)

- **Each** group presents their "adapt a plant" to the class. Based on the presentations the class will vote for the environment they think the plant lives in and share appreciations for their peers' work.
- **Ask:** What does a plant perfectly adapted to its environment look like?

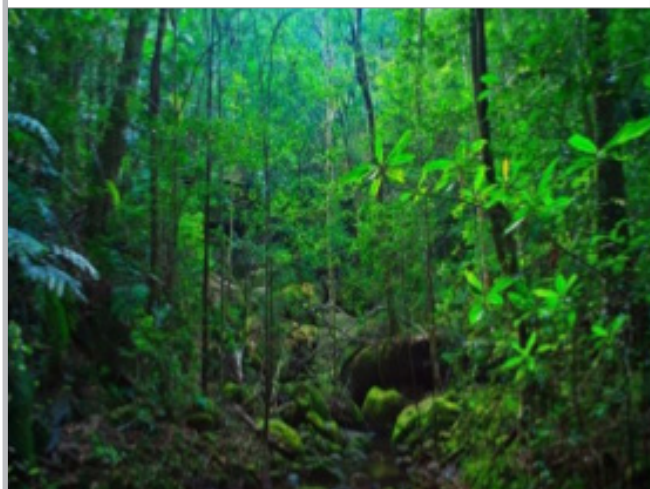
Additional Information:

NGSS:

[LS1.A] Structure and function: Organisms have both internal and external macroscopic structures that allow for growth, survival, behavior, and reproduction.

[LS4.C] Adaptation: Particular organisms can only survive in particular environments.

Your plant lives
in the
RAINFOREST



Your Plant
Lives in the
DESERT



Your Plant
Lives in the
ARCTIC



.....

TITLE | FIELD JOURNALING ADAPTED FROM NATURE JOURNALING CURRICULUM BY JOHN MUIR LAWS¹)

GRADE | Third Grade

UNIT | 1

LESSON | 8

OVERVIEW | In this lesson, students will learn about how scientists use field journals to record and communicate observations of natural phenomena through drawings and writing. After learning about plant adaptations, this lesson helps students identify them with the lens of a scientist. After looking at various sample scientific field journal pages, students will select a plant in the garden to be the subject of their own field journal page.

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Time: 45 minutes

Focus Question: What makes an effective field journal entry?

Key Terms: FIELD JOURNAL, RECORD, COMMUNICATE

Objectives: Students will be able to...

1. observe sample field journal pages from scientists and identify common elements (date, weather/location information, drawings, labels, description, questions, observations, etc.).
2. make their own field journal page by studying a plant from the garden.

Materials/Prep Work:

- Sample scientific field journal pages²**
- Paper or science notebooks**
- Clipboards, pencils**
- Colored pencils, crayons, and/or watercolor paints**
- ABCDEs of Scientific Drawing³ poster**, available in Curriculum Visuals linked in the Table of Contents

Student Prior Knowledge: Students should know the plant parts as taught in L1: Plant Part Inquiry, and have a familiarity with the ABCDEs of scientific drawing and previous practice with scientific drawing.

Lesson Steps:

Introduction: (5 minutes)

- **Two-minute challenge:** Encourage students to look closely at the garden (ex: take a pretend photograph of something in the garden, then share three details about your object with a partner based on your memory photograph).

Activity 1: What is a Field Journal? (10 minutes)

- **Brainstorm** what FIELD JOURNAL makes students think of (as whole group or **think-pair-share**).
- **Pass out** a variety of sample field journal pages, and encourage students to swap with nearby classmates to look at 3-4 different pages.

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- Key Questions:

- What are scientists recording in their field journals?
- What are some common elements you see on all/most of the journal pages?

- **List** common elements students find on the board.

- **Emphasize:** Scientists use field journals as a way to RECORD and COMMUNICATE information they observe in the field. They use a combination of drawing and words (labels, questions, written observations, etc.) to communicate the information. Scientists record as many details as possible, including the location, date, and weather information.

Activity 2: Making Field Journal Pages (25 minutes)

- **Demonstrate** how students will make their own field journal page about a plant in the garden, working to include all elements they saw on the sample journal pages. **Review** ABCDE's of scientific drawing.

- **Distribute** clipboards and paper or science notebooks.

- **Application:** Students select a plant as the subject of their field journal page. First sketch in pencil and write in observations, questions, labels, etc., then add color using crayons, colored pencils, or watercolor.

Closing: (5 minutes)

- **Gather** field journal pages in one place.
- **Ask:** What makes an effective field journal entry?
- **Gallery walk** so students can look at their classmates' work.

