

# THIRD GRADE GARDEN BASED CURRICULUM

## Table of Contents

### **UNIT 1: Life Cycle of Flowering Plants**

<i>Lesson 1 ~ Pollination: Flower Anatomy</i> .....	5
<i>Lesson 1.1 ~ Pollination: Flower Anatomy</i> .....	9
<i>Lesson 2 ~ The Importance of Pollinators</i> .....	12
<i>Lesson 3 ~ Pollination Adaptations</i> .....	15
<i>Lesson 4 ~ Attracting Pollinators</i> .....	19
<i>Lesson 5 ~ Seed Anatomy</i> .....	22
<i>Lesson 5.1 ~ Seed Anatomy Investigation</i> .....	25
<i>Lesson 6 ~ Seed Dispersal</i> .....	28
<i>Lesson 7 ~ Researching Pollinator</i> .....	31
<i>Lesson 8 ~ Writing a Report on a Pollinator</i> .....	34
<i>Lesson 9 ~ Making a Slideshow</i> .....	37
<i>Lesson 10 ~ Practicing and Presenting Oral Presentations</i> .....	40

### **UNIT 2: Desert Tortoise**

<i>Lesson 1 ~ Researching the Tortoise</i> .....	45
<i>Lesson 2 ~ Writing a Report</i> .....	48
<i>Lesson 3 ~ What's Your View?</i> .....	50
<i>Lesson 4 ~ How Can We Help Preserve the Tortoise?</i> .....	52
<i>Lesson 5 ~ Making a Slideshow</i> .....	54
<i>Lesson 6 ~ Practicing and Delivering Oral Presentations</i> .....	57

### **UNIT 3: Native Plants**

<i>Lesson 1 ~ Native Plants and Traditional Uses Part 1</i> .....	60
<i>Lesson 2 ~ Native Plants and Traditional Uses Part 2</i> .....	63
<i>Lesson 3 ~ Native Plants and Traditional Uses Part 3</i> .....	66
<i>Lesson 4 ~ Native Plants and Traditional Uses Part 4</i> .....	69

### **UNIT 4: Desert Biome**

<i>Lesson 1 ~ Manzo Desert Biome Field Observations</i> .....	71
<i>Lesson 2 ~ What's In Our Desert Biome?</i> .....	77

### **Appendix**

<i>Lesson 1a ~ Poster of Flower Anatomy</i>	
<i>Lesson 1b ~ Flower Anatomy Poster Template</i>	
<i>Lesson 2 ~ Article: Major Threats to Pollinators</i>	
<i>Lesson 3 ~ Pollination Adaptation Matching Cards</i>	
<i>Lesson 3 ~ Pollination Adaptations Chart</i>	
<i>Lesson 4 ~ Article: Attracting Pollinators to Your Garden</i>	
<i>Lesson 4 ~ Garden Design Poster Template</i>	
<i>Lesson 5a ~ Anatomy of a Seed</i>	
<i>Lesson 5a ~ Article: Monocot/Dicot</i>	
<i>Lesson 5b ~ Germination Poster Template</i>	
<i>Lesson 10 ~ Master Schedule for Presentations</i>	
<i>Lesson 10 ~ Pollinator Presentation Proposal</i>	
<i>Lesson 10 ~ Presentation Rubric</i>	

# UNIT 1: Life Cycle of Flowering Plants

## **Unit Summary:**

Since this unit is about the life *cycle* of flowering plants, it is not necessary to begin this unit at Lesson 1. Start the unit at any lesson based on the season and what the plants outside are doing naturally and continue from there.

## **Lesson Summaries:**

### **Lesson 1 ~ Pollination: Flower Anatomy**

Students analyze a text and diagrams to understand and identify flower anatomy. They will verbally summarize how a flower is pollinated. Then they select a native flower from outside and compare it to the diagram and text they just analyzed. They will communicate to a partner the similarities and differences they observe.

### **Lesson 1.1 ~ Pollination: Flower Anatomy**

Teacher will read a story about pollination to the class. Students will apply their learning from last session to create a flower anatomy poster based on the native flower he has selected. Posters contain a diagram and a paragraph describing the function of the various flower anatomies. They will write one more paragraph for their poster during Lesson 3.

### **Lesson 2 ~ The Importance of Pollinators**

Students will understand the importance of pollinators for making food for humans. Students will close read an article about threats to pollinators, analyzing the structure of the article as well as the ideas therein. Students will then create graphic organizers displaying what they learned about threats to pollinators.

### **Lesson 3 ~ Pollination Adaptations**

Students will read a chart that shows the adaptations between flowers and pollinators. They will then play a game matching pollinators to their flowers and justifying their decisions based on the connections outlined in the chart. Students will complete their posters from Lesson 1b by writing a paragraph in which they draw conclusions about what pollinators likely pollinate their flower based on the flower's characteristics.

### **Lesson 4 ~ Attracting Pollinators**

Students will read a brochure from the National Fish and Wildlife Service about attracting pollinators to a garden. Students will then create a poster illustrating 2 different gardens: one that would attract pollinators, and one that wouldn't. Students will also write a paragraph about each garden explaining why it would or wouldn't be suitable pollinator habitat.

<http://www.fws.gov/pollinators/pollinatorpages/yourhelp.html>

### **Lesson 5 ~ Seed Anatomy**

Students will read and analyze 2 texts: one on differentiating monocots and dicots and another on seed germination. Students will answer questions about the texts to show their understanding. Then students will begin a seed germination investigation in which they germinate corn and bean seeds to be able to more closely see the anatomy of the seeds and identify them as either monocots or dicots.

**Lesson 5.1 ~ Seed Anatomy Investigation**

Students will read one more article about the anatomy of a seed. They will observe their germinated seeds from the last lesson. Students will then write a paragraph that explains both how their seed germinated (with a focus on vocabulary) as well as how they can tell which seed is a monocot and which is a dicot.

**Lesson 6 ~ Seed Dispersal**

Students will read differentiated articles online about seeds' different strategies of dispersal. Then the whole class will watch a video about seed dispersal. Students will go outside to collect a seed of their choice and return to class. Once inside, students will use their knowledge from the online texts and video to write an opinion paragraph explaining how they think their seed is dispersed.

**Lesson 7 ~ Researching a Pollinator**

Students will select a Sonoran Desert pollinator to research. They will learn effective methods for note-taking and use a computer with Internet connection to research and take notes on their pollinator in preparation to write a report in a later lesson.

**Lesson 8 ~ Writing a Report on a Pollinator**

Students will learn the organizational structure of a research report. Students will use their notes to write a 5-paragraph report on their pollinator.

**Lesson 9 ~ Making a Slideshow**

Students will learn the basics of using PowerPoint and navigating the file system of a desktop computer. They will then create a slideshow about their pollinator. Students will have the choice to make their slideshow about the relationship between their pollinator and a specific plant; or a slideshow about threats to their pollinator.

**Lesson 10 ~ Practicing and Presenting Oral Presentations**

Students will learn how to effectively give a presentation using PowerPoint, practice their presentations with a partner, and then give a presentation about their pollinator to the class. Students will also create invitations to other classes to view their presentation at a later date. Upon acceptance of their invitations, students will visit other classrooms to spread their knowledge of pollinators.

# Life Cycles of Flowering Plants

## *Lesson 1 ~ Pollination: Flower Anatomy*

Teacher:  
Author: Wes Oswald

Grade Level: 3

Date:

<b>Common Core Standard:</b>	<p>ELA: RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).</p> <p>ELA: SL.3.2 Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.</p>
<b>Ecology Objective:</b>	<ul style="list-style-type: none"> <li>•Students will use a flower anatomy diagram to identify the different parts of native flowers at school and describe the process of pollination.</li> </ul>
<b>Enduring Understandings and Essential Questions</b>	<p>Interconnectedness (being joined or related): Organisms and their environments are interconnected; changes in one part of the system will affect other parts of the system.</p> <ul style="list-style-type: none"> <li>•What are some connections between flower parts and its environment that help the flower to make seeds?</li> </ul>
<b>Content Objective:</b> <i>Math Reading</i> <i>Writing</i> <i>Other:</i>	<ul style="list-style-type: none"> <li>•Students will analyze diagrams and read and understand an online text about flower anatomy</li> <li>•Students will use knowledge gained from the text to identify the parts of a native flower from school grounds and describe the function of each part.</li> </ul>
<b>Language Objective:</b>	

<b>Vocabulary</b>	<b>Materials</b>
Anatomy, petal, sepal, nectary, stamen, style, stigma, pistil, ovary, ovule, anther, filament, bud, pollen, anatomy, fruit	<ul style="list-style-type: none"> <li>•(1+ for every pair of students) Computer connected to the Internet (use this website: <a href="http://www.sciencekids.co.nz/gamesactivities/lifecycles.html">http://www.sciencekids.co.nz/gamesactivities/lifecycles.html</a>)</li> <li>•Cups with water and cut flowers (1 cup per table filled with enough flowers for each student to have at least 1)</li> <li>•(1) Prepared <i>Poster of Flower Anatomy</i> (see accompanying documents)</li> <li>•(1) Magnifying glass or loupe per student</li> <li>•(1) Teacher-created key matching flower name to flower</li> </ul>

**Seasonality:** This lesson relies on the availability of native flowers. Spring is optimum, but monsoon and dry summer will work too.

<i>Monsoon</i> July-Sept.	<i>Autumn</i> Oct.-Nov.	<i>Winter</i> Dec- Feb.	<i>Spring</i> Mar.-Apr.	<i>Dry Summer</i> May-June
------------------------------	----------------------------	----------------------------	----------------------------	-------------------------------

**Anticipatory Set:** (Use one side of a whole sheet of paper.) (5 minutes)

**Main Idea:** Describe why you think plants have flowers.

**Supporting Details:** Draw a flower. Label as many parts of the flower as you can.

## Activity/Investigation:

### Review and Discuss Anticipatory Set (10 minutes)

1. Have students share their diagrams and sentences with each other. Select a couple students to share theirs with the class. Tell students to set this paper aside as they will be using the back of it for their closing activity.

### Direct Instruction (15 minutes)

2. Reveal to students the flower anatomy poster you have prepared. Tell students that they will be going to the computer lab in a bit (if they are not already there) to learn the names of the parts of a flower as well as the function of each part. Tell students that you will first give them a brief overview of each part. Consider having students draw the flower anatomy and take notes in their science journals as you explain. As you tell them the name of each part and its function, have students repeat the name of each part after you. This is to be brief, as they will get a more detailed explanation online.

Include the following details about flower anatomy:

### Main Idea

The reason plants create flowers is to make seeds so that more plants can grow. Each part of the flower plays a different role in helping to create a seed. Flowers create pollen that pollinators such as butterflies, humming birds, moths, and bats need to move from one part of the flower to another so that a seed can form.

### Supporting Details:

-*Petals:* Attract specific pollinators using color and scent

-*Sepals:* Protect a not-yet-open flower called a bud

-*Nectary:* Produces nectar for pollinators to drink

-*Male parts of the flower:* The stamen is made of the *filament* and *anther* which create *pollen*

-*Female parts of the flower:* The whole female part is called the *pistil*. When *pollen* goes onto the *stigma*, it connects to the *ovule* through the *style* into the *ovary* where it is then *pollinated*. The *ovule* will grow into a *fruit* and the *ovary* will turn into a *seed*.

-*Receptacle:* Usually a rounded part at the base of the flower that holds all the flower parts together

3. Give students a preview of the website

(<http://www.sciencekids.co.nz/gamesactivities/lifecycles.html>) they are about to explore by projecting it onto the wall. Point out these key features:

- The blue box where they will be dissecting, labeling and reading about the flower anatomy
- How flower parts can be dragged and dropped.
- The magnifying glass icon (this is the most important part) which when clicked on, allows students to read about the function of each flower part.

Tell students that they will work with a partner and take turns “dissecting” the flower and reading the details using the magnifying glass icon to learn the function of each part. Reiterate that this is the most important part because they will be describing how the different parts work together to make seeds.

Students should work in pairs. They may share a single computer, or they may each have their own computer as long as they work at a similar pace and read aloud to each other.

### **Investigation (25 minutes)**

4. Students work together to manipulate and read about the flower parts online.

5. (Intermittent closure and check for understanding): Pose the following statement to the class: Describe the process of pollination that causes seeds to form. Use vocabulary that shows your understanding of flower anatomy. Quickly call off students as “A” or “B.” Then ask all “A” students to stand up and explain to a “B” student (who is not their original partner) the answer to the question. Then “B” students stand up and do the same to a different “A” student. Encourage students to help each other with their explanations and to use the flower diagram on the computer as a reference and teaching aid.

After students have summarized to each other, ask the question again to the whole class. Have a couple students to come to the flower anatomy poster at the front of the class to explain how flowers are pollinated and to point out the parts on the diagram as he explains. Clear up any confusion as needed.

6. After students have completed the computer activity and verbally summarized the process of pollination, either bring students back to class or to a different part of the computer lab (so that water doesn’t spill on computers!) to examine the cut flowers you have prepared into cups of water. Each table should have one cup of flowers with at least as many flowers as there are students at the table. Tell students that using a loupe or magnifying glass, they are to identify as many different parts of the flower as they can. Direct their attention once again to the flower anatomy poster at the front of the room so that they can compare. Tell students that some flowers will look very similar to the diagram and others will look rather different, but each flower will have the parts shown on the poster. Once students have identified most parts of the flower, encourage them to carefully break their flower open to identify any hidden parts, especially inside the pistil. After a few minutes of exploring the flower independently, ask students to share what they discovered with another person at their table. Encourage them to note similarities and differences between their flower and those of their neighbors.

### **Closure: (10 minutes)**

Tell students that they will be doing the exact same thing as they did for their anticipatory set. Have them turn over their papers they used at the beginning of the class and ask them again to draw a flower and label as many parts as they can. Then have

students write some sentences that describe why plants have flowers. Tell students they may not look back at their work from the beginning of the class and tell them that you will set aside the poster to see what they remember on their own.

After about 5 minutes, have students compare what they just created to what they drew and wrote at the beginning of class. Also put the flower anatomy poster back up so that students may add more flower parts they didn't include and correct their spelling. Then have them share their final drawing and sentences with a neighbor. Ask a few students to share their work with the whole class.

**Teacher Reflection:**

# Life Cycles of Flowering Plants

## *Lesson 1.1 ~ Pollination: Flower Anatomy*

Teacher:  
Author: Wes Oswald

Grade Level: 3

Date:

<p><b>Common Core Standard:</b></p>	<p>ELA: RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).</p> <p>ELA: W.3.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly.</p> <ul style="list-style-type: none"> <li>-Introduce a topic and group related information together; include illustrations when useful to aiding comprehension.</li> <li>-Develop the topic with facts, definitions, and details.</li> <li>-Use linking words and phrases (e.g., also, another, and, more, but) to connect ideas within categories of information.</li> <li>-Provide a concluding statement or section.</li> </ul>
<p><b>Ecology Objective:</b></p>	<ul style="list-style-type: none"> <li>•Students will draw and label the anatomy of native flowers at school and write about the function of each part.</li> </ul>
<p><b>Enduring Understandings and Essential Questions</b></p>	<p>Interconnectedness (being joined or related): Organisms and their environments are interconnected; changes in one part of the system will affect other parts of the system.</p> <ul style="list-style-type: none"> <li>•What are some connections between flower parts and its environment that help the flower to make seeds?</li> </ul>
<p><b>Content Objective:</b> <i>Math Reading</i> <i>Writing</i> <i>Other:</i></p>	<ul style="list-style-type: none"> <li>•Students will analyze diagrams and read and understand an online text about flower anatomy</li> <li>•Students will use knowledge gained from the text to identify the parts of a native flower from school grounds and describe the function of each part.</li> </ul>
<p><b>Language Objective:</b></p>	

Vocabulary	Materials			
Anatomy, petal, sepal, nectary, stamen, style, stigma, pistil, ovary, ovule, anther, filament, bud, pollen, anatomy, fruit	<ul style="list-style-type: none"> <li>•(1) Computer connected to projector (use this video “The Beauty of Pollination: <a href="http://www.neok12.com/video/Pollination/zX4a705d4406575c55575c06.htm">http://www.neok12.com/video/Pollination/zX4a705d4406575c55575c06.htm</a>)</li> <li>•Pollination storybooks such as <i>The Flowers are Calling</i> by Rita Gray, <i>Night Life of the Yucca : The Story of a Flower and a Moth</i> by Katherine B. Hauth or <i>The Reason for a Flower</i> by Ruth Heller. (<b>Check with your library at least a week in advance as you may need to request an interlibrary loan—these are just three of many possible stories about pollination</b>)</li> <li>•(1) <i>Flower Poster Template</i> (see accompanying documents)</li> <li>•(1 per student) Poster paper</li> <li>•Cups with water and cut flowers (1 cup per table filled with enough flowers for each student to have at least 1. <i>Don't rely on the same flowers as the previous lesson as they are likely destroyed!</i>)</li> <li>•(1) Prepared <i>Poster of Flower Anatomy</i> (from Lesson 1a)</li> <li>•(1 per student) Magnifying glass or loupe</li> <li>•(1) Teacher-created key matching flower name to flower for selected flowers in cups</li> </ul>			
<p><b>Seasonality:</b> This lesson relies on the availability of native flowers. Spring is optimum, but monsoon and dry summer will work too.</p>				
<i>Monsoon</i> July-Sept.	<i>Autumn</i> Oct.-Nov.	<i>Winter</i> Dec- Feb.	<i>Spring</i> Mar.-Apr.	<i>Dry Summer</i> May-June

**Before lesson:**

- Prepare enough cups with cut native flowers in water so each table has a bouquet.
- If possible create a key that shows a picture/drawing and the name of each type of flower that has been cut.
- Create a poster that shows the anatomy of a flower. Use *Flower Poster Template* as a model.

**Anticipatory Set: (5 minutes)**

Watch this video:

<http://www.neok12.com/video/Pollination/zX4a705d4406575c55575c06.htm>

As you watch the video, consider these questions:

1. What creatures are pollinating?
2. How does each creature move pollen from one part of a flower to another?
3. What techniques does each flower use to attract its specific pollinator?

**Activity/Investigation:**

**Review and Discuss Anticipatory Set (5 minutes)**

1. Have students share with a partner the answers to the three questions above. Then select a few students to share with the whole class.

**Direct Instruction (15 minutes)**

2. Read a selected storybook (see materials list above for suggestions) about pollination.

3. Tell students, that as in the previous lesson, today they will be examining native flowers from our school to identify the various parts involved in pollination and describe the function of each part. The difference, however, is that today, they will create a poster that includes their own diagram and a paragraph that describes the process of pollination.

Tell students the requirements for their poster (inform them that paragraph 2 will be completed during a subsequent lesson):

**A. Diagram**

- an accurate in-color drawing of the anatomy of a flower of your choice from the cup at your table
- labels that diagram as many parts of the flower as you can identify

**B. Paragraph 1 describing the process of pollination**

- Topic sentence
- 4 or more supporting detail sentences
- transitional words and phrases that connect ideas from sentence to sentence
- 8 or more pollination vocabulary words used correctly in context
- Closing sentence

**C. Paragraph 2 describing what pollinator is attracted to your flower and how it is attracted (*This paragraph is to be completed in Lesson 3—NOT TODAY*)**

- Topic sentence
- 3 or more supporting details that tell (or predict) what pollinator visits your flower using evidence to support your idea
- transitional words and phrases that connect ideas from sentence to sentence
- Closing sentence

**Investigation (30 minutes)**

4. Students select a flower from the cup of water at their table to draw, diagram and write about. Encourage students to help each other identify flower parts and to use the flower anatomy poster as a reference. If a student finishes early, encourage him or her to select a different flower to diagram on the back of their poster or to select another pollination book to read independently.

**Closure: (5 minutes)**

Have students stand up with their completed posters. Tell students to find a partner at a different table who created a poster about the exact same flower. Each student will take turns showing their diagrams and reading their paragraphs to their partners. Having students share with someone with the same flower will facilitate comparison and better understanding of their own flower.

**Teacher Reflection:**

# Life Cycles of Flowering Plants

## Lesson 2: The Importance of Pollinators

Teacher:  
Author: Wes Oswald

Grade Level: 3

Date:

<b>Common Core Standard:</b>	<p>ELA: RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).</p> <p>ELA: SL.3.2 Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.</p>
<b>Ecology Objective:</b>	<ul style="list-style-type: none"> <li>•Students will use a flower anatomy diagram to identify the different parts of native flowers at school and describe the process of pollination.</li> </ul>
<b>Enduring Understandings and Essential Questions</b>	<p>Interconnectedness (being joined or related): Organisms and their environments are interconnected; changes in one part of the system will affect other parts of the system.</p> <ul style="list-style-type: none"> <li>•What are some connections between flower parts and its environment that help the flower to make seeds?</li> </ul>
<b>Content Objective:</b> <i>Math Reading Writing Other:</i>	<ul style="list-style-type: none"> <li>•Students will analyze diagrams and read and understand an online text about flower anatomy</li> <li>•Students will use knowledge gained from the text to identify the parts of a native flower from school grounds and describe the function of each part.</li> </ul>
<b>Language Objective:</b>	

<b>Vocabulary</b>		<b>Materials</b>		
Degradation: decline in quality Fragmentation: the breaking up of a large area into smaller pieces Pesticide: chemical mixture designed to kill plants (herbs) Herbicide: chemical mixture designed to kill pests, especially insects		<ul style="list-style-type: none"> <li>•(1) <i>Major Threats to Pollinators</i> article (see accompanying documents)</li> <li>•(1 per table group) Butcher paper</li> <li>• Markers—a few per table group</li> </ul>		
<p><b>Seasonality:</b> This lesson will work anytime, but there will likely be little to no native plants in blossom during the winter.</p>				
<i>Monsoon</i> July-Sept.	<i>Autumn</i> Oct.-Nov.	<i>Winter</i> Dec- Feb.	<i>Spring</i> Mar.-Apr.	<i>Dry Summer</i> May-June

**Anticipatory Set:** (2 or 3 minutes)

We have been learning that plants make seeds when a flower is pollinated. Not only native plants need pollination, but plants we grow for food do too. To get you thinking about how important pollination is, make a list of foods that have seeds inside.

### **Activity/Investigation:**

#### **Review and Discuss Anticipatory Set (5 minutes)**

1. Have a variety of students share out fruits or vegetables they've written down that contain seeds. Make a list on the board. Point out that many plants we eat have seeds inside which means that they depend on pollination.

#### **Direct Instruction (5 minutes)**

2. Tell students, "We know that for a plant to be pollinated, the pollen has to move from the stamen to the pistil of a flower. But what causes that to happen?" Take responses from students. Then tell students that it is oftentimes a pollinator such as a bee, hummingbird, butterfly, or other insect or animal. Tell students that when the pollinator drinks nectar in the nectary of a flower, the pollinator brushes up against the pollen and accidentally moves it from the stamen to the pistil—sometimes on the same flower, and sometimes on a different flower. Reference the Flower Anatomy poster to show how this can happen.

3. Tell students, "However, many pollinators are in trouble. Scientists have noticed that bees and other pollinators are disappearing. Can anyone guess what might cause pollinators to disappear?" Take responses from students. Tell students that they will read an article about threats to pollinators to see if their guesses were correct. Distribute the article. Tell students to circle any words they don't know or understand and to use close reading symbols to interact with the text:

! Wow

✓ I agree

? I don't understand

\* Important

#### **Reading and Writing Activity (40 minutes)**

4. Students first read article by themselves. Pull aside struggling readers to lead a guided reading session with them or to read aloud to them.

5. Students share out unfamiliar words. Teacher and students disambiguate words together. Students then turn to a partner and share a sentence from the text they marked in their close reading.

6. Students then re-read the article with their table groups, taking turns reading each paragraph. After one student finishes reading a paragraph she should summarize what she just read to her group. Then the next reader continues in the same fashion.

7. Students then use the butcher paper to make a graphic organizer that summarizes their understanding of the article. Tell students to pay attention to the way the article is organized (titles, subheadings, bold words) as it will help them to organize their graphic organizer. Tell students that their graphic organizer can take on any shape or form as long as the hierarchy of main idea, supporting details, and examples/further details is

clear. At the bottom of each graphic organizer, students should each write their own take-away from the article—something that resonated with them, a new idea, or a reaction.

8. Hang posters on the wall or leave them displayed at each table. Students do a gallery walk in which they examine the ideas and organization of each graphic organizer.

**Closure: (5 minutes)**

Pose the following questions:

-“Did you find a poster that expressed a similar understanding of the article as yours? What was it?”

-“Did you find a poster that showed a different understanding of the article than yours? What was it?”

Students discuss and then teacher selects a few students to share with the whole class.

**Teacher Reflection:**

# Life Cycles of Flowering Plants

## Lesson 3 ~ Pollination Adaptations

Teacher:  
Author: Wes Oswald

Grade Level: 3

Date:

<b>Common Core Standard:</b>	<p>ELA: RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.</p> <p>ELA: W.3.1 Write opinion pieces on topics or texts, supporting a point of view with reasons. -Introduce the topic or text they are writing about, state an opinion, and create an organizational structure that lists reasons. -Provide reasons that support the opinion. -Use linking words and phrases (e.g., because, therefore, since, for example) to connect opinion and reasons. -Provide a concluding statement or section.</p>
<b>Ecology Objective:</b>	<ul style="list-style-type: none"> <li>•Students will draw conclusions about what pollinator(s) are best adapted to pollinate a flower based on the flower’s characteristics.</li> </ul>
<b>Enduring Understandings and Essential Questions</b>	<p>Interconnectedness (being joined or related): Organisms and their environments are interconnected; changes in one part of the system will affect other parts of the system.</p> <ul style="list-style-type: none"> <li>•What are some adaptations your flower has that allow it to attract certain pollinators?</li> </ul>
<b>Content Objective:</b> <i>Math Reading Writing</i> <i>Other:</i>	<ul style="list-style-type: none"> <li>•After reading and analyzing a pollination adaptation chart, students will write a paragraph in which they describe relationships between a flower and a pollinator.</li> <li>•Students will justify their reasoning using cause and effect relationships from the text.</li> </ul>
<b>Language Objective:</b>	

Vocabulary	Materials
Proboscis, adaptation, mutualistic relationship	<ul style="list-style-type: none"> <li>•<i>Pollination Adaptations Chart</i> (see Accompanying Documents)</li> <li>•Poster paper (Students continue using same poster from lesson 1b)</li> <li>•Cups with water and cut flowers (1 cup per table filled with enough flowers for each student to have at least 1)</li> <li>•(1 per student) Magnifying glass or loupe per student</li> <li>•<i>Pollination Adaptation Matching Game</i> <b>printed in color</b> (see accompanying documents)</li> <li>•Prepared <i>Poster of Flower Anatomy</i> (from Lesson 1a: see accompanying documents)</li> <li>•Teacher-created key matching flower name to flower (from lesson 1b)</li> </ul>

<p>•<i>Flower Poster Template</i> (from Lesson 1b: see accompanying documents)</p>				
<p><b>Seasonality:</b> This lesson relies on the availability of native flowers. Spring is optimum, but monsoon and dry summer will work too.</p>				
<p><i>Monsoon</i> July-Sept.</p>	<p><i>Autumn</i> Oct.-Nov.</p>	<p><i>Winter</i> Dec- Feb.</p>	<p><i>Spring</i> Mar.-Apr.</p>	<p><i>Dry Summer</i> May-June</p>

**Anticipatory Set: (2 or 3 minutes)**

Consider each of these common pollinators:

- Butterflies
- Moths
- Bats
- Hummingbirds
- Bees
- Flies

Perhaps you have seen one of these pollinators visit a flower. Select one pollinator that you have seen visit a flower.

- What special characteristics does your pollinator have that connect it to that flower?
- What characteristics does the flower have that might attract that specific pollinator?

(After sufficient time to consider this prompt, ask students who have a pollinator and flower in mind to stand up. Then ask them to find someone who is seated and describe the connections between the pollinator and the flower they have in mind.)

**Activity/Investigation:**

**Review and Discuss Anticipatory Set (5 minutes)**

1. Ask a few students to share with the whole class the adaptations they have in mind that connect a specific pollinator to a specific flower

**Direct Instruction (10 minutes)**

2. Tell students that pollinators and flowers are perfectly adapted for each other and can be rather ‘picky’ about each other, meaning that there is usually a very specific pollinator for a specific flower—not just any pollinator will visit a specific flower. Tell students that

pollinators and flowers have a **mutualistic relationship**, meaning that they both benefit each other. How do flowers benefit a pollinator? (They provide nectar or pollen to the pollinator.) How do pollinators benefit the flower? (They pollinate the flower, allowing it to make seeds and reproduce.)

3. Tell students, that today they will be analyzing a *Pollination Adaptations Chart* (see materials list) to find pollination adaptations between flowers and pollinators. Distribute the charts to pairs of students and ask them to notice how it is organized. Select a single pollinator and read across to the students, checking for understanding. Then inform students that they will take turns reading the chart to each other. Encourage students to think of and describe real-life examples of pollination adaptations as they read.

### **Reading Activity (5 minutes)**

4. Students read charts.

### **Direct Instruction (5 minutes)**

5. Once students have completed reading the chart, explain to them how they will play the *Pollination Adaptation Matching Game*. Show them the cards and how they can be divided into groups of pollinators and flowers. Students will play with their table groups. Students will display the flower cards face-up and the pollinator cards face-down. One at a time, students will draw a pollinator card. Once the card is drawn, they will do their best to match the pollinator to the flower that it is best adapted to. Tell students that they must use facts from the *Pollination Adaptations Chart* to justify their reasoning. If the group agrees with the connection the player has made, that player places the pollinator card above the flower card. If the group disagrees with the player, the group should offer hints or suggestions to find a better match until everyone agrees. Once agreement has been made, the player then places the pollinator card above the flower. Play continues until there are no more pollinator cards left. If time allows, students may shuffle the pollinator cards and play again.

### **Game Play (15 minutes)**

6. Students play *Pollination Adaptation Matching Game*. While students play, teacher ves play to look for and guide groups that have possible mismatches and asks for explanations/justifications and citations from the *Pollination Adaptations Chart* . After about 12 or so minutes of play, teacher should select a few pollinator cards to discuss with the class.

### **Direct Instruction (2 or 3 minutes)**

6. Collect cards and tell students that they will now compose the final paragraph for their flower poster that they started in Lesson 1b. Remind them what this paragraph is about:

### **C. Paragraph 2 describing what pollinator is attracted to your flower and how it is attracted**

-Topic sentence

-3 or more supporting details that tell (or predict) what pollinator visits your flower using evidence from Pollination Adaptation chart to support your idea

-transitional words and phrases that connect ideas from sentence to sentence

-Closing sentence

### **Writing Activity (15 minutes)**

Students then get to work on completing their paragraph, and thus, their poster. As in previous lessons, cups of flowers should be made available at each table so students can analyze adaptations and compare them to information on the chart.

**Closure: (5 minutes)**

Have students stand up with their completed posters. Tell students to find a partner at a different table who created a poster about the exact same flower. Each student will take turns showing and reading their adaptation paragraphs to their partners. Having students share with someone with the same flower will facilitate comparison and better understanding of adaptations between flowers and pollinators.

**Extension**

If time allows, take students outside to find a spot where their flower grows. Have them sit in silence to observe which pollinators come to visit their flower.

**Teacher Reflection:**

# Life Cycles of Flowering Plants

## Lesson 4 ~ Attracting Pollinators

Teacher:  
Author: Wes Oswald

Grade Level: 3

Date:

<b>Common Core Standard:</b>	ELA: RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).
<b>Ecology Objective:</b>	•Students will learn how to attract pollinators to an outdoor space
<b>Enduring Understandings and Essential Questions</b>	Interconnectedness (being joined or related): Organisms and their environments are interconnected; changes in one part of the system will affect other parts of the system. •How can we design and maintain outdoor spaces to attract pollinators?
<b>Content Objective:</b> <i>Math Reading Writing</i> <i>Other:</i>	•After reading and analyzing a brochure, students will create 2 different designs for a home or park garden: one that will attract a variety of pollinators and one that won't. •Students will describe each garden and explain why it would or would not attract pollinators.
<b>Language Objective:</b>	

Vocabulary		Materials		
(from brochure; page numbers noted) 2. reproductive, crucial 3. vertebrates 4. mobile 5. declining, fragmentation, degradation, invasive species, pesticides 7. beneficial		<ul style="list-style-type: none"> <li>•(1 per student) <i>Attracting Pollinators to Your Garden Brochure</i> (see accompanying documents)</li> <li>•(1 per student) Poster Paper</li> <li>•(1 per student) Lined writing paper</li> <li>• (1) <i>Garden Design Poster Template</i></li> </ul>		
<b>Seasonality:</b> Although this lesson revolves around flowers and pollinators, students will not need to interact with them in the wild. However, the lesson could be delivered more effectively if they saw flowers and pollinators in outdoor gardens at school as examples. Spring, dry summer, and monsoon would be the best time of year for students to see this.				
<i>Monsoon</i> July-Sept.	<i>Autumn</i> Oct.-Nov.	<i>Winter</i> Dec- Feb.	<i>Spring</i> Mar.-Apr.	<i>Dry Summer</i> May-June

**Anticipatory Set: (5 min.)**(Give each student or each student pair a brochure.)

Preview this brochure by looking at the pictures, and reading some of the words.

- How is this brochure organized?
- What's the main idea of this brochure?
- Which pages review information you already know?

- Which pages have new information?
- Who is the intended audience for this brochure?

### **Activity/Investigation:**

#### **Review and Discuss Anticipatory Set (5 minutes)**

1. After students have had a chance to explore the brochure independently, ask them to share their responses with a neighbor. Then ask a few volunteers to share with the whole class.

#### **Direct Instruction (5 minutes)**

2. Tell students that this is a brochure written by a national agency called the U.S. Fish and Wildlife Service. Their job is “working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people.” Inform students that this is a brochure intended for adults, but with a little help understanding some key vocabulary words, third graders can learn from it too. Write vocabulary words and corresponding page numbers on the board and explain what they mean. Read the words aloud and have students repeat them as you direct them to where they can be found in the text.

3. Tell students that once they read this brochure with their partner, they will create a poster that illustrates a garden that would attract a variety of pollinators and a garden that would not. Poster requirements:

#### **Illustrations**

- 2 illustrations—one of a garden that would attract a variety of pollinators and one that would not. Encourage students to incorporate flowers and plants they have learned about throughout this unit.
- Each illustration should be in color and show an imagined garden space at your home or at a park

#### **Paragraphs:**

- 2 paragraphs—each paragraph should explain the key components of each garden and why they would or would not attract a variety of pollinators.

Each paragraph should be organized as follows:

- topic sentence, supporting details, closing sentence
- transitional words guide the reader throughout your paragraph
- Use evidence from the brochure to support your ideas.

#### **Activity (45 min.)**

4. Students work with their partner, taking turns to read parts of the brochure. Have students circle unfamiliar words.

#### **Intermittent closure:**

5. Once student have had time to read a significant portion of the text. Ask students to share unfamiliar words they've circled. Students will work together to reach an understanding of these new words.

6. Students then use their poster paper to illustrate the two different gardens and then write their paragraphs describing them.

**Closure: (5 minutes)**

Pose this question to students for discussion: What are some key components of a garden that attract pollinators? Where have you seen such a garden space in real life? Give some examples of components that attract pollinators.

**Teacher Reflection:**

# Life Cycles of Flowering Plants

## Lesson 5 ~ Seed Anatomy

Teacher:  
Author: Wes Oswald

Grade Level: 3

Date:

<b>Common Core Standard:</b>	ELA: RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
<b>Ecology Objective:</b>	•Students will draw conclusions about what pollinator(s) are best adapted to pollinate a flower based on the flower’s characteristics.
<b>Enduring Understandings and Essential Questions</b>	Biodiversity (the variety of life on Earth): All ecosystems contain a variety of organisms that are interdependent.
<b>Content Objective:</b> <i>Math Reading Writing Other:</i>	•After reading and analyzing a text, students will respond to questions using evidence from the text
<b>Language Objective:</b>	

Vocabulary		Materials		
Germination, embryo, seed coat, endosperm, scarification, dormancy, monocot, dicot		<ul style="list-style-type: none"> <li>•Plastic baggies (1 per student-<b>have students save and reuse a plastic bag from their lunch</b>)</li> <li>•(2 each per student) Corn and bean seeds that you have soaked in water since the morning of or night before lesson. Any dried corn or bean seed will work. The larger the bean seed the better though.</li> <li>•Paper towels (1/2 towel per student)</li> <li>•Trays or dishes of water (1 per table)</li> <li>•Masking tape</li> <li>•(1 per student) Packet of the following articles: <i>Monocot Dicot, Germination, and Anatomy of a Seed</i> (see accompanying documents)</li> <li>•Sticky notes for closure (1 per student)</li> </ul>		
<b>Seasonality:</b> Seeds will likely germinate more easily during warmer seasons, but a heating pad or warm sunny window can aid germination during winter.				
<i>Monsoon</i> July-Sept.	<i>Autumn</i> Oct.-Nov.	<i>Winter</i> Dec- Feb.	<i>Spring</i> Mar.-Apr.	<i>Dry Summer</i> May-June

### Anticipatory Set: (15 minutes)

Today we will begin some studies on seed anatomy. We will focus on the two types of seeds made by flowering plants: monocots and dicots. To prepare you for today’s lesson, please read

the article “Monocot Dicot” in front of you and respond to the questions on the back once you are finished reading. Circle any unfamiliar words as you come across them.