Additional Information:

Blog Posts:

- S. Flynn. (2015, May 4). Field Scientists in Action [Web log post]. Retrieved June 7, 2019, from <https://springvalleygreenschoolyard.wordpress.com/2015/05/04/field-scientists-in-action/>

References:

1. Nature Journaling Curriculum, John Muir Laws. Retrieved on June 7, 2019 from <https://johnmuirlaws.com/journaling-curriculum/>
2. Sample Journal Pages [Web log post]. (n.d.). Retrieved June 7, 2019, from <http://kearnsscience.weebly.com/ideas.html>
3. ABCDE's of Scientific Drawing. Full Option Science System, Lawrence Hall of Science, U.C. Berkeley. Science Notebooks In Grades 3-6, p. 16

Third Grade Unit 2: Animal Adaptations

OVERVIEW:

This unit introduces and gives examples of the structural and behavioral adaptations of common garden animals. There is a strong emphasis on observation skills and practicing respect towards garden creatures. Lesson 1 (Camouflage Creature) introduces the concept of animal adaptations through the familiar adaptation of camouflage. Lessons 2 through 6 are case studies of different animals and their adaptations. The order of these lessons can be easily changed around based on what animals and materials are most easily available in a given week. Lesson 7 (Invent a Creature) is the application of these adaptations: students create a nature art creature that could survive in a given environment. This can serve as an informal assessment of students' understanding the key vocabulary/concepts for the year. Lesson 8 (Camouflage Stir Fry) is an optional cooking lesson to thematically tie-up the unit.

FOCUS QUESTIONS:

1. Can an animal use its appearance to help it survive?
2. How does a pill bug survive in our garden?
3. How do ladybugs survive in our garden?
4. How do decomposers survive in our garden?
5. What types of teeth eat best?
6. Do all bird beaks look the same?
7. What does an animal perfectly adapted for its environment look like?

NGSS DCIs:

[LS3.A] Inheritance of Traits: Many characteristics of organisms are inherited from their parents. (3-LS3-1). Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment. (3-LS3-2)

[LS3.B] Variation of Traits: Different organisms vary in how they look and function because they have different inherited information. (3-LS3-1). The environment also affects the traits that an organism develops. (3-LS3-2)

[LS4.C] Adaptation: For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)

Unit 2: Animal Adaptations

Lesson #	Title	In this lesson, students will...
1.	Camouflage	Review the concept of adaptation through the lens of camouflage. Students will see examples of camouflage, discuss why it is a beneficial adaptation, and distinguish between camouflage and hiding. Then, students will adapt an egg carton to camouflage it as an imaginary insect or animal in our garden.
2.	Pill Bug Adaptations	Observe pill bugs and identify their physical and behavioral adaptations.
3.	Ladybug Release	Closely observe ladybugs. Students will discuss the importance of ladybug adaptations and learn about their beneficial role in the garden. After observing, students compare their ladybug to others, and release it into the garden.
4.	Decomposer Adaptations	Be introduced to the term decomposer and go on a decomposer hunt in the garden. After collecting a variety of creatures, students will record the physical and behavioral adaptations of the decomposers they found.
5.	Intro to Skulls & Teeth	Observe a variety of skulls and make predictions about the diet of the animals using evidence from the skulls. Students will also eat two types of food (one that mimics the texture of meat and one that is a plant) and share their observations.
6.	Bird Beak Buffet	Review the term adaptation and learn through the lens of birds. Students will use tools to demonstrate that birds have beaks adapted to eat different foods and create a bird with unique adaptations.
7.	Invent a Creature	Review animal adaptations by creating a creature out of natural materials. Through the gallery walk students will share how their creature is well adapted to live in an assigned environment.
8.	Camouflage Stir-fry	Harvest greens from the garden and create a stir-fry where the greens are “camouflaged.” Students will also review the key terms from the animal adaptation unit with a word search.

.....

TITLE | CAMOUFLAGE

GRADE | Third Grade

UNIT | 2

LESSON | 1

OVERVIEW | In this lesson, students will review the concept of adaptation through the lens of camouflage. Students will see examples of camouflage, discuss why it is a beneficial adaptation, and distinguish between camouflage and hiding. Then, students will adapt an egg carton to camouflage it as an imaginary insect or animal in our garden.

.....

Time: 45 minutes

Focus Question: Can an animal use its appearance to help it survive?

Key Terms: ADAPTATION, CAMOUFLAGE, SURVIVAL, PREY, PREDATOR

Objectives: Students will be able to...

1. explain the benefits of camouflage.
2. connect camouflage to the concept of adaptations.
3. apply their knowledge to camouflage an egg carton animal in our garden environment.

Materials/Prep Work:

- Images** of camouflaged animals (attached)
- Egg cartons** (cut into individual sections, at least one for every student)
- Markers and colored pencils**
- Tape**
- Example** of a camouflaged egg carton
- Hide **brightly objects** around the garden (small balls, easter eggs, etc.)

Lesson Steps:

Introduction: (5 minutes)

- **Hide** 1 brightly colored object and 1 object that blends into the garden (example: a toy tiger and a toy frog).
- **Instruct** students to find 2 toys hidden in the garden.
- **Think-pair-share:** Which was easier to find? Which was harder to find? Why?

Activity 1: Camouflage Examples (7 minutes)

- **Distribute:** Give groups of students pictures of camouflaged animals.
- Introduce the concept of CAMOUFLAGE using examples of PREDATORS and PREY.
 - **Key Questions:**
 - What does it mean to camouflage?
 - Can an animal's appearance help it survive?
 - Why is it beneficial for animals? How does it benefit PREY? A PREDATOR?
 - How is camouflage different from hiding?