(Distribute packet of articles and direct their attention to the first article about Monocots and Dicots and give students time to read and respond to questions independently.)

### **Activity/Investigation:**

#### **Review and Discuss Anticipatory Set (10 minutes)**

1. Have students review their responses with a neighbor, making sure that students discuss unknown words that they circled in their articles. Then say, “Which questions were you and your partner unable to agree upon?” Then help students reach appropriate responses for those questions. To check for understanding, ask students to summarize the main idea of the article they read about along with some supporting details.

#### **Direct Instruction (5 minutes)**

2. Once it is clear that students understand that there are 2 types of plants, tell students that they will be getting 2 different types of seeds. They will germinate, dissect, and analyze the seeds to identify seed anatomy as well as to distinguish it as a monocot or dicot.

3. Each student should take out their plastic bag saved from lunch. They should also get a portion of a paper towel, a piece of masking tape, and 2 corn seeds and 2 bean seeds each. Each table should have a small tray with water for moistening paper towels. Show students how they should loosely wrap their seeds (corn on one side, beans on the other) in a damp paper towel, place it in the plastic bag, and seal the bag with the masking tape. Students should label one end of the masking tape with the word “corn” and the other end with the word “beans” to match the location of their seeds. They should also label the tape with their name. Lastly, students should tape the bag to the window.

#### **Activity (5 minutes)**

4. Students prepare and hang seed investigation baggies.

#### **Direct Instruction (2 or 3 minutes)**

5. Students next return to their reading packets. Students will read the article *Germination* with a partner at their table. Tell them also to find the diagram *Monocot vs. Dicot Seeds* so they can reference it as they read this article. Encourage students to use close reading strategies such as highlighting and annotating the text to aid comprehension.

Inform students that during the next class session, they will examine their germinated seeds, and read the final article in their packet. They will use information from the articles to write a paper explaining which of their germinated seed is a monocot and which is a dicot and how they can tell. They will also explain how they germinated their seeds. Thus, they will need to read carefully as they will be using evidence from the text to support their ideas.

#### **Reading Activity (15 minutes)**

6. Students read “Germination” article.

**Closure:** (5 minutes)

Pose the question: What is the most interesting thing you learned about seeds today? Students will write their response on a sticky note and post it on a designated spot on the white board to be revisited during the next lesson.

**Teacher Reflection:**

# Life Cycles of Flowering Plants

## Lesson 5.1 ~ Seed Anatomy Investigation

Teacher:  
Author: Wes Oswald

Grade Level: 3

Date:

<b>Common Core Standard:</b>	<p>ELA: W.3.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly.</p> <ul style="list-style-type: none"> <li>-Introduce a topic and group related information together; include illustrations when useful to aiding comprehension.</li> <li>-Develop the topic with facts, definitions, and details.-</li> <li>-Use linking words and phrases (e.g., also, another, and, more, but) to connect ideas within categories of information.</li> <li>-Provide a concluding statement or section.</li> </ul>
<b>Ecology Objective:</b>	<ul style="list-style-type: none"> <li>•Students will draw conclusions about what pollinator(s) are best adapted to pollinate a flower based on the flower’s characteristics.</li> </ul>
<b>Enduring Understandings and Essential Questions</b>	<p>Biodiversity (the variety of life on Earth): All ecosystems contain a variety of organisms that are interdependent.</p>
<b>Content Objective:</b> <i>Math Reading</i> <b>Writing</b> <i>Other:</i>	<ul style="list-style-type: none"> <li>•Using evidence from texts as well as observations from their investigation, students will write an explanatory paper explaining how a seed germinates, and which seed is a monocot and which is a dicot.</li> </ul>
<b>Language Objective:</b>	

<b>Vocabulary</b>		<b>Materials</b>		
<p>Germination, embryo, seed coat, endosperm, scarification, dormancy, monocot, dicot</p>		<ul style="list-style-type: none"> <li>•Plastic baggies with germinated seeds from Lesson 5a</li> <li>•(1 per student) Packet of the following articles: <i>Monocot Dicot, Germination, and Anatomy of a Seed</i> (see accompanying documents)</li> <li>•(1 per student) Sticky notes from closure in lesson 5a</li> <li>•(1 per student) Poster paper and lined paper</li> <li>•(1 per student) <i>Germination Poster Template</i> (see accompanying documents)</li> <li>•(1 per student) magnifying glass or loupe</li> </ul>		
<p><b>Seasonality:</b> Seeds will likely germinate more easily during warmer seasons, but a heating pad or warm sunny window can aid germination during winter.</p>				
<i>Monsoon</i> July-Sept.	<i>Autumn</i> Oct.-Nov.	<i>Winter</i> Dec- Feb.	<i>Spring</i> Mar.-Apr.	<i>Dry Summer</i> May-June

**Anticipatory Set:** (5 minutes) (Distribute one sticky note—not his or her own—to each student from the previous lesson’s closure.)

Each of you has one of your classmate’s response to last lesson’s closure question of, “What’s the most interesting thing you learned about seeds?” Look through your packet to identify a sentence, or part of a diagram that supports what your classmate has written.

(Once students have had sufficient time to identify a sentence or part of a diagram, have students meet with the author of their sticky note to show them the support they found. Don’t worry if they can’t find it or if it’s not even in the article! Some students’ writing may be more anecdotal. Regardless, the conversation students have will serve as a review of their learning from last session.)

### **Activity/Investigation:**

#### **Review and Discuss Anticipatory Set (5 minutes)**

1. Ask a few students to share what their classmate wrote as well as what they found from their packet that supports that students’ statement, or to simply share what she and her partner discussed as review from last lesson.

#### **Direct Instruction (5 minutes)**

2. Remind students that today they will read the final article from their packet, “Anatomy of a Seed.” Then they will examine their germinated seeds from last session. Lastly they will write a brief paper explaining how their seed germinated and describing which seed is monocot and which is dicot.

3. Direct students’ attention to the “Monocot vs. Dicot Seeds” diagram from their packets. Project this diagram onto the wall and read the labels, and have students repeat the names after you. This will give the students a preview of how to read these words and how to speak them during discussions.

#### **Reading Activity (15 minutes)**

4. Have students partner up with another student from their table. Partnerships will take turns reading paragraphs from “Anatomy of a Seed.” Partner A will read the first paragraph while partner B listens. After the first paragraph has been read, partner B will summarize the information from that paragraph and point out key information gained in that paragraph in the “Monocot vs. Dicot Seeds” diagram. Then partners will switch roles until the article has been read through.

5. Once students have read and summarized the article to each other, invite them to collect their germinated seeds in their baggies. Caution students that seedlings are fragile and will need to be treated as such. Students should compare their germinated seeds to the diagrams in their packets.

#### **Direct Instruction (5 minutes)**

6. Once students have had time to explore and compare their germinated seeds, direct their attention to the front of the room. Using a document camera and projector, ask volunteers to show the class their seeds and identify they seed parts using vocabulary from the diagram.

7. Instruct students how they are to work independently to create posters of a single germinated seed (bean or corn) of their choice and write to describe their seed. Show students the poster template they can use.

**Poster requirements:**

Diagram:

- Select one of your germinated seeds to draw.
- Label at least 6 parts of its anatomy using vocabulary from the diagram or texts.

Paragraphs (Topic sentence, 3 or more supporting details, closing sentence):

#1: Explain how your seed germinates.

- Use your own observations as well as information you learned from the articles.
- Use at least 4 vocabulary words from your packet.

#2: Explain why your seed is a monocot or dicot

- Use your own observations as well as information you learned from the articles.
- Use at least 4 vocabulary words from your packet.

**Writing Activity (20 minutes)**

8. Students create their posters with a diagram and 2 paragraphs. This activity may lend itself to a second class session, especially if students will create poster sketches/rough drafts and then final drafts.

**Closure: (5 minutes)**

Students will now share their completed posters. Students with corn posters will get to one side of the room and students with bean posters will get to the other side of the room. Have students exchange posters with someone on their own side to read and analyze a classmate's diagrams and writing. Allow students to provide feedback to each other.

**Teacher Reflection:**

# Life Cycles of Flowering Plants

## Lesson 6 ~ Seed Dispersal

Teacher:  
Author: Wes Oswald

Grade Level: 3

Date:

<b>Common Core Standard:</b>	<p>ELA: W.3.1 Write opinion pieces on topics or texts, supporting a point of view with reasons. -Introduce the topic or text they are writing about, state an opinion, and create an organizational structure that lists reasons. -Provide reasons that support the opinion. -Use linking words and phrases (e.g., because, therefore, since, for example) to connect opinion and reasons. -Provide a concluding statement or section.</p>
<b>Ecology Objective:</b>	<ul style="list-style-type: none"> <li>•Students will learn of different ways seeds are dispersed</li> </ul>
<b>Enduring Understandings and Essential Questions</b>	<p>Biodiversity (the variety of life on Earth): All ecosystems contain a variety of organisms that are interdependent. •Why do seeds come in such a variety of forms?</p>
<b>Content Objective:</b> <i>Math Reading Writing Other:</i>	<ul style="list-style-type: none"> <li>•After reading texts and watching a video, students will select a seed outdoors and write a paragraph expressing their opinion of how they believe the seed is dispersed.</li> </ul>
<b>Language Objective:</b>	

Vocabulary	Materials
dispersal	<ul style="list-style-type: none"> <li>•(1 per student) Computers with access to internet using the following websites:</li> <li>-Website 1 for more advanced readers: <a href="http://calscomm.cals.cornell.edu/naturalist/Naturalist-Outreach-Seed-dispersal.pdf">http://calscomm.cals.cornell.edu/naturalist/Naturalist-Outreach-Seed-dispersal.pdf</a></li> <li>-Website 2 for at-level readers: <a href="http://science.jrank.org/kids/pages/72/ALL-ABOUT-SEEDS.html">http://science.jrank.org/kids/pages/72/ALL-ABOUT-SEEDS.html</a></li> <li>-Website 3 for below-level readers: <a href="http://www.learningliftoff.com/1st-grade-science-learning-activity-traveling-seeds/#.Vba-ymRViko">http://www.learningliftoff.com/1st-grade-science-learning-activity-traveling-seeds/#.Vba-ymRViko</a> or <a href="http://www.slideshare.net/belleminjuan/how-seeds-travel">http://www.slideshare.net/belleminjuan/how-seeds-travel</a> (slides 1-11 only)</li> <li>•Video to show to whole class: <a href="http://www.cornell.edu/video/naturalist-outreach-seed-dispersal---the-great-escape">http://www.cornell.edu/video/naturalist-outreach-seed-dispersal---the-great-escape</a></li> <li>•Clear tape or glue</li> </ul>

**Seasonality:** In the Sonoran desert, you are most likely to find seeds in dry summer or autumn. Seeds will be present at other times of the year, but may be more difficult to find, as many will have already been dispersed.

<i>Monsoon</i> July-Sept.	<i>Autumn</i> Oct.-Nov.	<i>Winter</i> Dec- Feb.	<i>Spring</i> Mar.-Apr.	<i>Dry Summer</i> May-June
------------------------------	----------------------------	----------------------------	----------------------------	-------------------------------

**Anticipatory Set: (5 min.)**

Think about the native plants that grow in our habitats at school, as well as native plants growing in nature. Each of these plants create seeds, but how do these seeds spread away from the plant that made them and how do they plant themselves? Create a list of some guesses as to how seeds in nature move from their parent plant and then start growing without the help of humans. Provide illustrations if needed.

**Activity/Investigation:**

**Review and Discuss Anticipatory Set (2 or 3 minutes)**

1. Ask a few volunteers to read items from their lists.

**Direct Instruction (5 minutes)**

2. Tell students that today they will learn how seeds travel from their parent plant and plant themselves. Tell students that **dispersal** is the word we use to describe a seed moving from its parent plant. As they look at a video and some websites, students will confirm or deny their predictions.

3. Based on each students' reading level, tell them what number website they will read to learn about seed dispersal (see materials list). Take students to the computer lab. Either have links readily available online, or write the various websites on the board for students to type into a browser.

**Activity (15 minutes)**

4. Students use computers to read about seed dispersal. If students finish their assigned reading early, encourage them to explore more websites about seed dispersal using google.

**Direct Instruction and Video (15 minutes)**

5. Project the video for the whole class to see. Inform students that although the speaker focuses on seed dispersal in forests, the seed dispersal methods are applicable to all plants.

Video: <http://www.cornell.edu/video/naturalist-outreach-seed-dispersal---the-great-escape>. Discuss.

6. Inform students that they will have 5 minutes outside to find a seed/fruit of their choice to select and bring back to class. Remind students to be careful around plants and to only take one type of seed. Once in class, they will tape or glue their seed to a paper and write an opinion piece explaining what method of dispersal they think their seed uses. They will use their own observations as well as information provided on the websites and video to justify their opinions.

**Activity (20 minutes)**

7. Students spend 5 minutes outside selecting a seed of their choice.

8. Students return to class. In class, they will glue or tape their seed to the top of a page in their journal or a lined piece of paper. Inform students of the guidelines for their paragraph.

- Introduce your topic and state your opinion of how you think the seed is dispersed
- Provide reasons (remember the websites and video!) to support your opinion
- Use linking words and phrases to connect ideas
- End with a closing sentence

**Teacher note:** Here are just a few examples of Sonoran Desert plants that employ each method of seed dispersal:

**Wind:** Milkweed, clematis, cottonwood

**Explosion:** Lupine, caesalpinia species (Mexican bird of paradise)

**Water:** Any plant (especially trees like palo verdes, ironwoods, and mesquites) growing near a wash or river

**Hitchhiking:** devils claw, triangle leaf bursage

**Ingestion:** Mesquite, wolf berries, hackberries, and most cacti

**Closure: (5 minutes)**

Ask students, "What are the ways that seeds are dispersed?" Take some responses from the whole class and write them down on the board. Then ask students to get up and share their paragraphs with someone who wrote about a different method of dispersal than they did themselves.

**Teacher Reflection:**

# Life Cycles of Flowering Plants

## Lesson 7 ~ Researching Pollinators

Teacher:  
Author: Wes Oswald

Grade Level: 3

Date:

<b>Common Core Standard:</b>	<p><b>3.RI.1</b> Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.</p> <p><b>3.W.8</b> Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.</p>
<b>Ecology Objective:</b>	<ul style="list-style-type: none"> <li>•Students will gain better understanding about the relationship between a specific pollinator and the plant(s) it relies on.</li> </ul>
<b>Enduring Understandings and Essential Questions</b>	<p>Interconnectedness (being joined or related): Organisms and their environments are interconnected; changes in one part of the system will affect other parts of the system.</p> <ul style="list-style-type: none"> <li>•How are pollinators interconnected with the plants and environment of the Sonoran Desert?</li> </ul>
<b>Content Objective:</b> <i>Math Reading</i> <i>Writing</i> <i>Other:</i>	<ul style="list-style-type: none"> <li>•Write brief notes about a pollinator of your choice.</li> <li>•Categorize notes into the appropriate category.</li> </ul>
<b>Language Objective:</b>	

<b>Vocabulary</b>	<b>Materials</b>
Habitat, Life Cycle, threats	<ul style="list-style-type: none"> <li>•Pollinator books and books about specific pollinators if available</li> <li>•Computers with Internet connection</li> </ul>

**Seasonality:** This lesson will work anytime, but there will likely be little to no native plants in blossom during the winter.

<i>Monsoon</i> July-Sept.	<i>Autumn</i> Oct.-Nov.	<i>Winter</i> Dec- Feb.	<i>Spring</i> Mar.-Apr.	<i>Dry Summer</i> May-June
------------------------------	----------------------------	----------------------------	----------------------------	-------------------------------

**Anticipatory Set: (5 minutes)** (Project images of the pollinators featured on the Pollination Adaptation Matching Game cards from Lesson 2)

Today we will begin researching and taking notes about a pollinator of your choice. Select one of these Sonoran Desert pollinators. Write 3 questions you have about this pollinator.

**Activity/Investigation:**

**Review and Discuss Anticipatory Set (2 or 3 minutes)**

1. Have a few volunteers share with the class the question they are most curious about.

**Direct Instruction (10 minutes)**

2. Tell students that today they will go to the computer lab to research the answers to these questions as well as take notes on other aspects of this pollinator they have chosen. (*Teacher note: Note-taking session will likely take 2 or more class sessions.*) They will then use these notes to write a report and later develop a Powerpoint Presentation and present their learning to peers from another class.

3. Tell students that their report will consist of 5 paragraphs—an introduction, 3 body paragraphs, and a conclusion. Reports must have body paragraphs on these 3 topics: *general description of the pollinator, the plant(s) they pollinate, and threats to this pollinator*. If students would like to add an additional body paragraph, they may do it on the pollinator's *life cycle* or *habitat*. Have students designate space in their notebooks for each of these 3+ topics.

4. If you have books on pollinators for students to reference, give instruction on how to use organizational features in the texts to help them find desired information. Discuss the table of contents, index, headings, bolded words, etc. and show examples of these text features from actual books.

5. The Internet, however, will probably be the best option for information about specific pollinators. Use model effective note-taking skills in the computer lab. Show students how to do a search using google, evaluate the results by reading previews on the results page, and then visiting a site that seems to be on topic based on the preview. Go to a website about a pollinator. Show students how you notice the organization of the website (tabs on different topics, photos, links, etc.). Find a paragraph and read it aloud. Model how you are thinking about which section of your notebook you can write notes in based on the topic of the paragraph. Now turn off the monitor (to model prevention of inadvertent plagiarism) and write some notes about what you learned. Point out how your notes are not necessarily complete sentences, but they sufficiently convey the desired details in your own words. Show the students how you can then turn the monitor back on to check your spelling of key words. Then model how you continue to search for more information on your topics and the questions you are curious about. Remind students to work with purpose so they focus their note-taking on only their three research topics and the answers to their own three questions.

6. You may wish to lead a research group of your most struggling readers. Gather them together and have them agree on a pollinator to research. Have them navigate to websites on their own computer. Then you can read aloud to them as they follow along. You will likely need to help them with note-taking as well. A projector used with this group could prove to be valuable.

**Research and Note-Taking (45 minutes)**

7. Students perform research, read websites, and take notes.

**Closure: (5 minutes)**

Have students meet with other students researching the same pollinator. Ask students to take turns sharing the most interesting thing they discovered about their pollinator during their research.