Activity 2: Camouflage a Creature (20 minutes)

- **Explain:** Using materials from the garden, tape, markers, and colored pencils, each student will adapt an egg carton to be a camouflaged animal in the garden. Show an example of a camouflaged egg carton. Use garden-only materials (compostable) as much of it will be lost in the garden.
- **Distribute:** Give each student an egg carton and provide them with materials.
- **Application:** Students transform their egg carton into a camouflaged imaginary animal and discreetly place it in the garden. If students finish early, provide them with another egg carton.

Activity 3: Safari Hunt (5 minutes)

- **Exploration:** Students wander through the garden keeping track on their fingers when they spot a creature (remind them to not move the creatures). Consider having students pick a type of predator to be while hunting for prey.

Closing: (8 minutes)

- **Reflection:**
 - **Think-pair-share:** Students share their experience when using camouflage to disguise their egg carton and their experiences as a predator. If time allows, have students share compliments about the egg carton animals they saw.
 - **Move** a creature to a new environment near students.
- **Key questions**
 - What challenges does this animal face in this new environment?
 - Can an animal's appearance help it survive?
 - Can the animal change its color right now?

Additional Information:

NGSS:

[LS4.C] Adaptation: For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)

Blog Links:

- T. Connery. (2015, May 21). Adaptations are Everywhere! [Web log post]. Retrieved June 7, 2019, from <https://springvalleygreenschoolyard.wordpress.com/2015/05/21/adaptations-are-everywhere/>
- S. Flynn. (2015, January 29). "I want to be a geologist when I grow up." [Web log post]. Retrieved June 7, 2019, from <https://miralomagarden.wordpress.com/2015/01/29/i-want-to-be-a-geologist-when-i-grow-up/>

References:

1. Podgorski, A. (2017, July 19). SCIENCE & TECHNOLOGY Can You Spot These 15 Camouflaged Animals? [Photograph found in BabbleTop]. Retrieved June 13, 2019, from <https://babbletop.com/can-you-spot-these-15-camouflaged-animals/> (Originally photographed 2017, July 19)

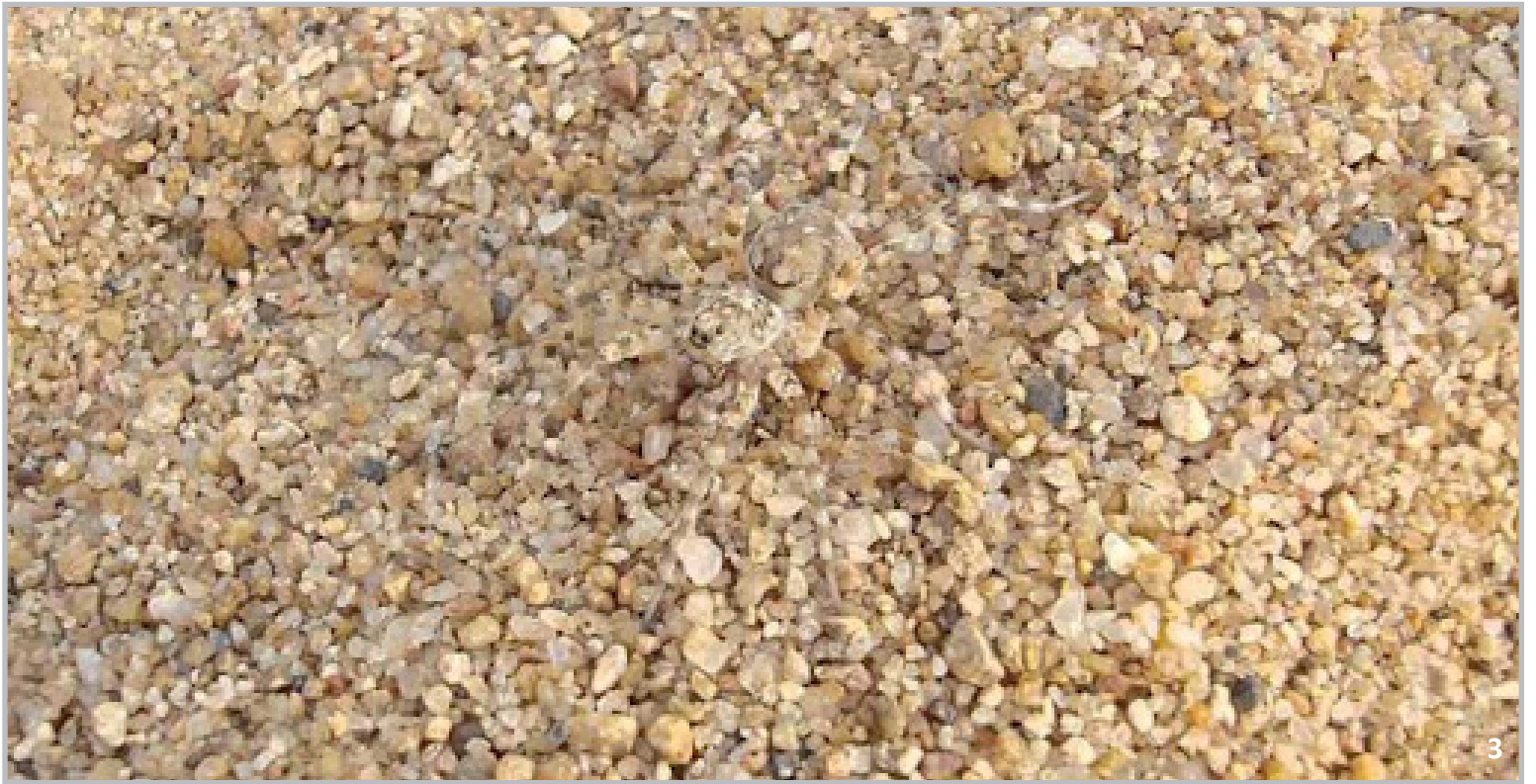


3



3







3

TITLE | PILL BUG ADAPTATIONS

GRADE | Third Grade

UNIT | 2

LESSON | 2

OVERVIEW | In this lesson students will observe pill bugs and identify their physical and behavioral adaptations.

Time: 45 minutes

Focus Question: How does a pill bug survive in our garden?

Key Terms: ADAPTATION, PHYSICAL ADAPTATION, BEHAVIORAL ADAPTATION

Objectives: Students will be able to...

1. identify the physical and behavioral adaptations of pill bugs that help them survive.
2. explain how pill bugs are adapted to live in a garden environment.

Materials/Prep Work:

- Worksheet** (attached) or **notebook page** for drawing
- Clipboards, pencils**
- Crayons/colored pencils**
- Bug hunt supplies** (cups for catching, magnifying glasses, and/or bug boxes)
- Find **1-2 pill bugs per student** in the garden and put in cups

Lesson Steps:

Introduction: Adaptation Challenge (5 minutes)

- **Think-pair-share** about adaptation from the previous week.
- **Challenge** students to untie and tie their shoes/take off their watch/unzip and zip their jacket without using their thumbs.
- **Reflect** on the challenge - what did the students learn from only being able to use their thumbs?
- **Relate** thumbs to PHYSICAL ADAPTATIONS (how an animal's body looks and functions to help it survive). Introduce the term BEHAVIORAL ADAPTATIONS (how animals act) and provide visual examples.
 - Give a few examples of behavioral and physical adaptations and have students vote on what type of adaptation is being demonstrated.
 - Ask: Are these examples of behavioral or physical adaptations?
 - A giraffe's long neck -- physical
 - Bear hibernating -- behavioral
 - Pelican's bill-- physical
 - Birds flying south for the winter -- behavioral

Activity 1: Pill Bug Observation (17 minutes)

- **Demonstrate** what information students will record in their science notebooks.
- **Distribute** pill bugs in cups to each student and worksheet/science notebooks.
- **Exploration:** Students observe pill bugs for 5 minutes. After the initial observation period, students scientifically illustrate their pill bug and record the PHYSICAL and BEHAVIORAL ADAPTATIONS they observe and any questions they have.

Activity 2: Pill Bug Hunt (17 minutes)

- **Distribute** magnifying glasses and other bug hunt supplies as students finish their scientific illustrations and observations.
- **Explore** garden by collecting pill bugs and observing their behavior.
- **Collect** all pill bugs at front of the classroom.

Closing: (6 minutes)

- **Reflection:** Students share observations (number of pill bug legs, their color, the shape of the body, etc). Demonstrate with finger what happens when the pill bug is poked/picked up.
- **Key Questions:**
 - What helps a pill bug survive?
 - What is a pill bug's habitat like? What challenges might arise there?
 - What physical body structures did we observe on our pill bugs?
 - How do these adaptations help the pill bug to survive in its habitat?
 - What are the behavioral adaptations of the pill bug?
 - How do you think these behavioral adaptations help the pill bug survive in its habitat?

Additional Information:

NGSS:

[LS3.B]: Variation of Traits: Different organisms vary in how they look and function because they have different inherited information. (3-LS3-1)

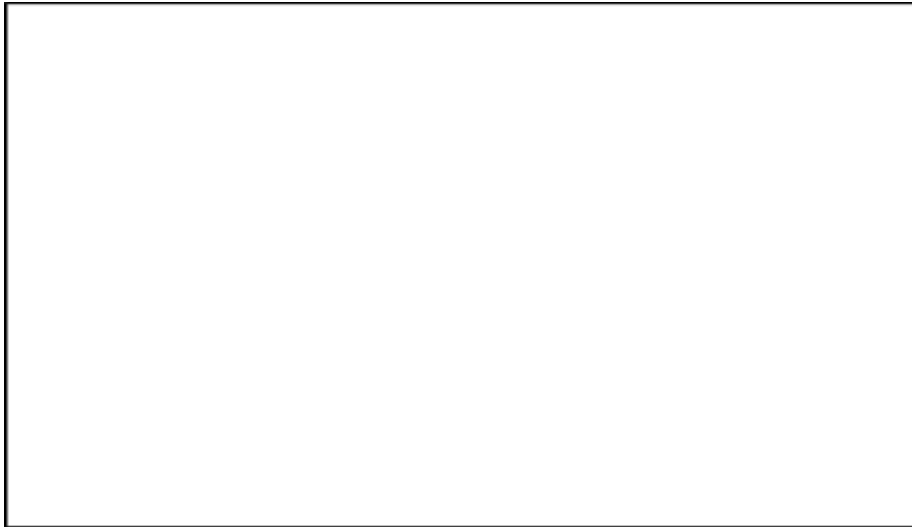
[LS3.B]: Variation of Traits: The environment also affects the traits that an organism develops. (3-LS3-2)