**Teacher Reflection:**

# Life Cycle of a Flowering Plant

## Lesson 8 ~ Writing a Report on a Pollinator

Teacher:  
Author: Wes Oswald

Grade Level: 3

Date:

<b>Common Core Standard:</b>	<b>3.W.7</b> Conduct short research projects that build knowledge about a topic.
<b>Ecology Objective:</b>	•Students will gain better understanding about the relationship between a specific pollinator and the plant(s) upon which it relies.
<b>Enduring Understandings and Essential Questions</b>	Interconnectedness (being joined or related): Organisms and their environments are interconnected; changes in one part of the system will affect other parts of the system. •How are pollinators interconnected with the plants and environment of the Sonoran Desert?
<b>Content Objective:</b> <i>Math Reading</i> <b>Writing</b> <i>Other:</i>	•Use your notes to write a report with an introduction, body paragraphs, and a conclusion.
<b>Language Objective:</b>	

<b>Vocabulary</b>		<b>Materials</b>		
Introduction, body paragraphs, conclusion		•Students' notes from last session		
<b>Seasonality:</b> This lesson will work anytime, but there will likely be little to no native plants in blossom during the winter.				
<i>Monsoon</i> July-Sept.	<i>Autumn</i> Oct.-Nov.	<i>Winter</i> Dec- Feb.	<i>Spring</i> Mar.-Apr.	<i>Dry Summer</i> May-June
<b>Guiding Questions:</b> How are you showing that a new paragraph is beginning? Are your ideas clear? (For introduction paragraph) How can you summarize for the reader what they are about to learn? (For conclusion paragraph) What are the most important things about the tortoise that you'd like to re-iterate to your reader?				

**Anticipatory Set: (5 minutes)**

Choose 2 topics below that relate to the pollinator you have been researching:

<b>Description of pollinator</b>	<b>Plant(s) it pollinates</b>	<b>Threats</b>
----------------------------------	-------------------------------	----------------

Now write an interesting topic sentence for each of them.  
(Remember that a topic sentence gives general information on your topic and can be in the form of a question or a surprising statement.)

**Review and Discuss Anticipatory Set (2 or 3 minutes)**

1. As students write their topic sentences, walk around to identify a few quality topic sentences. Then ask those students to share them.

**Direct Instruction (10 minutes)**

*(Depending on the speed and abilities of the writers in your class, this activity may require an additional class session for completion. If you choose to have students edit each other's reports and write final drafts, this will require at least one more class session too.)*

1. After reviewing and discussing effective topic sentences...Write on the board the format of the report they are about to write which includes an introduction, 3 body paragraphs, and a conclusion.

**Introduction:**

- Hook-start with a question, anecdote, or interesting fact
- Transitional sentence(s)
- Thesis statement that directly tells the reader the main idea of the essay

**Body Paragraphs:**

- Topic sentence
- Supporting details, examples, elaboration
- Closing sentence

**Conclusion:**

- Restate most important things you learned about your pollinator
- Leave the reader with a thought-provoking idea.

2. Remind students they already have at least 2 topic sentences from their anticipatory set that they can use. Suggest that students leave a few lines blank (for their introduction) and dive right in to their first body paragraph as many students get stuck with the introduction. Remind students that they have all the information they will need for their report in their notes. Suggest that they write their introductions and conclusions only once their body paragraphs have been completed.

3. Project some prepared invented notes on a topic (for example the diet of a chicken), and demonstrate on the board how you use these notes to craft the sentences of a body paragraph. Model how to use transition words and phrases.

**Writing Activity (35 minutes)**

3. Have students take out their notes from last class session and begin their reports. You may want to regroup your more struggling reading group from last session to lead them in a guided writing session at a separate table.

**Closure: (5 minutes)**

Select and circle either your introduction or conclusion paragraph—whichever you think is better. Get with a partner. Put your paper on the table so that both of you can see your paragraph. Read it aloud to them and ask for their feedback. Then have your partner do the same. Who has an effective introduction or conclusion to share?

**Teacher Reflection:**

# Life Cycle of a Flowering Plant

## Lesson 9 ~ Making a Slideshow

Teacher:  
Author: Wes Oswald

Grade Level: 3

Date:

<b>Common Core Standard:</b>	<b>3.W.6</b> With guidance and support from adults, use technology to produce and publish writing (using keyboarding skills) as well as to interact and collaborate with others.
<b>Ecology Objective:</b>	<ul style="list-style-type: none"> <li>•Students consider threats to the pollinator of their choice and convince their peers that the pollinator is worth protecting and provide examples of how to help.</li> <li>•Students share the unique facts they have learned about their pollinator</li> </ul>
<b>Enduring Understandings and Essential Questions</b>	<p>Biodiversity (the variety of life on Earth): All ecosystems contain a variety of organisms that are interdependent.</p> <ul style="list-style-type: none"> <li>•How are pollinators affected by human activities?</li> </ul> <p>Culture (The resources (language, values, beliefs) people use to perceive their surroundings): The biodiversity and climate of a region are interconnected with the region's culture.</p> <ul style="list-style-type: none"> <li>•How can we foster a culture of respect for pollinators as well as the plants they pollinate?</li> </ul>
<b>Content Objective:</b> <i>Math Reading</i> <i>Writing</i> <i>Other:</i>	<ul style="list-style-type: none"> <li>•Students will use PowerPoint to create a slide show about the pollinator of their choice.</li> </ul>
<b>Language Objective:</b>	

<b>Vocabulary</b>		<b>Materials</b>		
PowerPoint		<ul style="list-style-type: none"> <li>•Students' journals</li> <li>•(1 per student) Computers with Internet connection</li> <li>•Students' pollinator reports from lesson 8 and <i>Flower Anatomy Poster</i> from Lesson 1a</li> </ul>		
<b>Seasonality:</b> This lesson will work anytime, but there will likely be little to no native plants in blossom during the winter.				
<i>Monsoon</i> July-Sept.	<i>Autumn</i> Oct.-Nov.	<i>Winter</i> Dec- Feb.	<i>Spring</i> Mar.-Apr.	<i>Dry Summer</i> May-June
<b>Guiding Questions:</b> What do you want to teach to another class about threats to your pollinator? What kinds of images would best match your ideas?				

Have you saved your work properly?

**Anticipatory Set: (10 minutes)**

(Show the class this PowerPoint slideshow about pollinators from the US Fish and Wildlife Service:)

<http://www.fws.gov/pollinators/ppt/PollinatorWalkfinalFeb2010web.ppt>

Direct Instruction (15 minutes)

*Note: Depending on students' experience using PowerPoint, you may wish to inform students of the project and let them practice during one class session and then have them create their PowerPoint presentations during a separate class session.*

1. Tell students that they will be making a slideshow to share with students from other classes at school. Tell students that they already have the knowledge to share with others based on their research and studies from the last few class sessions. Tell students that their presentations can be either of the following:
  - Threats to your pollinator and how we can protect them
  - How does your pollinator pollinate a specific plant?

Tell students that their slide show may focus on just one of the aspects above. If you have more advanced students, you may challenge them to develop a slideshow that combines the two topics.

2. Show students the template on the board for their storyboard. (Just draw 6 squares. Label the first one "1. Title." Label the second "2. Thesis/Main Idea." Label squares 3, 4, and 5 with their numbers, and the last one, 6, "Conclusion".) They will copy this template into their journals and use it to plan their slide show. Tell students that their slide show should be 6 slides. The first slide should be an introduction/title page, the second slide their thesis or main idea they are presenting, the middle slides supporting details, and the last slide a conclusion. Show students the chart below that shows a suggested organization for each type of slide show.

<b>Threats to your pollinator and how we can protect them</b>	<b>How does your pollinator pollinate a specific plant?</b>
Slide 1. Title and your name Slide 2. Thesis/Main Idea of your slide show Slide 3. Introduce your pollinator and a plant it pollinates Slide 4. Describe threat(s) to your pollinator Slide 5. Describe how kids can protect your pollinator Slide 6. Conclusion	Slide 1. Title and your name Slide 2. Thesis/Main Idea of your slide show Slide 3. Introduce your pollinator Slide 4. Introduce the plant Slide 5. Describe how your pollinator pollinates the plant Slide 6. Conclusion

3. (The teacher may wish to do this part of the lesson separately, or as the first part of this activity.) Teacher will need to use the computer lab to model to students the following before they can begin their slide show:

- a. How to log in

- b. How to open PowerPoint
- c. How to name and where to save their document
- d. How to use basic features of PowerPoint including adding text and images, using a template, etc.
- e. How to make a folder to save images from the internet into, how to use Google images to search for images, and how to place images in their slideshow
- f. How to place a saved image into the slideshow
- g. Aesthetics and organization of a slideshow including picking just one or two typefaces, limiting colors, selecting appropriate image sizes that won't appear pixelated, how to resize an image to scale using the shift key, etc., making sure that slides are unified and appear to fit together as a whole.

*Step 3 is essential to the sanity of the classroom! It is so important that kids keep their files organized how you instruct them to otherwise sharing the Powerpoint with another class may result in missing or lost images.*

**Computer Activity (10 minutes)**

- 4. Give students some time to play/practice using the program.

**Writing Activity (15 minutes)**

- 5. Away from the computers (or with monitors turned off), have students design the storyboard (images and text) of their slideshow in their journals. Tell students it's probably not best to simply copy the text from their report or other work, but that they should create a slideshow with more refined ideas that can be presented to another class in a brief period of time.

**Computer Activity** (*Most likely at least one entire separate class session*)

- 6. Once teacher has approved storyboards, students then create their slide shows.

**Closure Question:**

Teacher will ask the class, "Who figured out something interesting using PowerPoint that I didn't teach you?" Likely many hands will go up, but allow about half of the groups to stand and share their discovery with another group at their computer. If there are enough who wish to share, allow the other half of the class to act as teachers to another group to show something they learned. Once students have been seated, ask class if anyone would like to share a discovery about PowerPoint to the whole class. Allow a few students to share on the teacher computer showing the whole class their discovery.

**Teacher Reflection:**

# Life Cycle of Flowering Plants

## Lesson 10: Practicing and Presenting Oral Presentations

Teacher:

Grade Level: 3

Date:

Author: Wes Oswald

<b>Common Core Standard:</b>	<b>3.SL.4:</b> Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.
<b>Ecology Objective:</b>	Students culminate their learning about pollinators and share it with their classmates as well as another class at school.
<b>Enduring Understandings and Essential Questions</b>	Biodiversity (the variety of life on Earth): All ecosystems contain a variety of organisms that are interdependent. •How are pollinators affected by human activities? Culture (The resources, language, values, beliefs) people use to perceive their surroundings): The biodiversity and climate of a region are interconnected with the region's culture. •How can we foster a culture of respect for pollinators as well as the plants they pollinate?
<b>Content Objective:</b> <i>Math Reading</i> <i>Writing</i> <i>Other:</i>	•Students will practice presenting their PowerPoint slideshow first with their partner, then among a small group of students, and then to the whole class. •Students will present their PowerPoint slideshow to another class.
<b>Language Objective:</b>	

Vocabulary		Materials		
Pacing, volume, poise		<ul style="list-style-type: none"> <li>•(1 per student) <i>Presentation Rubric</i> (See accompanying documents)</li> <li>•(1) <i>Master Schedule for Presentations</i> (See accompanying documents)</li> <li>•(1 per student) <i>Pollinator Presentation Proposal</i> (See accompanying documents)</li> <li>•(1 per student) Computers</li> <li>•Projector (not necessary, but certainly helpful)</li> </ul>		
<b>Seasonality</b> This lesson will work anytime, but there will likely be little to no native plants in blossom during the winter.				
<i>Monsoon</i> July-Sept.	<i>Autumn</i> Oct.-Nov.	<i>Winter</i> Dec- Feb.	<i>Spring</i> Mar.-Apr.	<i>Dry Summer</i> May-June
<b>Guiding Questions:</b> Are you speaking at the right volume? Are you speaking at the right pace—not too fast and not too slow? Are you engaging your audience by looking at them, asking questions, and referencing your				

**Anticipatory Set: (5 minutes)**

Today you will practice giving a presentation. Describe some things you see this boy doing that make him appear confident during his speech.



**Activity/Investigation:**

1. Ask students to share what they notice about the speaker above. (He is standing up straight, looking directly at the audience—not his notes or the slide show, his pose is dynamic, etc.) This should lead to a discussion of what qualities a good speaker should exhibit including:
  - a. Staying on topic
  - b. Sharing appropriate facts and descriptive details
  - c. Speaking clearly
  - d. Speaking at an understandable pace.
  - e. Referencing your notes or slideshow, but not reading from them
  - f. Presenting yourself in a composed manner by standing up straight, looking at audience members, etc.

**Direct Instruction (10 minutes)**

2. Tell students that today they will present their slideshow with a partner like this:
  - a. 5-10 minutes to practice with just you and your partner and providing feedback to each other
  - b. 10 minutes to practice presenting and listening to the presentation of another group or two and providing them feedback when finished
  - c. Presenting your slideshow to the whole class
3. Give students *Presentation Rubric* (see accompanying documents) they can use to evaluate their own presentations as well as those of others. Take students to the computer lab so that they may practice simultaneously in front of computers. Model for

students how to stand, use the appropriate volume and demeanor, etc. Remind students that after about 20 minutes in the lab, they will return to the class and present slideshows in front of the room with the slide show projected on the wall in front of class. Give students a signal as to when to do presentations in front of another group.

### **Speaking and Listening Activity (20 minutes)**

4. Students practice their speeches.

5. Students then begin their actual presentations in front of their own class. Teacher uses rubrics to evaluate students. You will likely need another class session for all students to present their slideshows.

*Note: Once all presentations are finished, email fellow teachers (remember to include PACE and self-contained classes) and tell them that students in your class would like to give presentations to their class sometime next week. Propose a general time for presentations, and tell them they will be receiving a visit from a pair of students on a designated day asking them if they would be willing to hear and see their presentation. **Better yet, have students create and distribute invitations to classroom(s) of their choice.** It might be nice to have all or most of your students give presentations at roughly the same time so kids aren't in and out of the class at random times throughout the day/week. Once you have a willing audience, and a schedule coordinated, email teachers the slideshow their class will be viewing so that when students come to present it will be easy to access.*

*Note: Once it is time for students to do presentations, have each student select a friend to accompany her to the other classroom for the presentation. This friend can advance the slides as the presentation goes on. This friend will also serve as an ally to the possibly nervous speaker during their presentation. On the other hand, you may wish to have students create slideshows with a partner. If you do this, make sure that partners share usernames and passwords with each other so that work can continue in the case of an absent partner.*

### **Closure Question: (5 minutes)**

Tell students to find at least one other person in the class and give them a specific compliment about something you enjoyed about their presentation.

### **Teacher Reflection:**

# Extensions

- Contact the US Fish and Wildlife Service office to request a presentation on pollinators and native plants
- Plant a pollinator garden
- Apply for free milkweed plants: <http://monarchwatch.org/bring-back-the-monarchs/milkweed/free-milkweeds-for-restoration-projects/>

# The Desert Tortoise Unit Summary

## Unit Summary

This is a six-lesson unit of study connected to English Language Arts standards. This could be turned in to a seven or eight unit of study if students are given extensions in lesson two for editing and final draft writing and in lesson 5 depending on students' experience using PowerPoint. Students will begin the unit by reading informational texts about the desert tortoise and writing research reports based on their findings. Students will read a piece online from AZ Game and Fish about what to do if one encounters a desert tortoise in the wild and then respond to the article distinguishing their own point of view from that of the author. This will prepare students for the next lesson in which they will write a persuasive piece about tortoise conservation. At the end of the unit, students will create a PowerPoint presentation about the desert tortoise and then give oral presentations to their own class and then to a different class at school.

## Lesson Summaries:

### Lesson 1 ~ Researching the Tortoise

Students will be presented with a variety of printed and electronic resources from which they will research the range, habitat, diet, life cycle, and threats to the desert tortoise. Before setting out on their research, they will first write 2 of their own questions they would like to answer through research. Students will take notes on their findings.

### Lesson 2 ~ Writing a Report

Students will write short research reports based on their notes from the previous session.

### Lesson 3 ~ What's Your View?

Students will be given a printed copy of Arizona Game and Fish Departments online article, "Encountering a Desert Tortoise." After reading the article, students will write a reflection response stating their views on the ideas presented in the article. Students will cite specific parts of the article stating whether they agree or disagree and why.

### Lesson 4 ~ How Can We Help Preserve the Tortoise?

Students will write a persuasive piece about tortoise conservation with the goal of persuading their fellow schoolmates why it's important to conserve tortoises and how students can help in this effort.

### Lesson 5 ~ Making a Slideshow

With a partner, students will create PowerPoint presentations from one of two topics:

1. Create a presentation about Desert Tortoise Facts
2. Create a presentation persuading schoolmates the importance of desert tortoise conservation
3. Or combine these ideas into one slide show.

### Lesson 6 ~ Practicing and Delivering Oral Presentations

With a partner, students will give brief oral presentations to the class with their PowerPoint presentations. Student partnerships will also schedule and give one presentation in a different class at school.

# The Desert Tortoise

## Lesson 1: Researching the Tortoise

Teacher:  
Author: Wes Oswald

Grade Level: 3

Date:

<b>Common Core Standard:</b>	<p><b>3.RI.1:</b> Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.</p> <p><b>3.W.8:</b> Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.</p>
<b>Ecology Objective:</b>	Gain understanding about the desert tortoise.
<b>Enduring Understandings and Essential Questions</b>	<p>Interconnectedness (being joined or related): Organisms and their environments are interconnected; changes in one part of the system will affect other parts of the system.</p> <ul style="list-style-type: none"> <li>•How is the desert tortoise interconnected with the plants, animals, and environment of the Sonoran Desert?</li> </ul>
<b>Content Objective:</b> <i>Math Reading</i> <i>Writing</i> <i>Other:</i>	<ul style="list-style-type: none"> <li>•Ask questions and find answers through research</li> <li>•Summarize and categorize information through note-taking</li> </ul>
<b>Language Objective:</b>	

<b>Vocabulary</b>	<b>Materials</b>
Range, habitat, diet, threats, life cycle, adaptations	<ul style="list-style-type: none"> <li>•Variety of informational materials and books about the desert tortoise selected for students' individual reading levels</li> <li>•Notebooks</li> </ul>

**Seasonality** This lesson would work at any time, but you may wish to avoid doing it in the winter if you'd like to involve the school's tortoise, as it will be bromating. If you choose to do it in the winter, student work could lead up to and involve a celebration of the tortoise' active period in the warmer months.

<i>Monsoon</i> July-Sept.	<i>Autumn</i> Oct.-Nov.	<i>Winter</i> Dec- Feb.	<i>Spring</i> Mar.-Apr.	<i>Dry Summer</i> May-June
------------------------------	----------------------------	----------------------------	----------------------------	-------------------------------

**Connections to:** Climate Culture Energy/Materials Health

**Guiding Questions:** What category does your fact best fit into?  
 What text features are you using to help you find the answers to your questions?  
 Using your own language, what's the most important thing you learned about \_\_\_\_\_ aspect of the tortoise?

**Anticipatory Set:**

Make a KWL Chart about the Desert Tortoise, stating what you already know about tortoises, what you'd like to know, and what you've learned. (Leave the "L" portion blank for now since we haven't had our lesson about the tortoise yet!)