[LS4.C]: Adaptation: For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)

Name _____ Date _____

Pill Bug-Ology

Make a scientific drawing of one of your pill bugs:



Accurate

Big

Colorful

Detailed

Explained

Physical Adaptations	Behavioral Adaptations
<p>What color is your pill bug?</p> <p>How many legs does it have?</p> <p>What does its body look like?</p>	<p>What happens when you touch your pill bug?</p> <p>What happens when you put soil in the cup?</p>

How do the pill bug's adaptations help it survive?

.....

TITLE | LADYBUG RELEASE

GRADE | Third Grade

UNIT | 2

LESSON | 3

OVERVIEW | In this lesson, students will closely observe ladybugs. Students will discuss the importance of ladybug adaptations and learn about their beneficial role in the garden. After observing, students compare their ladybug to others and release it into the garden.

.....

Time: 45 minutes

Focus Question: How do ladybugs survive in our garden?

Key Terms: ADAPTATION, CHARACTERISTICS

Objectives: Students will be able to...

1. observe ladybug behavior.
2. compare their ladybug with others in the class.
3. enjoy the wonder of ladybugs.

Materials/Prep Work:

- Images of a ladybug and an insect
- Ladybugs (can be purchased at local nurseries) in vials/bug boxes/containers, one per student
- Magnifying glasses
- Large pictures/posters of ladybugs

Lesson Steps:

Introduction: Mystery Garden Creature (3 minutes)

- **Introduce** ladybugs with a riddle. Give students clues describing a ladybug. Have students put their finger on their noses when they think they know the answer.
 - There are over 300 types of this creature in the world
 - This creature....
 - ...is red to warn its predators it tastes bad.
 - ...releases a yellow liquid that tastes bad to prevent its predators from eating it.
 - ...helps our garden by eating aphids.
 - ...flies.
 - ...is an insect.
 - ...has black spots.
- **Think-pair-share** which of these qualities do you think helps a ladybug survive?

Activity 1: Ladybug Observation (15 minutes)

- **Ask:** What do you know about ladybugs? Are they helpful or harmful to our garden?
- **Explain:** that ladybugs eat harmful insects in our garden like aphids. Show ladybug and aphid images.
- **Review** how to hold, interact with, and respect ladybugs.
- **Distribute** one vial/bug box with a ladybug and a magnifying glass to each student.

-
- Explore ladybug behavior. Observe how ladybugs act in bug boxes, search for aphids in the garden to feed the ladybugs. Place one ladybug on a plant infested with aphids and observe its behavior. Have students observe ladybugs in the wild as well.

Activity 2: Do you look like me? Ladybug Comparison (10 minutes)

- **Challenge** students to find partners in the class that have ladybugs that...
 - have the same number of spots
 - have the same color of red
 - are the same size
- **Key Questions:**
 - What helps a ladybug survive?
 - What physical and behavioral adaptations do ladybugs have?
 - What characteristics do all ladybugs have?
 - What characteristics vary?
 - Can students think of examples of other organisms that are the same species, but look different? (Humans, dogs, etc).

Optional: Draw a graph, labeling the X-axis with # spots and Y-axis with # ladybugs. Have students graph the number of spots on their ladybug, either using markers or physical objects, such as rocks. Discuss student observations after everyone has added to the graph.

Activity 3: Ladybug Release (10 minutes)

- Release ladybugs in the garden and encourage them to find a plant with aphids

Closing: (7 minutes)

- **Reflection:** Students share what they observed about their ladybugs and review what adaptations ladybugs have to aid in their survival.

Additional Information:

NGSS:

[LS3.B] Variation of Traits: Different organisms vary in how they look and function because they have different inherited information. (3-LS3-1)

[LS4.C] Adaptation: For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)

TITLE | BREAKING IT DOWN: DECOMPOSER ADAPTATIONS

GRADE | Third Grade

UNIT | 2

LESSON | 4

OVERVIEW | In this lesson, students will be introduced to the term decomposer and go on a decomposer hunt in the garden. After collecting a variety of creatures, students will record the physical and behavioral adaptations of the decomposers they found.

Time: 45 minutes

Focus Question: How do decomposers survive in our garden?

Key Terms: PHYSICAL ADAPTATION, BEHAVIORAL ADAPTATION, DECOMPOSER

Objectives: Students will be able to...

1. state what decomposers do and provide examples from the garden.
2. observe and record physical and behavioral adaptations of garden decomposers.

Materials/Prep Work:

- Worksheets (attached) or science notebooks
- Clipboards, pencils
- Crayons/colored pencils
- Bug boxes/containers to collect decomposers
- Magnifying glasses
- Garden insect/decomposer field guide

Lesson Steps:

Introduction: Decomposers break it down (5 minutes)

- **Two-minute challenge:** Search for a dead leaf or rotting/decomposing items in the garden.
- **Think-pair-share** observations and guesses as to how items become rotten and broken down.
- **Introduce** the term DECOMPOSER. Repeat after me chant: "Decomposers break it down!"
- **Remind** students that breaking things down is analogous to rotting.

Activity 1: Decomposer Hunt (10-15 minutes)

- **Explain** that the garden is home to many types of decomposers and that students are going to search for them in the garden.
- **Think-pair-share** locations where students may find decomposers.
- **Review** how to collect and handle organisms.
- **Distribute** containers to collect creatures.
- **Exploration:** students explore the garden and collect decomposers.

Activity 2: Decomposer Observation and Recording (15-20 minutes)

- **Exploration** continued: students sit and observe the behaviors and structures of their decomposers.
- **Distribute** worksheets and give students time to draw, record details, and write questions about their decomposers.

Closing: (5-10 minutes)

- **Reflect** on the importance of decomposers.
- **Key questions:**
 - What are some reasons decomposers are important for our garden?
 - What characteristics help your decomposer survive?
 - If our garden had no worms, pill bugs, or fungus, what would it look like?
 - What examples of physical and behavioral adaptations do decomposers have?
- **Release** decomposers.

Additional Information:

NGSS:

[LS4.C] Adaptation: For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)

		Behavioral:
Earwig		Physical: Behavioral:
Spider		Physical: Behavioral:
Centipede		Physical: Behavioral:

.....

TITLE | WHAT'S IN YOUR HEAD? AN INTRODUCTION TO SKULLS AND TEETH

GRADE | Third Grade

UNIT | 2

LESSON | 5

OVERVIEW | In this lesson, students will observe a variety of skulls and make predictions about the diet of the animals using evidence from the skulls. Students will also eat two types of food (one that mimics the texture of meat and one that is a plant) and share their observations.

.....

Time: 45 minutes

Focus Question: What types of teeth eat best?

Key Terms: SKULLS, PHYSICAL ADAPTATION

Objectives: Students will be able to...

1. understand teeth as an example of physical adaptations.
2. observe teeth and predict what animals eat based on the physical adaptation.

Materials/Prep Work:

- Skulls** (local natural resource libraries often carry these and many times they are free to check out!)
- Pictures** of the animals that each of the skulls come from
- Gummy bears** for each student (or some other chewy snack that mimics the texture of meat, like jerky, etc)
- A **plant snack** for each student (apple, lettuce, snap peas, etc)
- Post-its**
- Clipboards, pencils**

Lesson Steps:

Introduction: Skull Observation (15 minutes)

- **Lay** out the different pictures of creatures that correspond to each skull.
- **Hold** up one skull at a time and have students guess which of the animals it came from.
- **Facilitate** by asking students to share their questions and observations as they are looking at the skulls (*Note: Remind classroom teacher/students that you will reveal the species of the skulls at the end of class.*)
- **Divide** students into two groups for activities 1 and 2.

Activity 1: Using our teeth! (With garden educator) (12 minutes)

- **Application:** Students eat a plant snack and a gummy bear. Students share observations about what teeth they used each time to eat.
- **Key questions:**
 - What teeth do we share with carnivores? Herbivores?
 - What types of teeth eat best?
 - What can we learn from skulls and teeth by observing them?
 - Can we predict what the animals eat using only their skulls or teeth?

.....

Activity 2: Skull Voting (With Classroom Teacher) (12 minutes)

- **Application:** Students observe each of the skulls and use post-its to record what type of food they think the animal consumed, explaining what evidence they used to make their prediction (carnivore, herbivore, omnivore). Students can vote as a small group or individually.

Closing: (6 minutes)

- **Think-pair-share** guesses about which animal each skull came from, and what the animals eat.
- **Ask:** Which skull/teeth combination would you choose to have and why?
- **Reveal** which animals belongs to each skull and determine if voting predictions are correct.

Additional Information:

NGSS:

[LS3.A]: Inheritance of Traits: Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment. (3-LS3-2)

[LS4.C]: Adaptation: For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)

TITLE | BIRD BEAK BUFFET

GRADE | Third Grade

UNIT | 2

LESSON | 6

OVERVIEW | In this lesson, students will review the term adaptation and learn more about it through the lens of birds. Students will use tools to demonstrate that birds have beaks adapted to eat different foods and create a bird with unique adaptations.

Time: 45 minutes

Focus Question: Do all bird beaks look the same?

Key Terms: ADAPTATIONS, BEAKS

Objectives: Students will be able to...

1. provide examples of bird adaptations.
2. use tools effectively and safely.