<b>Know</b>	<b>What I'd like to know</b>	<b>Learned</b>

**Activity/Investigation:**

1. After reviewing student responses...Tell students they are about to embark on a unit in which they read and learn about desert tortoises, write a report about their findings, and present their learning to their peers. Then, show students the reading materials available to them. Either distribute the attached paper or have students designate a portion of their journals to transcribe the categories they will be researching about the desert tortoise. Remind students that they should have two questions in their KWL chart that they will also be looking to answer in the "W" portion.
2. Give instruction on how to use organizational features in the texts to help them find desired information. Discuss the table of contents, index, headings, bolded words, etc. and give examples from actual books.
3. Give instruction on how to effectively take notes. Tell students what plagiarism is and that this is not our goal! Model effective note-taking skills. Place a text under the document camera and begin by showing the students the table of contents. Ask students which page number is likely to directly relate to either a question they have or a topic on their notes page. Go to that page, read it aloud. After reading a paragraph, shut the book and show students how you write in your own words a summary of the most important fact/facts you just read and use organization to add them to the appropriate portion of your notes. Tell students the book should only be opened to check spelling. If you have students do research on a computer, you can model how you briefly turn off the monitor while you write your summary and then turn it back on to continue researching.
4. Have books pre-organized in a way that suits the reading levels of your students. Set up stations with appropriate books for each level at each. Direct students to their stations. This would probably be easiest by using reading levels from their reading class. You may wish to have your most struggling readers join you for a guided reading/note taking session. Just be sure to have prepared enough copies of the same book for each member of this group!
5. Once students get to their research areas, have them begin by writing the name of each book in their journal on a page titled "Sources." Have students highlight each book name in a different color. As students write notes, have them highlight their notes in the color

that matches the book title. Tell students this will get them used to citing their sources and allow them to reference a source if needed by matching colors of notes to book titles. Students begin their research and note taking. Remind them to work with purpose so they write information about each of the six research categories and find the answer to their own two questions.

**Closure Question:**

Go back to your KWL chart and fill out at least 2 important things you learned about the desert tortoise today.

**Teacher Reflection:**

# The Desert Tortoise

## *Lesson 2: Writing a Report*

Teacher:  
Author: Wes Oswald

Grade Level: 3

Date:

<b>Common Core Standard:</b>	<b>3.W.7:</b> Conduct short research projects that build knowledge about a topic.
<b>Ecology Objective:</b>	Gain understanding about the desert tortoise.
<b>Enduring Understandings and Essential Questions</b>	Interconnectedness (being joined or related): Organisms and their environments are interconnected; changes in one part of the system will affect other parts of the system. •How is the desert tortoise interconnected with the plants, animals, and environment of the Sonoran Desert?
<b>Content Objective:</b> <i>Math Reading</i> <i>Writing</i> <i>Other:</i>	•Use your notes to write a report with an introduction, short body paragraphs, and a conclusion.

<b>Vocabulary</b>	<b>Materials</b>
Introduction, body paragraphs, conclusion, range, habitat, diet, threats, life cycle, adaptations	•Students' notes from last session

**Seasonality** This lesson would work at anytime, but you may wish to avoid doing it in the winter if you'd like to involve the school's tortoise, as it will be bromating. If you choose to do it in the winter, student work could lead up to and involve a celebration of the tortoise' active period in the warmer months.

<i>Monsoon</i> July-Sept.	<i>Autumn</i> Oct.-Nov.	<i>Winter</i> Dec- Feb.	<i>Spring</i> Mar.-Apr.	<i>Dry Summer</i> May-June
------------------------------	----------------------------	----------------------------	----------------------------	-------------------------------

**Connections to:** Climate Culture Energy/Materials Health

**Guiding Questions:** How are you showing that a new paragraph is beginning?  
Are your ideas clear?  
(For introduction paragraph) How can you summarize for the reader what they are about to learn?  
(For conclusion paragraph) What are the most important things about the tortoise that you'd like to re-iterate to your reader?

**Anticipatory Set:**

Choose at least 2 topics below that relate to the desert tortoise:

<b>Habitat</b>	<b>Diet</b>	<b>Life cycle</b>	<b>Threats</b>	<b>Range</b>	<b>Adaptations</b>
----------------	-------------	-------------------	----------------	--------------	--------------------

Now write an interesting topic sentence for each of them.

**Activity/Investigation:** *(Depending on the speed and abilities of the writers in your class, this activity may require an additional class session for completion. If you choose to have students edit each other's reports and write final drafts, this will require at least one more class session.)*

1. After reviewing and discussing effective topic sentences...Write on the board the format of the report they are about to write which includes an introduction, 6 short body paragraphs, and a conclusion.

**Introduction:**

- Hook- start with a question, anecdote, or interesting fact
- Transitional sentence(s)
- Thesis statement which tells the reader exactly the main idea of the essay

**Body Paragraphs:**

- Topic sentence
- Supporting details
- Closing sentence (you may wish to omit this except for your most advanced students since each paragraph will likely be quite short)

**Conclusion:**

- Restate most important things you learned about tortoises
- Leave the reader with a thought-provoking idea.

2. Remind students they already have at least 2 topic sentences from their anticipatory set that they can use. Suggest that students leave a few lines blank (for their introduction) and dive right in to their first body paragraph as many students get stuck with the introduction. Suggest that they write their introductions and conclusions only once their body paragraphs have been completed.

3. Project some prepared invented notes on a topic (for example the diet of a chicken), and demonstrate on the board how you use these notes to craft the sentences of a body paragraph.

4. Have students take out their notes from last class session and begin their reports. You may want to regroup your more struggling reading group from last session to lead them in a guided writing session at a separate table.

**Closure Question:**

Select and circle either your introduction or conclusion paragraph—whichever you think is better. Get with a partner. Put your paper on the table so that both of you can see your paragraph. Read it aloud to them and ask for their feedback. Then have your partner do the same. Who has an effective introduction or conclusion to share?

**Teacher Reflection:**

# The Desert Tortoise

## Lesson 3: What's Your View?

Teacher:  
Author: Wes Oswald

Grade Level: 3

Date:

<b>Common Core Standard:</b>	<b>3.RI.6:</b> Distinguish your own point of view from that of the author of a text.
<b>Ecology Objective:</b>	Students think critically about one aspect of conservation of the desert tortoise.
<b>Enduring Understandings and Essential Questions</b>	Culture (The resources (language, values, beliefs) people use to perceive their surroundings): The biodiversity and climate of a region are interconnected with the region's culture. •How do people in the Sonoran Desert interact with their ecosystem in an interdependent manner?
<b>Content Objective:</b> <i>Math Reading</i> <i>Writing</i> <i>Other:</i>	•After reading an article think about whether you agree or disagree with the author's ideas. •Write a response stating your own point of view and why you agree or disagree with the author
<b>Language Objective:</b>	

<b>Vocabulary</b>		<b>Materials</b>		
Bladder, dehydration, respiratory tract, parasite, Mojave, adoption		•Printed copies of the article "Encountering a Desert Tortoise" from the website of Arizona Game and Fish Department		
<b>Seasonality</b> This lesson would work at any time, but you may wish to avoid doing it in the winter if you'd like to involve the school's tortoise, as it will be bromating. If you choose to do it in the winter, student work could lead up to and involve a celebration of the tortoise' active period in the warmer months.				
<i>Monsoon</i> July-Sept.	<i>Autumn</i> Oct.-Nov.	<i>Winter</i> Dec- Feb.	<i>Spring</i> Mar.-Apr.	<i>Dry Summer</i> May-June
<b>Connections to:</b> Climate Culture Energy/Materials Health				
<b>Guiding Questions:</b> What part of this article do you agree/disagree with? Why? Based on your research on the tortoise, what part of this article especially makes sense to you? Does the information in this article connect to the mission of Arizona's Department of Game and Fish? How?				

**Anticipatory Set:**

It's a lovely spring day and you and your family are taking a hike in Saguaro National Park. You spot a desert tortoise walking across the trail right in front of you! Your cousin says, "What a beautiful animal! Let's take it home with us."

What would you tell her?

**Activity/Investigation:**

1. After reviewing and discussing student responses...tell students that they will be reading an article from Arizona's Department of Game and Fish about what you are supposed to do in this very situation. Tell students that Arizona's Game and Fish Department's job is to, "To conserve Arizona's diverse wildlife resources and manage for safe, compatible outdoor recreation opportunities for current and future generations." Write this mission statement on the board. Make sure students understand what this mission means and ask if they have any questions. Then tell students that after reading the article, they will discuss with their group members their own point of view on the topic, and then write a paragraph expressing their point of view.

2. Show students the list of vocabulary words (see above) you have also written on the board. Read them aloud with the class and explain their meanings. Tell students that these are words they will encounter in their reading and will need to understand them. Tell students that they will spend some time reading the article quietly on their own. Once they have had some time to read it independently, they will read it aloud with the people at their table. Designate one strong reader at each table to help guide the reading. Give that student a white board and marker to use to help students with decoding if necessary.

3. After students have completed the reading, ask each student to pick one sentence from the article that they either agree or disagree with and underline that sentence. Each student at the table will take turns reading the sentence they underlined and explain whether they agree or disagree with it and tell why.

4. Once discussions have been completed, students will write a paragraph expressing their own point of view of what one should do upon encountering a wild desert tortoise. Their views should be supported with their knowledge and opinions of desert tortoises. The following sentence starters may be helpful:

- The article says that....
- I think that...
- Based on my research...

**Closure Question:**

Do you mostly agree with this article? Do you mostly disagree with this article? Do you both agree and disagree with this article? Have those in agreement go to one side of the room, those in disagreement go to the other side, and those in the middle go to the middle of the room. With their paragraphs in hand, each student discusses with someone else in their area their own point of view. Lastly, have a sampling of students share their points of view.

**Teacher Reflection:**

# The Desert Tortoise

## Lesson 4: How Can We Help Preserve the Tortoise?

Teacher:  
Author: Wes Oswald

Grade Level: 3

Date:

<b>Common Core Standard:</b>	<b>3.W.1:</b> Write opinion pieces on topics or texts, supporting a point of view with reasons. a. Introduce the topic or text they are writing about, state an opinion, and create an organizational structure that lists reasons. b. Provide reasons that support the opinion. c. Use linking words and phrases (e.g., because, therefore, since, for example) to connect opinion and reasons. d. Provide a concluding statement or section.
<b>Ecology Objective:</b>	Students consider threats to the desert tortoise and convince their peers that the tortoise is worth preserving and provide examples of how to help.
<b>Enduring Understandings and Essential Questions</b>	Biodiversity (the variety of life on Earth): All ecosystems contain a variety of organisms that are interdependent. •How is biodiversity affected by human behavior?
<b>Content Objective:</b> <i>Math Reading</i> <i>Writing</i> <i>Other:</i>	•Students will write a paragraph summarizing ways that the desert tortoise is threatened, why it should or should not be preserved, and provide reasons and examples how.
<b>Language Objective:</b>	

<b>Vocabulary</b>		<b>Materials</b>		
Vulnerable, urbanization, ravens, juvenile, camouflage, ATVs, OHVs		<ul style="list-style-type: none"> <li>•Printed copies of “Threats to the Desert Tortoise”</li> <li>•Poster paper</li> <li>•Art materials</li> </ul>		
<b>Seasonality</b> This lesson would work at any time, but you may wish to avoid doing it in the winter if you’d like to involve the school’s tortoise, as it will be bromating. If you choose to do it in the winter, student work could lead up to and involve a celebration of the tortoise’ active period in the warmer months.				
<i>Monsoon</i> July-Sept.	<i>Autumn</i> Oct.-Nov.	<i>Winter</i> Dec- Feb.	<i>Spring</i> Mar.-Apr.	<i>Dry Summer</i> May-June
<b>Connections to:</b> Climate Culture Energy/Materials Health				
<b>Guiding Questions:</b> Which of these threats is easy for you to control in your own life? How? Which of these threats is more difficult to control? Why? Whose responsibility is it to protect desert tortoises?				

**Anticipatory Set:**

Today you will read about some threats (dangers) to the Desert Tortoise. Some of them are:

Predators, urbanization (the growth of cities), disease, ATV use, trash, and roads and power lines.

Can you predict why any of those are threats? Provide some details of your predictions.

**Activity/Investigation:**

1. After reviewing and discussing student responses, tell students that they will be reading about some threats the desert tortoise faces. Tell them this might be kind of a sad lesson, but we're going to work to think of solutions and help educate others to help preserve the tortoise. As part of their work today, they will create posters to put around the school explaining how the tortoise is threatened and what students can do to help.
2. Begin by previewing with the students the vocabulary words they will encounter in their reading. Write words on the board, practice reading it aloud with them, and help them define the words.
3. Next distribute the "Threats to the Desert Tortoise" reading to each student. Students will read the paper aloud in their groups. Again, ask a strong reader in the group to help facilitate the reading by acting as the guided reading leader. Give this student a white board and marker to help students decode words. Encourage students to discuss, summarize, and ask each other questions as they read.
4. Once groups have finished reading, they should get lined paper to write their opinions in a paragraph. Direct students' attention to the guidelines for their paragraph that are written on the board:
  - Introduce the problem and state your opinion about it.
  - Give reasons that support your opinion.
  - Use linking words like: because, for example, therefore, since, etc.
  - Provide ways Manzo students can help solve this problem.
  - Write a concluding statement.
5. Tell students that once their paragraphs are complete, you will read it approve it, and allow them to use their paragraph as part of a poster. The poster should contain a title, an image of their creation and their paragraph.

**Closure Question:**

Students will participate in a gallery walk to view the posters made by their classmates. Give the students about five minutes to walk from table to table looking at posters and reading paragraphs. At the end of five minutes, ask students, "What's the best way kids can help preserve the tortoise?" and to provide their reasoning for their response.

**Teacher Reflection:**

# The Desert Tortoise

## Lesson 5: Making a Slideshow

Teacher:  
Author: Wes Oswald

Grade Level: 3

Date:

<b>Common Core Standard:</b>	<b>3.W.6:</b> With guidance and support from adults, use technology to produce and publish writing (using keyboarding skills) as well as to interact and collaborate with others.
<b>Ecology Objective:</b>	<ul style="list-style-type: none"> <li>•Students consider threats to the desert tortoise and convince their peers that the tortoise is worth preserving and provide examples of how to help.</li> <li>•Students share the unique aspects they have learned about the desert tortoise.</li> </ul>
<b>Enduring Understandings and Essential Questions</b>	<p>Biodiversity (the variety of life on Earth): All ecosystems contain a variety of organisms that are interdependent.</p> <ul style="list-style-type: none"> <li>•How is biodiversity affected by human behavior?</li> </ul> <p>Culture (The resources (language, values, beliefs) people use to perceive their surroundings): The biodiversity and climate of a region are interconnected with the region's culture.</p> <ul style="list-style-type: none"> <li>•How do people in the Sonoran Desert interact with their ecosystem in an interdependent manner?</li> </ul>
<b>Content Objective:</b> <i>Math Reading</i> <i>Writing</i> <i>Other:</i>	<ul style="list-style-type: none"> <li>•Students will use PowerPoint to create a slide show about the desert tortoise.</li> </ul>
<b>Language Objective:</b>	

<b>Vocabulary</b>	<b>Materials</b>
PowerPoint	<ul style="list-style-type: none"> <li>•Student journals</li> <li>•Computers</li> </ul>

**Seasonality** This lesson would work at any time, but you may wish to avoid doing it in the winter if you'd like to involve the school's tortoise, as it will be bromating. If you choose to do it in the winter, student work could lead up to and involve a celebration of the tortoise' active period in the warmer months.

<i>Monsoon</i> July-Sept.	<i>Autumn</i> Oct.-Nov.	<i>Winter</i> Dec- Feb.	<i>Spring</i> Mar.-Apr.	<i>Dry Summer</i> May-June
------------------------------	----------------------------	----------------------------	----------------------------	-------------------------------

**Connections to:** Climate    Culture    Energy/Materials    Health

**Guiding Questions:** What do you want to teach to another class about the desert tortoise?  
What kinds of images would best match your ideas?  
Have you saved your work properly?

**Anticipatory Set:**

Today you will work with a partner to create a slideshow on the computer to teach others what you know about the tortoise. What are the five most important big ideas about tortoises that you'd like to share?

**Activity/Investigation:**

1. After reviewing and discussing student responses...Tell students that they will be making a slideshow to share with students from other classes at Manzo. Tell students that they already have the knowledge to share with others based on their research and studies from the last few class sessions. Their job now is to decide what exactly they'd like to share with schoolmates. Remind them that the two main areas of study we've had are:

- a. Facts about the life of a desert tortoise
- b. Desert tortoise conservation

Tell students that their slide show may focus on just one of the aspects above, or it could be a combination of both.

2. Show students the template on the board for their storyboard. (Just draw 5 squares. Label the first one "1. Intro/Title." Label squares 2, 3, and 4 with their numbers, and the last one "5. Conclusion".) They will copy this template into their journals and use it to plan their slide show. Tell students that their slide show should be 5 slides. The first slide should be an introduction/title page, the middle slides supporting details, and the last slide a conclusion. If they have time for more middle slides, great, but they'll start with this.

3. (The teacher may wish to do this part of the lesson separately, or as the first part of this activity.) Teacher will need to use the computer lab to model to students the following before they can begin their slide show:

- a. How to log in
- b. How to open PowerPoint
- c. How to name and where to save their document
- d. How to use basic features of PowerPoint including adding text and images, using a template, etc.
- e. How to make a folder to save images from the internet into, how to use Google images to search for images, and how to place images in their slideshow
- f. Aesthetics and organization of a slideshow including picking just one or two typefaces, limiting colors, selecting appropriate image sizes that won't appear pixelated, how to resize an image to scale using the shift key, etc., making sure that slides are unified and appear to fit together as a whole.

4. Give students some time to play/practice using the program.

5. Away from the computers, have students work with a partner to design the storyboard (images and text) of their slideshow. Tell students it's probably not best to simply copy the text from their report or other work, but should collaborate to create a slideshow with more refined ideas that can be presented to another class in a brief period of time. Partnerships should reach consensus about what they want their slideshow to communicate as well as the message for each slide.

6. Once teacher has approved storyboards, students can then work with their partner to create their slideshow.

**Closure Question:**

Teacher will ask the class, “Who figured out something interesting using PowerPoint that I didn’t teach you?” Likely many hands will go up, but allow about half of the groups to stand and share their discovery with another group at their computer. If there are enough who wish to share, allow the other half of the class to act as teachers to another group to show something they learned. Once students have been seated, ask class if anyone would like to share a discovery about PowerPoint. Allow a few students to share on the teacher computer showing the whole class their discovery.

**Teacher Reflection:**

# The Desert Tortoise

## Lesson 6: Practicing and Delivering Oral Presentations

Teacher:  
Author: Wes Oswald

Grade Level: 3

Date:

<b>Common Core Standard:</b>	<b>3.SL.4:</b> Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.
<b>Ecology Objective:</b>	Students culminate their learning about the desert tortoise and share it with their classmates as well as another class at school.
<b>Enduring Understandings and Essential Questions</b>	Biodiversity (the variety of life on Earth): All ecosystems contain a variety of organisms that are interdependent. •How is biodiversity affected by human behavior? Culture (The resources (language, values, beliefs) people use to perceive their surroundings): The biodiversity and climate of a region are interconnected with the region's culture. •How do people in the Sonoran Desert interact with their ecosystem in an interdependent manner?
<b>Content Objective:</b> <i>Math Reading</i> <i>Writing</i> <i>Other:</i>	•Students will practice presenting their PowerPoint slideshow first with their partner, then among a small group of students, and then to the whole class. •Students will present their PowerPoint slideshow to another class.
<b>Language Objective:</b>	

<b>Vocabulary</b>	<b>Materials</b>
Pacing, volume, poise	<ul style="list-style-type: none"> <li>•Presentation Rubric</li> <li>•Master Schedule for Presentations</li> <li>•Desert Tortoise Presentation Proposal</li> <li>•Computers in computer lab</li> <li>•Projector (not necessary, but certainly helpful)</li> </ul>

**Seasonality** This lesson would work at any time, but you may wish to avoid doing it in the winter if you'd like to involve the school's tortoise, as it will be bromating. If you choose to do it in the winter, student work could lead up to and involve a celebration of the tortoise' active period in the warmer months.

<i>Monsoon</i> July-Sept.	<i>Autumn</i> Oct.-Nov.	<i>Winter</i> Dec- Feb.	<i>Spring</i> Mar.-Apr.	<i>Dry Summer</i> May-June
------------------------------	----------------------------	----------------------------	----------------------------	-------------------------------

**Connections to:** Climate Culture Energy/Materials Health

**Guiding Questions:** Are you speaking at the right volume?  
Are you speaking at the right pace—not too fast and not too slow?  
Are you engaging your audience by looking at them, asking questions, and referencing your slideshow?

**Anticipatory Set:**

Today you will practice giving a presentation. Describe some things you see this girl doing that make her appear confident during her speech.

**Activity/Investigation:**

1. Ask students to share what they notice about the speaker above. (She is standing up straight, she is looking directly at the audience—not her notes, her clothes and appearance are neat, her pose is dynamic, etc.) This should lead to a discussion of what qualities a good speaker should exhibit including:
  - a. Staying on topic
  - b. Sharing appropriate facts and descriptive details
  - c. Speaking clearly
  - d. Speaking at an understandable pace.
  - e. Referencing your notes or slideshow, but not reading from them
  - f. Presenting yourself in a composed manner by standing up straight, looking at audience member, etc.
  
2. Tell students that today they will present their slideshow with their partner. It will happen like this:
  - a. 5-10 minutes to practice with just your partner and yourself
  - b. 10 minutes to practice presenting and listening to the presentation of another group or two and providing them feedback when finished
  - c. Presenting your slideshow to the whole class
  
3. Give students rubrics they can use to evaluate their own presentations as well as those of others. Take students to the computer lab so that they may practice simultaneously in front of computers. Model for student how to stand, the appropriate volume, demeanor, etc. Remind students that that after about 15 or 20 minutes in the lab, they will return to the class and present slideshows in front of the room with the slide show projected on the wall in front of class. Give students a signal as to when to do presentations in front of another group.
  
4. Once all presentations are finished, email fellow teachers (remember to include PACE and self-contained classes!) and tell them that students in your class would like to give presentations to their class sometime next week. Propose a general time for presentations, and tell them they will be receiving a visit from a pair of students on such

and such day asking them if they would be willing to hear and see their presentation. It might be nice to have all or most of your students give presentations at roughly the same time so kids aren't in and out of the class at random times throughout the day/week. Once you have a willing audience, and a schedule coordinated, email teachers the slideshow their class will be viewing so that when students come to present it will be easy to access.

**Closure Question:**

- a. Please go to your presentation partner, shake their hand or give them a high five and thank them for working with you. Please give them a specific compliment about their work with you.
- b. Please find at least one other person in the class and give them a specific compliment about something you enjoyed about their presentation.

**Teacher Reflection:**

# Native Plants

## Lesson 1 ~ Native Plants and Traditional Uses Part 1

Teacher:

Grade Level: 3

Date:

Author: Norma Gonzalez

<b>Common Core Standard:</b>	<b>3.RI.4</b> Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a <i>grade 3 topic or subject area</i> . <b>3.RI.1</b> Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
<b>Enduring Understandings and Essential Questions:</b>	Culture (The resources (language, values, beliefs) people use to perceive their surroundings): The biodiversity and climate of a region are interconnected with the region's culture. How do people from the Sonoran Desert make use of their ecosystem for survival? How do people from the Sonoran Desert learn about their ecosystem? How do people from the Sonoran Desert interact with their ecosystem in an interdependent manner?
<b>Content Objective:</b>	Students will determine the meaning of vocabulary words in context.
<b>Language Objective:</b>	<b>3.SI.1</b> Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

Vocabulary		Materials		
Ecology	native	Manila folder (one per student) Markers Colored pencils Clear packing tape Scissors		
Culture	natural resources			
Ethnobotany	tradition			
Ethnoecology	Tohono O'odham			
Indigenous	Sonoran Desert			
Botany	Yoeme			
Ethnobotanists	cultivate			
perennial				
<b>Seasonality</b> (If more specificity is required, please note date/time range under season)				
<i>Monsoon</i> July-Sept.	<i>Autumn</i> Oct.-Nov.	<i>Winter</i> Dec- Feb.	<i>Spring</i> Mar.-Apr.	<i>Dry Summer</i> May-June
<b>Guiding Questions:</b> How do people make use of desert plants?				

### Anticipatory Set:

Place a nopal cactus (one piece) in the middle of each table for students to handle. Ask the students to make observations about the nopal and to record the observations on a piece of butcher paper. Now pose the following question: What can you do with this nopal? Allow students to make comments in their small groups and to record their comments. After they have shared what they know about what we can do with a nopal

have students share out loud. Most of the students will share that you can eat a nopal. Share with students that people from this region have been eating nopales for thousands of years. They are rich in fiber, calcium and vitamin A. Also share with them that nopales have medicinal properties including; they are used for burns on skin, skin irritations, and infections. Explain that there are many plants from this region that can be consumed and have medicinal properties.

**Activity/Investigation:**

1. Share with the students that they will be engaged in a research project for the next few weeks. They will be asked to select one native plant from the desert biome to research. Allow students time to review their native plant journal hunt so that they can decide which plant they will research. Once they have chosen a plant then they will create a plant specimen data journal using the same format as the field journal for the desert biome observations. Follow the power point presentation on how to put together a field journal. Hand out the materials and have students work as a whole group to construct their field journal. Follow the directions on the power point presentation step by step until the journal is completed. After it is complete allow the students' time to create a cover for their journal. They are free to decorate it appropriately with their name and title as well as an illustration. Reference the power point presentation for samples of completed journals. Share with the students that they are expected to make their journal aesthetically pleasing.

2. Next students will be learning the vocabulary that will help them in their investigation. Share with them the four square method for vocabulary. Students will put the vocabulary in their research portfolio that they will construct in part 3.

Word	Definition of the word
Use the word in a sentence	Picture

3. Students will be reading information on the various uses of plants. Read in a close reading format the following article (from the Arizona-Sonora Desert Museum):  
Ethnobotany: How Do People Use Plants?

Use the following symbols for the reading:

- ! Use this symbol next to a sentence you really agree with.
- ? Use this symbol next to a sentence you don't really understand.
- + Use this symbol next to a sentence that contains information you want to know more about.

After you have displayed the symbols they will be using then start to read the article out loud to the class. After reading each section have the students *interact with the text*, meaning they will use one of the symbols and write some notes. This strategy is used as a comprehension strategy that will help them really interact with the text and make personal meaning. Allow a few students to share their responses after each section. Students will save this article to put in their research portfolio.

**Closure Question:**

Students will be given an index card to write in their own words the definition of ethnobotany. They are to make it a complete thought using the information that they just learned from the article and the vocabulary.

**Teacher Reflection:**

# Native Plants

## Lesson 2 ~ Native Plants and Traditional Uses Part 2

Teacher:

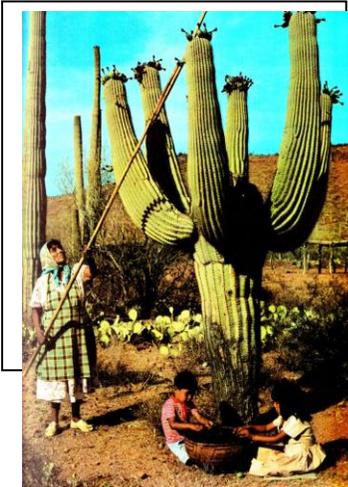
Grade Level: 3

Date:

Author: Norma Gonzalez

<b>Common Core Standard:</b>	<p><b>3.W.4</b> With guidance and support from adults, produce writing in which the development and organization are appropriate to task and purpose. (Grade-specific expectations for writing types are defined in standards 1-3 above.)</p> <p><b>3.W.10</b> Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p> <p><b>SCo3-S1C1-01</b> Formulate relevant questions about the properties of objects, organisms, and events of the environment using observations and prior knowledge.</p>
<b>Enduring Understandings and Essential Questions:</b>	<p>Culture (The resources (language, values, beliefs) people use to perceive their surroundings): <i>The biodiversity and climate of a region are interconnected with the region's culture.</i></p> <p>How do people from the Sonoran Desert make use of their ecosystem for survival?</p>
<b>Content Objective:</b>	Students will identify native plants that they will observe and research throughout the seasons.
<b>Language Objective:</b>	<b>3.SI.1</b> Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on <i>grade 3 topics and texts</i> , building on others' ideas and expressing their own clearly.

<b>Vocabulary</b>		<b>Materials</b>		
Ecology	native	Power point presentation on Edible Landscapes Presentation notes outline (one per student) Native plants specimen journal Colored pencils Clear packing tape Pencils		
Culture	natural resources			
Ethnobotany	tradition			
Ethnoecology	Tohono O'odham			
Indigenous	Sonoran Desert			
Botany	Yoeme			
Ethnobotanists	cultivate			
perennial				
<b>Seasonality</b> (If more specificity is required, please note date/time range under season)				
<i>Monsoon</i> July-Sept.	<i>Autumn</i> Oct.-Nov.	<i>Winter</i> Dec- Feb.	<i>Spring</i> Mar.-Apr.	<i>Dry Summer</i> May-June
<b>Guiding Questions:</b> How do people, from a specific region, make use of their ecosystem for survival? How did native people survive in the region thousands of years ago?				



Students will analyze this picture and answer the following questions.  
Where might this woman be from?  
What might this woman be doing?  
What might she be holding in her hand?  
Allow students plenty of time to observe the picture and then to write the responses to the questions. The students will turn to a partner and talk to them about their responses. Students should be engaged in a conversation about the picture with a buddy. Finally have the students share their responses and discussions with the whole class.  
Share with the students that this is an O'odham woman who is harvesting the fruit from the saguaro for consumption. Explain that this is an ancient practice that is still practiced today and the fruit still eaten today.

**Activity/Investigation:**

**Part 1:**

Students will be building on background knowledge by viewing and recording important information on edible desert plants. Share the power point presentation titled: Edible Landscapes (adapted from the Arizona-Sonora Desert Museum article). In this presentation they will explore perennial plants that are native to Tucson and how native people have been eating them for thousands of years. Students will be taking notes during the presentation recording only important information. Students will record information on the presentation outline handout. Explain to students that they will be engaged in a research project on plants and how they have been and are currently being used.

**Part 2:**

Students will now be going out to the biome to collect data on the native plant that they will be researching.

Remind them of the field observation agreements:

**Out of the class Observation Agreements:**

Stay with the group.

Once on sight you are to observe the whole time there.

Stay focused recording observational notes the whole time.

Students are to maintain silence while in the breezeways so as not to disrupt other classes.

Gather materials, i.e., specimen journals and pencils.

Once in the biome students are to go identify the location of the plant and begin to make observations. In their investigation/data collection they will need to complete the following:

A sketch of their plant, a specimen of their plant, characteristics of the plant, location in the biome of the plant time of day the data was collected, season the specimen was collected.

After the investigation/data collection students will create a map of the biome that identifies the location of their plant. The map is a component of their journal.

**Closure Question:**

**Turn -and-Talk**

Students will select a shoulder buddy (someone they are close to) to turn and talk to. Students' buddies will determine who will share first and who will share second. Each student will get 2 minutes to share with their "buddy" information about their plant.

**Teacher Reflection:**

**Power Point Presentation Notes**

**Name:** \_\_\_\_\_

Name of Plant	Uses and characteristics
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

# Native Plants

## Lesson 3 ~ Native Plants and Traditional Uses Part 3

Teacher:

Grade Level: 3

Date:

Author: Norma Gonzalez

<b>Common Core Standard:</b>	<p><b>3.W.4</b> With guidance and support from adults, produce writing in which the development and organization are appropriate to task and purpose. (Grade-specific expectations for writing types are defined in standards 1-3 above.)</p> <p><b>SCo3-S1C1-01</b> Formulate relevant questions about the properties of objects, organisms, and events of the environment using observations and prior knowledge.</p> <p><b>SCo3-S1C1-03</b> <i>Locate information (e.g., book, article, website) related to an investigation. (See Wo5-S3C6-01 and Ro5-S3C1-05)</i></p>
<b>Enduring Understandings and Essential Questions:</b>	<p>Culture (The resources (language, values, beliefs) people use to perceive their surroundings): <i>The biodiversity and climate of a region are interconnected with the region's culture.</i></p> <p>How do people from the Sonoran Desert make use of their ecosystem for survival?</p> <p>How do people from the Sonoran Desert learn about their ecosystem?</p>
<b>Content Objective:</b>	Students will create a research portfolio that identifies the uses of a native plant.
<b>Language Objective:</b>	<b>3.SI.1</b> Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

Vocabulary		Materials		
Ecology	native	Plant information worksheet from power point presentation Pencils Research journal cover page Plant specimen journal		
Culture	natural resources			
Ethnobotany	tradition			
Ethnoecology	Tohono O'odham			
Indigenous	Sonoran Desert			
Botany	Yoeme			
Ethnobotanists	cultivate			
perennial				
<b>Seasonality</b> (If more specificity is required, please note date/time range under season)				
<i>Monsoon</i> July-Sept.	<i>Autumn</i> Oct.-Nov.	<i>Winter</i> Dec- Feb.	<i>Spring</i> Mar.-Apr.	<i>Dry Summer</i> May-June
<b>Guiding Questions:</b> How do people, from a specific region, make use of their ecosystem for survival? How did native people survive in the region thousands of years ago?				

**Anticipatory Set:  
Chalk Talk**

In the center of a large piece of butcher paper write the word ETHNOBOTANY. Students should work in small groups of no more than four students. Explain to the students that this is a nonverbal activity initially. Each student will be given a marker. They are to silently and individually write down everything they can about the word in the center. Possible responses can include a definition of the word (in their own words), an example of the word, etc. Next step is the verbal part of the activity. Students will take turns sharing what they wrote about the word. Explain to the students that they will have to share with the whole class what they discussed so they should identify a speaker for the group. When students have had a chance to share their thoughts in a small group then allow the speaker for the group to share with the whole class.

Ethnobotany: is the study of the plants of a specific region, as well as how the people of that region make use of them.

**Activity/Investigation:**

Part 1:

Students will create a research portfolio with information about their native plant and general desert biome information. To construct the portfolio students will need a cover page. They are to write their name on it. Students are also required to create a drawing of their plant in the appropriate sheet. They will include the drawing in the portfolio. Students will also include the vocabulary four-square activity they worked on earlier.

Part 2:

Students will fill out their plant information on the plant information handout. Most of the information will be available to them from the previous activities completed on biome native plants. On this information sheet they are to record what the nutritional benefits are if the plant is used as food. Students will also record medicinal benefits if the plant is used for medicine. Students will also describe other uses of the plant, be it materials, fibers etc. If possible, access to the internet should be available for students to further research their plant and/or have other informative pieces for students to further research information about their plant.

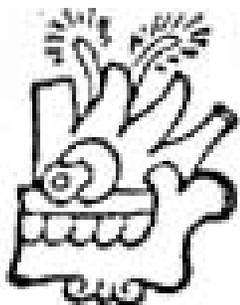
**Closure Question:**

**Turn -and-Talk**

Students will select a shoulder buddy (someone they are close to) to turn and talk to. Students' buddies will determine who will share first and who will share second. Each student will get 2 minutes to share information about their plant with their "buddy".

**Teacher Reflection:**

Plant name: \_\_\_\_\_



**Native Name:**

**Spanish Name:**

**Scientific sketch of plant**

**Use as a food:**

**A description of the plant:**

**Use as medicine:**

**Other information:**

**Other uses:**

# Native Plants

## Lesson 4 ~ Native Plants and Traditional Uses Part 4

Teacher:

Grade Level: 3

Date:

Author: Norma Gonzalez

<b>Common Core Standard:</b>	<b>3.W.7</b> Conduct short research projects that build knowledge about a topic. <b>SC03-S1C1-03</b> <i>Locate information (e.g., book, article, website) related to an investigation. (See W05-S3C6-01 and R05-S3C1-05)</i>
<b>Enduring Understandings and Essential Questions:</b>	Culture (The resources (language, values, beliefs) people use to perceive their surroundings): <i>The biodiversity and climate of a region are interconnected with the region's culture.</i> How do people from the Sonoran Desert make use of their ecosystem for survival? How do people from the Sonoran Desert learn about their ecosystem?
<b>Content Objective:</b>	Students will compose a research paper on a native plant and its uses.
<b>Language Objective:</b>	<b>3.SL.4</b> Report on a topic or text, tell a story, or recount and experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.

Vocabulary		Materials		
Ecology	native	Research report graphic organizer Five paragraph essay template Writer's checklist		
Culture	natural resources			
Ethnobotany	tradition			
Ethnoecology	Tohono O'odham			
Indigenous	Sonoran Desert			
Botany	Yoeme			
Ethnobotanists	cultivate			
perennial				
<b>Seasonality</b> (If more specificity is required, please note date/time range under season)				
<i>Monsoon</i> July-Sept.	<i>Autumn</i> Oct.-Nov.	<i>Winter</i> Dec- Feb.	<i>Spring</i> Mar.-Apr.	<i>Dry Summer</i> May-June
<b>Guiding Questions:</b> If you were stranded in a remote area of the desert how might you survive? How did native people survive in the region thousands of years ago?				

### Anticipatory Set:

#### Chalk Talk

In the center of a large piece of butcher paper write the word ETHNOECOLOGY. Students should work in small groups of no more than four students. Explain to the students that this is a nonverbal activity initially. Each student will be given a marker. They are to silently and individually write down everything they can about the word in the center. Possible responses can include a definition of the word (in their own words), an example of the word etc. Next step is the verbal part of the activity. Students will take

turns sharing what they wrote about the word. Explain to the students that they will have to share with the whole class what they discussed so they should identify a speaker for the group. When students have had a chance to share their thoughts in a small group then allow the speaker for the group to share with the whole class.