Materials/Prep Work:

- Bird Beak Buffet** kit (some local resource libraries have these or you can construct your own at <https://www.fishwildlife.org/projectwild/growing-wild/activity-resources/bird-beak-buffet>).
- 2 - 4 Cups or other scoops** (pelican)
- 10 - 15 Small plastic fish or craft foam** (pelican)
- 2 - 4 Turkey Basters or eye droppers** (hummingbird)
- 2 - 4 Tall vases or cylinders** (hummingbird)
- 2 - 4 Tongs** (snipe and shorebirds)
- 5 - 10 Plastic or rubber worms** (snipe and shorebirds)
- 5 - 7 Cups of sand or soil** (snipe and shorebirds)
- 2 - 4 Tweezers** (woodpeckers)
- 3/ 4 Cups of rice tucked into a wooden stump** (woodpeckers)
- 2 - 4 Pairs of scissors** (owls, hawks and eagles)
- 2 - 4 Pieces of playdough** wrapped around sticks (owls, hawks and eagles)
- 2 - 4 Pairs of chopsticks** (herons and egrets)
- 10 - 15 Styrofoam or foam pieces** (herons and egrets)
- 2 - 4 Nutcrackers** (sparrows and finches)
- 1 Cup pecans, peanuts, almonds or other nuts** (sparrows and finches)
- 2- 4 Strainers** (ducks and (some) swans)
- 1- 15 Leaves in water** (ducks and (some) swans)
- Worksheet** (attached) or science notebooks
- Images** of different species of birds (pelicans, hummingbirds, shorebirds, woodpeckers, hawks, herons, sparrow, ducks)
- Clipboards, pencils**
- Crayons/colored pencils**

Lesson Steps:

Introduction: Bird Brainstorm (7 minutes)

- **Think-pair-share:** Students think about birds they have seen in the garden or in other locations.
- **Ask:** Do all bird beaks look the same?
- **Distribute** images of local bird species. Give students time to observe characteristics.
- **Introduction Key Questions:**
 - What do all birds have in common?
 - Do all bird beaks look the same?
 - Do all birds look the same? What is different about them?
 - Using your knowledge of adaptations, what are some example adaptations that birds have?
- **Divide** students into two groups for activities 1 and 2.

Activity 1: Bird Beak Buffet (with garden educator) (15 minutes)

- **Review** that birds have different types of beaks and have adapted to eat different types of food.
- **Think-pair-share** the types of foods birds eat and what their corresponding beaks look like.
- **Introduce** the tools/stations to students. **Demonstrate** how to use “beaks” effectively and safely.
- **Break** students up into groups so that they can go to each station and experience the different bird beaks.
- **Remind** students that they will get the chance to use more than one type of beak.
- **Exploration:** Students use their “beaks” to collect as much food as possible at each station.
 - Give students an allotted amount of time to collect a variety of foods using their given “beak.” Remind students to reset the station before moving onto the next one.
 - After collecting food, students share what tools they used and what type of food they collected most successfully. Encourage students to provide evidence and the reasons for their success using that specific “beak.”
 - **Repeat** until each student has used all the “beaks.”
- **Distribute** pictures of birds and have students draw connections between the “beaks” they used and real bird beaks.

Activity 2: Staying Alive: Bird Adaptation Worksheet (with classroom teacher) (15 minutes)

- **Application:** Students complete rhyming beak ADAPTATION riddles and draw and describe a bird and its adaptations. If students finish their worksheet, they can share their birds and compare their riddle answers with a partner.

Closing: (8 minutes)

- **Reflection:** Students share their experiences from the Bird Beak Buffet activity.
- **Key Questions:**
 - Do all bird beaks look the same?
 - What did the students notice when collecting food with their beaks?
 - Were some “beaks” better at collecting food than others?
 - What can we predict about birds when we see them outside?

Additional Information:

NGSS:

[LS4.C] Adaptation: For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)

Blog Links:

- S. Flynn. (2015, February 5). "Get in my belly!" [Web log post]. Retrieved June 7, 2019, from <https://miralomagarden.wordpress.com/2015/02/05/get-in-my-belly/>

References:

1. Bird Beak Buffet, Growing Up WILD: Exploring Nature with Young Children, Association of Fish and Wildlife Agencies. (2017). Retrieved June 7, 2019, from <https://www.fishwildlife.org/projectwild/growing-wild/activity-resources/bird-beak-buffet>

Name: _____

Staying Alive! Bird Adaptations

Use the rhyming clues to figure out what birds eat.

1. A beak can tell you what a bird will **eat**. A sharp curved beak? That bird eats _____!
2. A beak can tell you what that bird **needs**. A round blunt beak? That bird eats _____!
3. A beak that's sharp and short in **size**, is the perfect beak for eating _____!
4. A beak can grab its favorite **dish**. A long sharp beak can stab a _____!
5. A short thin beak has the **power** to sip some nectar from a _____!

Create a bird with adaptations (example: a beak, camouflage).

TITLE | INVENT A CREATURE

GRADE | Third Grade

UNIT | 2

LESSON | 7

OVERVIEW | In this cumulative lesson, students will review animal adaptations by creating a creature out of natural materials. Students will share how their creature is well adapted to live in an assigned environment via a gallery walk.

Time: 45 minutes

Focus Question: What does an animal perfectly adapted to its environment look like?

Key Terms: ADAPTATION, ENVIRONMENT, SURVIVAL

Objectives: Students will be able to...

1. create examples of adaptations that help an animal live in a specific environment.
2. work as a team to create a final product.
3. listen to their peers and share positive feedback.