Ethnoecology: the study of how cultures manage their ecosystems they inhabit for their survival.

### **Activity/Investigation:**

Students will utilize the information and data they gathered on their plant to write a research paper. Specifically students will use the plant information worksheet to draw on that information. Students can organize their ideas on the "My Native Plant Research Report" graphic organizer. Explain to students that the graphic organizer will help them organize their information so that they can create a five paragraph essay on their plant. Additionally explain that you will work together on the graphic organizer.

1. Ask the students to fill out the center square with the topic sentence.
2. Next ask the students to fill out the square for paragraph #2 where they will list one use of their plant. To support that use they will write an example.
3. Students will now fill out square for paragraph #3 again with a second use for their plant.
4. Students will now fill out square for paragraph #4 with a third use for their plant.
5. Finally students will write a concluding statement for their essay.
6. Students will use the writer's checklist to ensure that they have written a complete essay.
7. Conduct a final edit and have students rewrite a final essay.
8. Allow students time to present their findings on their plant to the whole class.

### **Closure Question:**

#### **Think-Write-Share**

Draw student's attention to the guiding questions. Allow time for them to think about the responses to the questions. After several minutes of think time then allow students time to write their responses in complete sentences on an index card. Finally have the students get with a "buddy" and they should be given time to share their responses to the guiding questions.

### **Teacher Reflection:**

# Desert Biome

## Lesson 1 ~ Manzo Desert Biome Field Observations

Teacher:  
Author: Norma Gonzalez

Grade Level: 3

Date:

<b>Common Core Standard:</b>	<b>SC03-S1C1-01</b> Formulate relevant questions about the properties of objects, organisms, and events of the environment using observations and prior knowledge. <b>3.W.4</b> With guidance and support from adults, produce writing in which the development and organization are appropriate to task and purpose. <b>3.W.10</b> Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.
<b>Enduring Understandings and Essential Questions:</b>	Biodiversity (the variety of life on Earth): <i>All ecosystems contain a variety of organisms that are interdependent.</i> How are humans dependent on biodiversity?  Climate: (long standing weather patterns): <i>Life on Earth depends on, is shaped by, and causes changes in climate.</i>  How does climate affect the way humans live?
<b>Content Objective:</b>	Students will explore the desert biome, collect specimens and write their own observations about the biome.
<b>Language Objective:</b>	<b>3.SI.1</b> Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on <i>grade 3 topics and texts</i> , building on others' ideas and expressing their own clearly.

<b>Vocabulary</b>	<b>Materials</b>
Ecosystem Biome	Large manila envelope one per student. Scissors Clear packing tape Markers Lined paper Hole puncher Power point presentation for the unit of study Colored pencils

**Seasonality** (If more specificity is required, please note date/time range under season)

<i>Monsoon</i> July-Sept.	<i>Autumn</i> Oct.-Nov.	<i>Winter</i> Dec- Feb.	<i>Spring</i> Mar.-Apr.	<i>Dry Summer</i> May-June
------------------------------	----------------------------	----------------------------	----------------------------	-------------------------------

**Guiding Questions:**

How are the seasons in the desert different from other ecosystems? What flowers or plants are blooming during which season? What are the characteristics of a biome?

## **Anticipatory Set:**

### **Quick Write:**

1. Every student will get a note card for their quick write.
2. Explain to the students that they will get three minutes to respond to the quick write question.
3. Display the question for everyone to see and give students 3 minutes of quiet reflection and writing time. **What is your favorite season in the desert? Describe what is happening in nature during this time and also explain why it is your favorite season.**
4. After students have had time to reflect and to write ask if there are any volunteers to read their response out loud.
5. Following student responses explain that they will be engaged in a year long project where they will be closely observing what is happening in nature during each of the five seasons throughout the year. Explain that their observations will take place in the Manzo Desert Biome.

### **Activity/Investigation:**

1. The first activity that students will be engaged in is to put together an observation/investigation field journal. Hand out the materials and have students work as a whole group to construct their field journal. Follow the directions on the power point presentation step by step until the journal is completed. After it is complete with illustrations and lined paper for observations, allow the students time to create a cover for their journal. They are free to decorate it appropriately with their name and title as well as an illustration. Reference the power point presentation for samples of completed journals. Share with the students that they are expected to make their journal aesthetically pleasing.
2. Included as part of their field journal creation, is an introduction. For the introduction students are to create a detailed map of the desert biome. Have students recall the native plant hunt to help them with the creation of their map. Additionally with their map they are also required to include a written description of the biome as an introduction to the site where they will be conducting observations/investigations.
3. **Field observation/investigation protocol.**  
Explain to the students that they will be engaged in conducting five observations/investigations throughout the year. Reference the power point presentation that provides the guidelines for the project. The guidelines are as follows:
  - Each time students go conduct an observation/investigation they will write a descriptive observation of something they focused on for this investigation.
  - Students are required to collect one specimen during each observation. They are to place it in the envelope or they can tape it with clear packing tape to preserve it.
  - Additionally they are to sketch a picture of something they observed.Explain to them that to be observant requires complete focus and engagement on what is out there. Therefore it is required that every time an observation takes place they are to be observing and investigating the whole time.

### **Observation #1- Monsoon season (July - Sept.):**

Explain to the students that they will be going on their **first** observation/investigation today. The season that they are in currently is called the Monsoon and starts in July through September. Share with students the characteristics of the season before they go

out. Remind students of the protocols for each observation. Reference the power point presentation so they are clear on the expectation.

**Observation #2- Autumn (Oct.- Nov.):**

Explain to the students that they will be going on their **second** observation/investigation today. The season for this observational period is Autumn. This season starts in October through November. Share with students the characteristics of the season before they go out. Remind students of the protocols for each observation. Reference the power point presentation so they are clear on the expectation.

**Observation #3- Winter (Dec.- Feb.):**

Explain to the students that they will be going on their **third** observation/investigation today. The season for this observational period is winter. This season starts in December and goes through through February. Share with students the characteristics of the season before they go out. Remind students of the protocols for each observation. Reference the power point presentation so they are clear on the expectation.

**Observation #4- Spring (Mar.-Apr.):**

Explain to the students that they will be going on their **fourth** observation/investigation today. The season for this observational period is Spring. This season starts in March through April. Share with students the characteristics of the season before they go out. Remind students of the protocols for each observation. Reference the power point presentation so they are clear on the expectation.

**Observation #5- Dry Summer (May-June):**

Explain to the students that they will be going on their **fifth** observation/investigation today. The season for this observational period is referred to as dry summer. This season starts in May through June. Share with students the characteristics of the season before they go out. Remind students of the protocols for each observation. Reference the power point presentation so they are clear on the expectation.

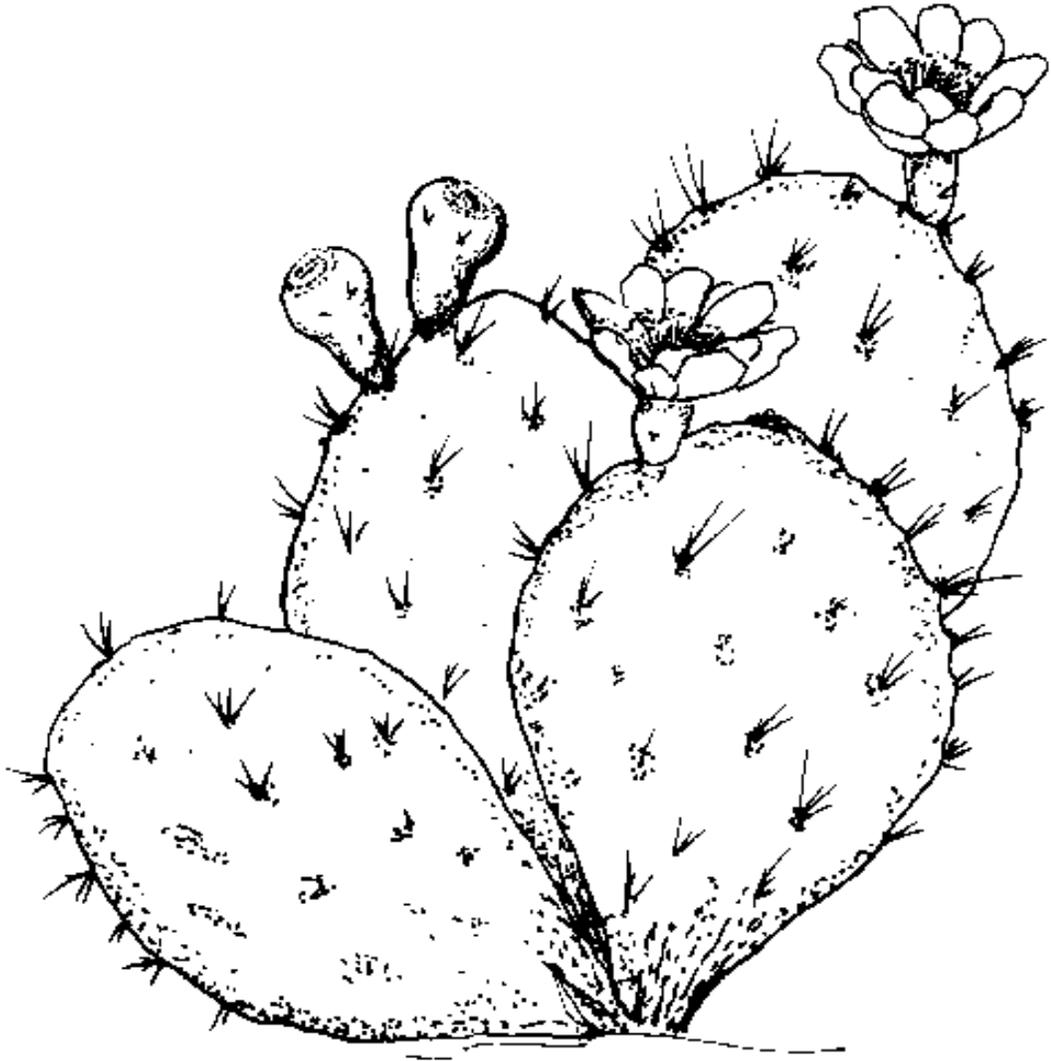
**Closure Question:**

Following each observation have the students do a quick write activity.

1. Every student will get a note card for their quick write.
2. Explain to the students that they will get three minutes to respond to the quick write question.
3. Display the question for everyone to see and give students 3 minutes of quiet reflection and writing time. **What observations did you make today? What was the most fascinating observation you made? Why?**
4. After students have had time to reflect and to write ask if there are any volunteers to read their response out loud.

**Teacher Reflection:**

# Manzo Desert Biome Plant Observation Journal



<b>Name of Plant</b>	<b>Sketch</b>	<b>Characteristics</b>

--	--	--

**Season:**

---

---

---

---

---

---

---

**Date of observation:**

---

---

---

---

**Time of day:**

---

---

# Desert Biome

## Lesson 2 ~ What's In Our Desert Biome?

Teacher:

Grade Level: 3

Date:

Author: Norma Gonzalez

<b>Common Core Standard:</b>	<b>3.L.6</b> Acquire and use accurately grade-appropriate conversational, general academic, and domain-specific words and phrases, including those that signal spatial and temporal relationships (e.g., <i>After dinner that night we went looking for them</i> ). <b>SCo3-S1C1-01</b> Formulate relevant questions about the properties of objects, organisms, and events of the environment using observations and prior knowledge.
<b>Enduring Understandings and Essential Questions:</b>	Biodiversity (the variety of life on Earth): All ecosystems contain a variety of organisms that are interdependent. How does decreased or increased biodiversity affect life on Earth? How are humans dependent on biodiversity?
<b>Content Objective:</b> <i>Reading Writing</i>	Students will identify and locate native plants that make up the ecosystem at the Manzo Desert Biome.
<b>Language Objective:</b>	<b>3.SI.1</b> Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

Vocabulary		Materials		
Observation Biome Ecosystem Native		Desert Biome Hunt Journal Pencils Clipboards		
<b>Seasonality</b> (If more specificity is required, please note date/time range under season)				
<i>Monsoon</i> July-Sept.	<i>Autumn</i> Oct.-Nov.	<i>Winter</i> Dec- Feb.	<i>Spring</i> Mar.-Apr.	<i>Dry Summer</i> May-June
<b>Guiding Questions:</b> Why is it important to know what plants exist in our environment?				

### Anticipatory Set: "Stand up if..."

For an informal assessment on what students know about our desert biome, have the students engage in the "stand up if" activity. Students will stand up if they can answer yes to the questions that are going to be posed. Additionally if they stand up they need to be prepared to also answer the question verbally.

**Stand up if:**

**You know that at Manzo we have a desert biome.**

**You know where the desert biome is located.**

**You have ever visited the biome.**

**You can name three plants in the biome.**

**You know why the desert biome was constructed.**

**You know who constructed the desert biome.**

After this activity it would be ideal to have Moses Thompson come to the class and give a history of the desert biome. During his presentation he can elaborate on the history of the biome and the purpose for the creation of the biome.

**Activity/Investigation:**

1. Explain to the students that they will be going on a desert native plant hunt in the Manzo desert biome. The purpose of the hunt is that it will help them to become familiar with the plants that make up the desert biome. Moreover it will help them to identify the names of the plants and at some point, in further research, they can learn about the benefits of having these plants in the desert biome.
2. Explain to the students the agreements for observations outside of the classroom. These agreements will set the tone for the rest of the year as observations at the biome will take place at least four other times during the year.

**Out of the class Observation Agreements:**

Stay with the group.

Once on sight you are to observe the whole time there.

Stay focused recording observational notes the whole time.

Students are to maintain silence while in the breezeways so as not to disrupt other classes.

3. Gather all needed materials and head out for the biome. Hand out one Desert Biome native plant journal per student. Preview the journal with the students and explain to them that they have the picture of the plant in first column, second column is where they indicate whether or not they identified the plant, third column is where the common name of the plant is listed, and the fourth column is for them to sketch a part of the plant that they choose to.

4. Once there explain that they will have 45 minutes to complete as much of the native plant hunt as they can. Another day of observation is probably necessary so that students are not rushed to complete the observations and sketches.

5. After 45 minutes out in the biome have the students get ready to go back to class.

6. Once students are in class spend about 10 minutes allowing them to make general biome observation notes in the appropriate page in their journal. This is an individual activity having them reflect on what they observed and learned about the desert biome.

7. Allow another 10 minutes to have students share out loud anything about the observations they made while in the hunt.

8. Explain to the students that they will be going out to the biome several times this year and so it is very beneficial for them to know the plants and the names.

**Closure Question:****Quick Write activity: 3-2-1**

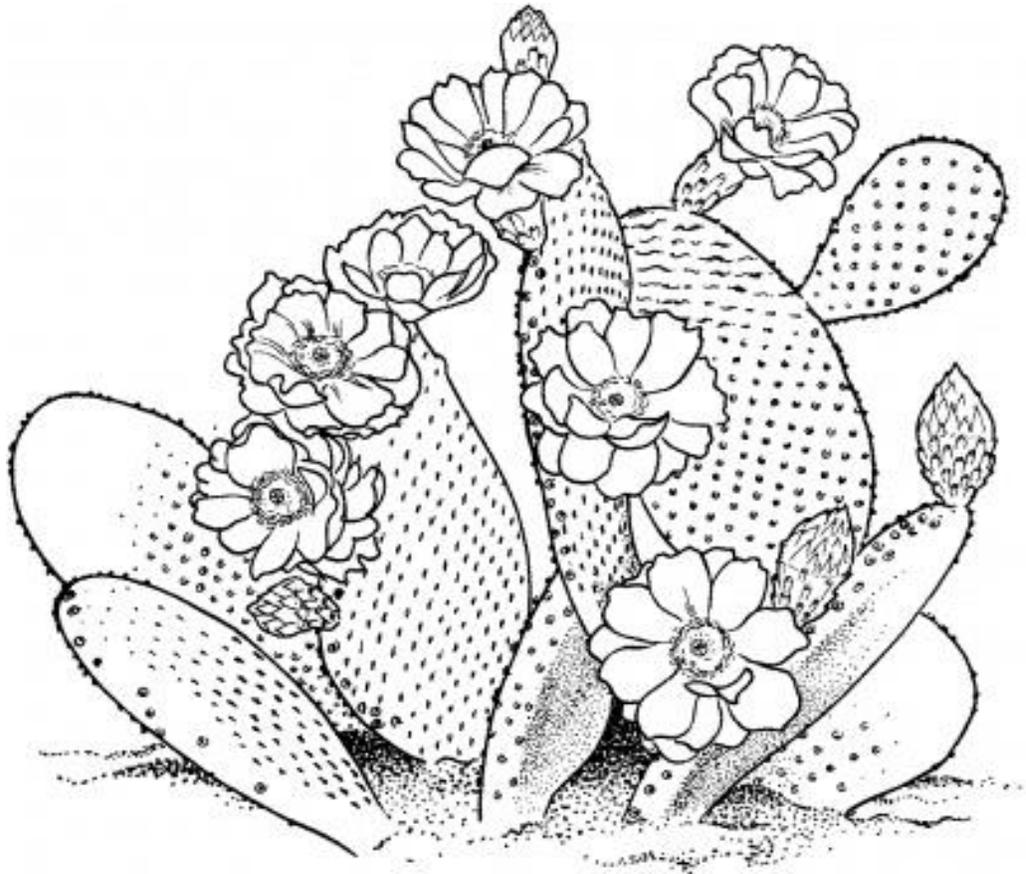
Before the students begin to write explain that you will be reading all their responses and that you will select several comments that are unique and thought provoking to display.

1. Tell the students that they will get 3 minutes to write some information they learned on a note card. They will write about 3 plants they really liked, 2 questions they might have about the observations they made and 1 thing they would like to return to the biome for.