Materials/Prep Work:

- Tape or clay** to attach materials (optional)
- Environment cards** (below)
- Print images of different animals for charades** (polar bear, giraffe, camel, tiger)

Lesson Steps:

Introduction: Animal Charades (10 minutes)

- Game: Students will act out different animals.
- Review adaptations of each animal after they are guessed.

Activity 1: Create a Creature (15 minutes)

- *Note: Be sure to frame this activity as an “imagination creation” and not necessarily something that would/could exist in nature.*
- **Pass out** environment cards to pairs.
- **Challenge** students to build a creature out of natural materials from the garden that is adapted to live in their particular environment. For example, an animal living in the desert might have special pods that collect and store rain water.

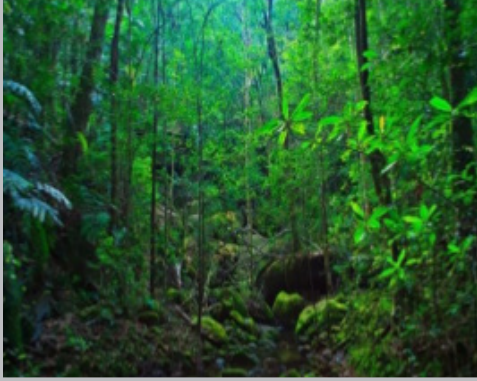
Activity 2: Gallery Walk (15 minutes)

- **Present** creatures through a gallery walk.
- **Share** compliments about ways in which each creature is well adapted if there is time.

Closing: (8 minutes)

- Think-pair-share: Is there anything about animal adaptations that you still want to know?
- Ask: What does an animal perfectly adapted to its environment look like?

Your plant lives
in the
RAINFOREST



Your Plant
Lives in the
DESERT



Your Plant
Lives in the
ARCTIC



Create a creature
adapted to living
UNDERWATER



Create a creature
adapted to living
in the
GRASSLANDS



TITLE | CAMOUFLAGE STIR-FRY

GRADE | Third Grade

UNIT | 2

LESSON | 8

OVERVIEW | In this lesson, students will harvest greens from the garden and review key terms by creating a stir-fry where the greens are “camouflaged.” Students will also review the key terms from the animal adaptation unit with a word search (or other worksheet the garden educator wants to create).

Time: 45 minutes

Key Terms: CAMOUFLAGE, HARVEST, ADAPTATION

Objectives: Students will be able to...

1. Harvest and prepare greens from the garden.
2. Identify a variety of green vegetables in the “camouflage” stir-fry.

Materials/Prep Work:

- Green ingredients** (kale, chard, collards, peas, leeks, green onions, etc)
- Other ingredients and materials** from recipe
- Stove and fuel**
- Pan** to cook stir-fry
- Spatula/spoon** to stir and serve
- Knives or scissors** to chop green ingredients
- Plates, utensils** for each student
- Cutting Boards**
- Wordsearch worksheet** (optional)

Note: This lesson involves eating. Before the lesson, check-in with the classroom teacher about students with food allergies!

Lesson Steps:

Introduction: (5 minutes)

- **Invite** students to reflect back to the first lesson on animal adaptations.
- **Think-pair-share** what concept they explored (CAMOUFLAGE) and how that ADAPTATION aids in animal survival.
- **Explain** that students will harvest greens from the garden and cook a CAMOUFLAGE stir-fry using all green ingredients. Half of the class will harvest and cook while the other half does another activity, then the groups will switch.
- **Divide** students into two groups for activities 1 and 2.

Activity 1: Harvesing and Cooking (with garden educator) (30 minutes)

Camouflage Stir-Fry Recipe

Ingredients

- 2 tbsp oil
- *At least 1 medium leaf per student:* kale, chard, collards, etc
- Other vegetables: garlic, onions, leeks, peas, root vegetables, ginger, peppers, etc. (may prepare beforehand or instruct students to do so)
- 1 tbsp soy sauce
- 1 tbsp rice vinegar
- ½ tsp toasted sesame oil
- *Optional: 2 tbsp sesame seeds*
- *Optional: a pre-cooked grain like rice, noodles, etc. If using, add more soy sauce, vinegar, and oil.*

Instructions

1. Wash the vegetables harvested from the garden.
2. Using your preferred teaching method, prepare the vegetables:
 - a. Dice the vegetables using scissors or knives.
 - b. Tear the green leaves into bite-sized pieces. Discard the stems, unless students want to dice them.
3. Heat the oil in a large skillet over medium-high heat.
4. Add the green onions, leeks, and sugar snap peas. Cook for two minutes, until leeks and onions soft.
5. Add the leafy greens and soy sauce, stirring occasionally, until the kale is tender, 4 to 7 minutes.
6. Pour the rice vinegar, sesame oil, and sesame seeds into the stir-fry.
7. Stir until combined.
8. Serve to very excited and eager students.

Activity 2: Worksheet Station (with classroom teacher as needed)

- Students can draw the recipe to take home or complete a wordsearch with the ingredients.

Closing and Eating (10 minutes)

- **Challenge** students to identify the CAMOUFLAGED greens in their food.
- **Reflection:** Students share their favorite animal adaptation from the past lessons and any questions they still have.