2. Collect all the responses as students finish up.

**Teacher Reflection:**

**Manzo Desert Biome  
Native Plant Hunt  
Documentation Journal**



**Name:** \_\_\_\_\_

Find this plant in the Biome	Identified: Yes or no	Common Name	Sketch a picture of the plant
		<p><b>White Thorn Acacia</b></p>	
		<p><b>Teddy Bear Cholla</b></p>	
		<p><b>Arizona Ash Tree</b></p>	
		<p><b>Hedgehog Cactus</b></p>	

		<p><b>Salt Bush</b></p>	
<p><b>Find this plant in the Biome</b></p>	<p><b>Identified: Yes or no</b></p>	<p><b>Common Name</b></p>	<p><b>Sketch a picture of the plant</b></p>
		<p><b>Desert Willow Tree</b></p>	
		<p><b>Desert Honeysuckle</b></p>	
		<p><b>Chuparosa</b></p>	

		<b>Brittlebush</b>	
		<b>Kidneywood</b>	
<b>Find this plant in the Biome</b>	<b>Identified: Yes or no</b>	<b>Common Name</b>	<b>Sketch a picture of the plant</b>
		<b>Ocotillo</b>	
		<b>Fairy Duster</b>	

		<p><b>Thurber's Cotton</b></p>	
		<p><b>Globemallow</b></p>	
		<p><b>Jojoba</b></p>	

Find this plant in the Biome	Identified: Yes or no	Common Name	Sketch a picture of the plant
		<b>Fishhook Barrel Cactus</b>	
		<b>Heart Leafed Limberbush</b>	
		<b>Englemann's Prickly Pear</b>	
		<b>Chiltepin</b>	

		<p><b>Hohokam Agave</b></p>	
<p><b>Find this plant in the Biome</b></p>	<p><b>Identified: Yes or no</b></p>	<p><b>Common Name</b></p>	<p><b>Sketch a picture of the plant</b></p>
		<p><b>Arizona Rosewood</b></p>	
		<p><b>Hopseed Bush</b></p>	
		<p><b>Desert Senna</b></p>	

		<b>Cane Cholla</b>	
		<b>Pin Cushion Cactus</b>	
<b>Find this plant in the Biome</b>	<b>Identified: Yes or no</b>	<b>Common Name</b>	<b>Sketch a picture of the plant</b>
		<b>Blue Palo Verde</b>	
		<b>Desert Spoon</b>	

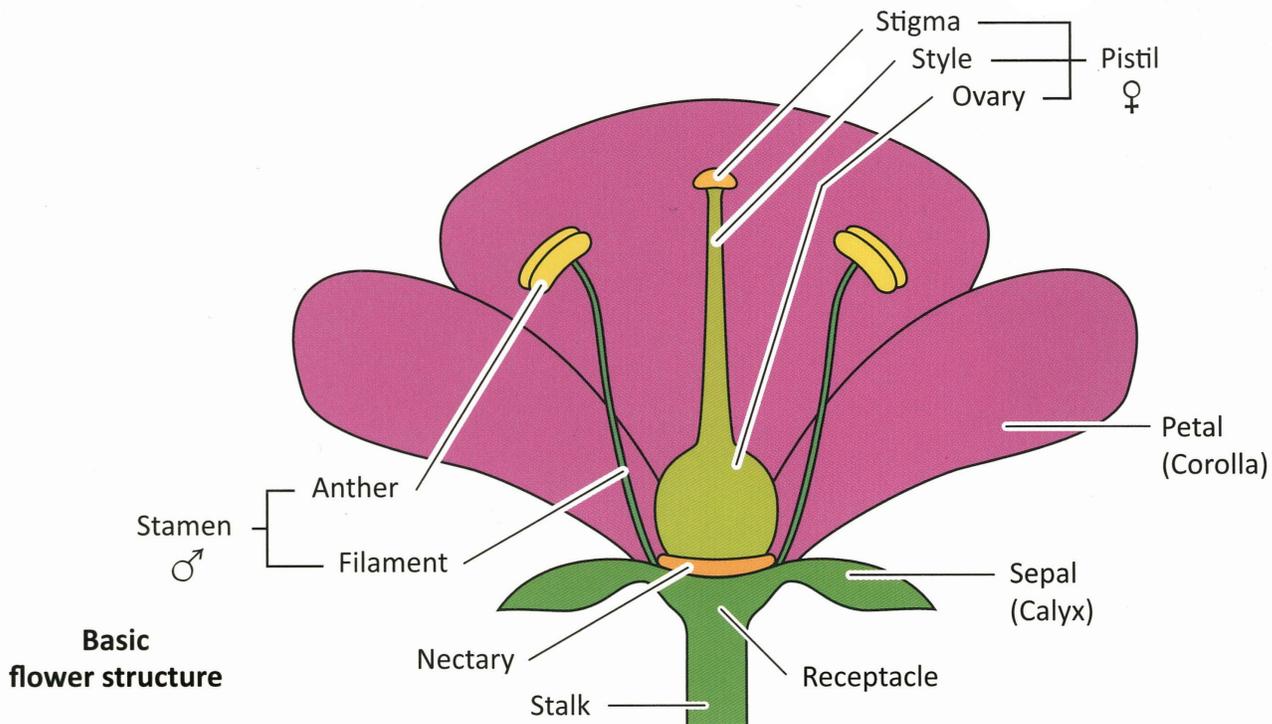
		<p><b>Smoke Tree</b></p>	
		<p><b>Fleabane</b></p>	
		<p><b>Beavertail Cactus</b></p>	





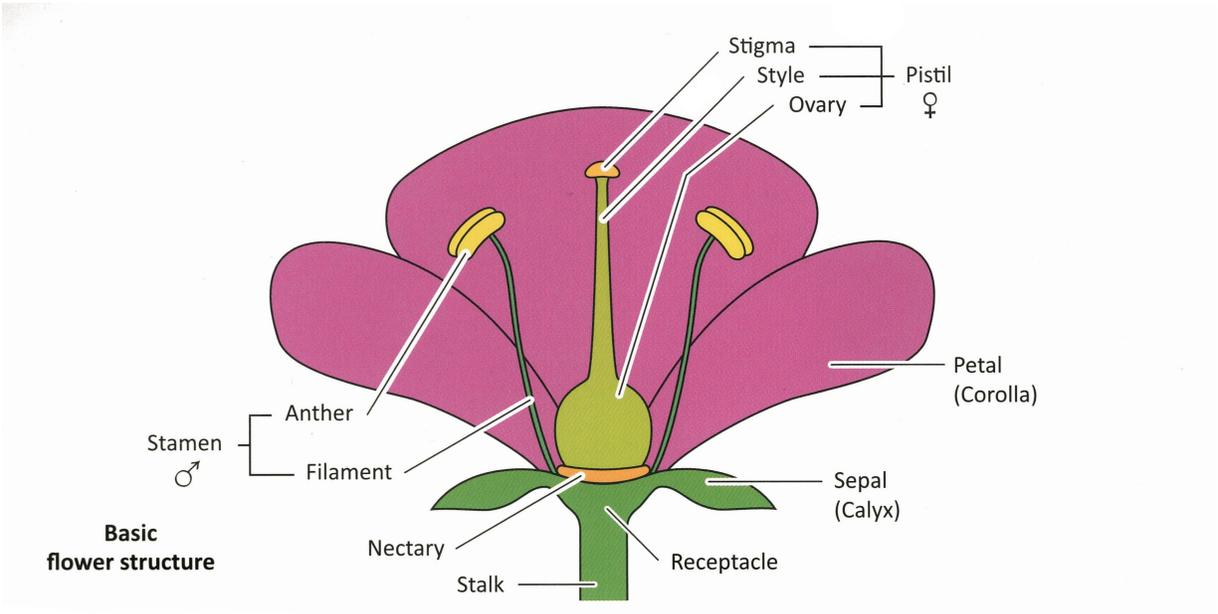
# Template for Poster of Flower Anatomy

Note: Use this diagram to create a poster for students to reference:



Thanks to Laguna Wilderness Press for allowing use of this image; you can find this and other botanical terms illustrated in their book, *Wildflowers of Orange County and the Santa Ana Mountains* by Robert Allen and Fred Roberts (2013).

# Title



Thanks to Laguna Wilderness Press for allowing use of this image; you can find this and other botanical terms illustrated in their book, *Wildflowers of Orange County and the Santa Ana Mountains* by Robert Allen and Fred Roberts (2013).

# Major Threats to Pollinators

*(This is a modified version of an article produced by the Great Pollinator Project available online: <http://greatpollinatorproject.org/conservation/major-threats-to-pollinators>)*

Bees and other insect pollinators have many of the same challenges as other species, including habitat loss, degradation, and fragmentation; non-native species; pollution, including pesticides; and climate change.

## Habitat Loss, Degradation, and Fragmentation

Much pollinator habitat has been lost to farming, mining, and urban and suburban development (building and growing of cities and neighborhoods). Although farms and new neighborhoods can provide some flowers and be good for some pollinators, many bees and butterflies like only one or 2 types of flowers that may not be present. When pollinators lose habitat, their chances for survival drop.

Habitat **degradation** (deh/gruh/day/shun), the decline in habitat quality, is another serious problem. For example, the loose, crumbly soil that solitary bees need to dig into for their homes may be trampled by heavy foot traffic or off-road vehicles. In cities, solitary bees face more problems because of the large amount of land that has been covered with concrete for streets, sidewalks, and parking lots.

Many pollinators are badly affected when large areas of habitat are broken up into smaller, isolated patches by road construction, development, or agriculture. These habitat **fragments** (small pieces) may not be large enough to meet all the pollinator's needs by themselves. Making connectivity—ways to travel safely among small patches of land—is key to pollinator survival in these areas.

## Non-native Species

Plants or animals brought here from other places can worsen pollinator habitat. When non-native plants such as buffel grass take over mountains or valleys, they crowd out the wildflowers butterfly and bee species need for pollen, nectar, or larval food. Some non-native plants also attract pollinators away from native species that are better food sources. In other examples, non-native species can compete with native plants or animals for resources—in fact, in some habitats European honeybees compete with native bees for pollen and nectar.

Although they were meant to be helpful at the time, some non-native creatures brought in to control pests have caused problems for native species. For example, non-native lady beetles introduced to this country for aphid control have killed off New York's state insect, the nine-spotted lady beetle. These non-native lady beetles even eat Monarch butterfly caterpillars. In

another example, a non-native fly called the tachinid fly was brought to the East Coast to control gypsy moths. Gypsy moths are also non-native and they can destroy forests by eating all the leaves on some trees! But bringing in this fly has brought another problem. It has likely contributed to the decline of the large sphinx moths that pollinate flowers such as evening primrose and some orchids.

## **Pollution, Including Pesticides and Herbicides**

Air pollution is a very real problem for bees and other pollinators that depend on scent trails to find flowers. Light pollution (when city lights are left on at night when it should be dark) can harm moths by making them visible to bat or bird predators. The moths are attracted to light bulbs and glowing signs at night, which allows predators to easily see them and eat them.

The spraying of **pesticides** (poisons to kill pests and other creatures) is a major threat to insect pollinators. Pesticides don't just kill pests—they can kill pollinators too. Using **herbicides** (poisons that kill weeds and other plants) that get rid of important plants for bees and other pollinators is another problem.

## **Climate Change**

Studies predict that climate change will change the close relationship between insect pollinators and the plants that depend upon them for reproduction. Flowering plants are growing further north or to cooler, higher elevation habitat because of warming temperatures. When these plants grow in new places like this, their pollinators sometimes cannot find them. What will happen to pollinators or their favorite plants if pollinators can't find them? We don't yet know.



### Anna's Hummingbird

- Only North American Hummingbird with a red crown
- Males more colorful than females



### Carpenter Bee

- Burrow into dead wood to make nests



### Cloudless Sulphur Butterfly

- Caterpillar changes color based on what it eats



### Costa's Hummingbird

- Very small hummingbird
- Males have purple cap and throat



### Fly

- Lay eggs in manure and rotting flesh



### Honey Bee

- Although not native to North America, they are important pollinators worldwide



### Monarch Butterfly

- Predators stay away from the Monarch because it is poisonous to eat
- Becomes poisonous because of the toxic plant it eats as a caterpillar



### Pronuba Moth

- Sometimes called the Yucca Moth
- Like many moths, this moth too, is nocturnal



**Solitary Bee**

- Tend to live in small holes in the ground or in wood—not hives
- Do not usually interact with other bees



**Lesser Long Nosed Bat**

- Live in Central and North America
- Feed on nectar of night blooming plants



**Chuparosa**

- Produces many bright red tubular flowers
- Grows in hot sandy areas



**Desert Senna**

- 1 inch wide flowers
- Frequently has chewed leaves and flowers from caterpillars



**Devil's Claw**

- Produces a long seed pod in the shape of a claw-like hook



**Fairy Duster**

- Usually blooms in late winter



**Velvet Mesquite Tree**

- Desert tree with a tap root that can be over 100 feet long
- Produces long nutritious beans in summer



**Blue Palo Verde Tree**

- Covered in striking yellow flowers in spring



**Parry's Penstemon**

- Produces bright pink spikes of flowers in early spring if there has been enough winter rain



**Pine Leaf Milkweed**

- One of many varieties of milkweed
- Toxic to almost all animals



**Queen of the Night Cactus**

- This cactus is hidden in plain sight because it is camouflaged as dead sticks
- Produces huge white, fragrant flowers one night per year



**Sideoats Grama Grass**

- Grows only in summer
- Produces many tiny greenish brownish flowers



**Soaptree Yucca**

- Blooms once a year in spring
- Flowers are open in day and night



**Wind**

- Abiotic (not alive)



**Saguaro Cactus**

- Arizona's state flower
- Flowers turn to bright red fruits enjoyed by people and animals alike



**Hawk Moth**

- Medium to large moth
- Sometimes called sphinx moth or hummingbird moth

# Pollination Adaptations

<b>Pollinator</b>	<b>Pollinator Characteristics</b>	<b>Flower Characteristics</b>
Bees	<ul style="list-style-type: none"> <li>•Good sense of vision and smell</li> <li>•Often have body hairs</li> <li>•Do not see true red—see UV</li> </ul>	<ul style="list-style-type: none"> <li>•Often yellow or blue and have a landing platform</li> <li>•Often have lines or markings that act as nectar guides</li> <li>•Irregular shaped</li> <li>•May have deep tube for nectar</li> </ul>
Butterflies	<ul style="list-style-type: none"> <li>•Active in the day time</li> <li>•Have a long, thin proboscis to sip nectar</li> <li>•Can see red</li> <li>•land on blossoms</li> </ul>	<ul style="list-style-type: none"> <li>•Open in the day</li> <li>•Emit some scent during the day</li> <li>•Landing platform</li> <li>•May be blue, purple, red, or yellow</li> <li>•May have a nectar guide</li> </ul>
Beetles and Flies	<ul style="list-style-type: none"> <li>•Good sense of smell</li> <li>•Some lay eggs in rotting flesh</li> </ul>	<ul style="list-style-type: none"> <li>•Dull colors or dark red</li> <li>•Strong, spicy odor, or odor of rotting flesh</li> <li>•flat shape</li> </ul>
Hummingbirds	<ul style="list-style-type: none"> <li>•Vision like a human</li> <li>•Long bill and tongue, large body</li> <li>•Little sense of smell</li> <li>•Intelligent—they remember and return to the same flowers</li> <li>•Active during the day</li> <li>•Approach flower and hover</li> </ul>	<ul style="list-style-type: none"> <li>•Red or orange tube shaped flowers</li> <li>•Little or no fragrance</li> <li>•Open in day</li> <li>•No landing platform or nectar guide</li> </ul>
Moths and Bats	<ul style="list-style-type: none"> <li>•Active at night</li> <li>•Strong sense of smell</li> <li>•Long proboscis for nectar</li> </ul>	<ul style="list-style-type: none"> <li>•Open at dusk or night with a sweet odor</li> <li>•Often white or light colored</li> <li>•No landing platform</li> </ul>
Wind	<ul style="list-style-type: none"> <li>•Abiotic (not alive)</li> </ul>	<ul style="list-style-type: none"> <li>•Dull or green colored</li> <li>•Tend to be small and unnoticeable</li> <li>•Sometimes no petals</li> <li>•Lots of flowers to make lots of pollen</li> <li>•Frequently in the canopy (top part of a tree)</li> </ul>

U.S. Fish & Wildlife Service

# Attracting Pollinators to Your Garden



# Why are Pollinators Important?

- Pollinators are nearly as important as sunlight, soil and water to the reproductive success of over 75% of the world's flowering plants.
- They are crucial to the production of most fruits, nuts, and berries on which people and wildlife depend.
- Over 150 food crops in the United States depend on pollinators, including blueberries, apples, oranges, squash, tomatoes and almonds.



*Blueberries*



*Sunflower Seeds*



*Wild Strawberries*



*Wild Cherries*



*Carolina Rose*



*Elderberry*



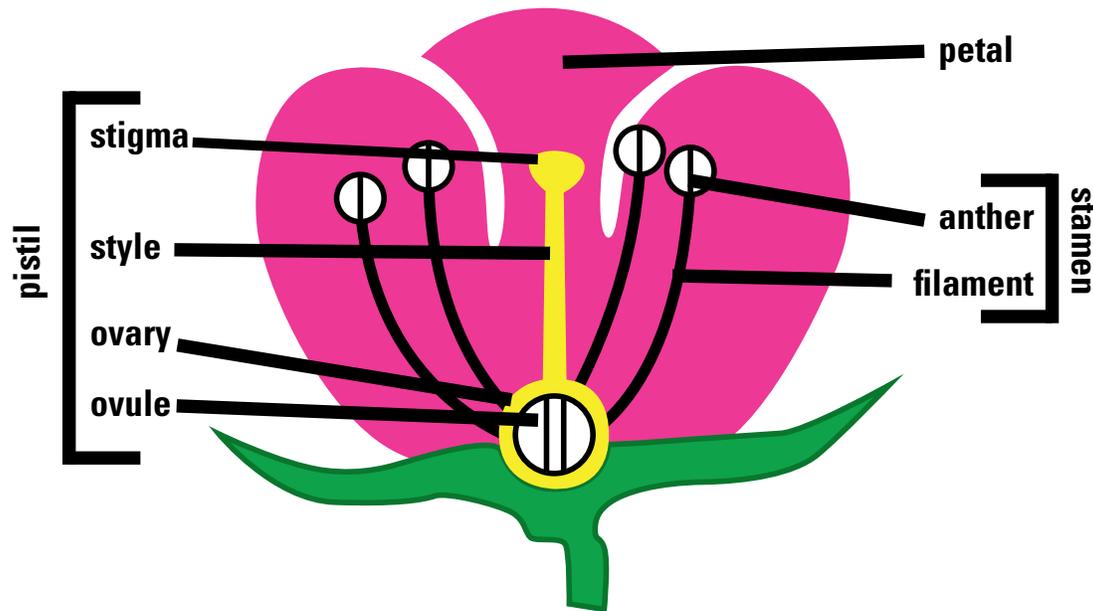
*Thistle Seeds*

# What is Pollination?

Pollination occurs when pollen grains from a flower's male parts (anthers) are moved to the female part (stigma) of the same species. Once on the stigma, the pollen grain grows a tube that runs down the style to the ovary, where fertilization occurs, producing seeds.

Most plants depend on pollinators to move the pollen from one flower to the next, while others rely on wind or water to move pollen.

Plants produce nectar to attract pollinators. As the pollinator moves from flower to flower collecting nectar, they are also moving pollen from flower to flower. Certain fruits and seeds will not be produced if their flowers are not pollinated.



*Worldwide there are more than 100,000 different animal species that pollinate plants. Insects are the most common pollinators, but as many as 1,500 species of vertebrates also help pollinate plants.*

*A Good Pollinator:*

- *Is highly mobile and can travel from flower to flower. Moving pollen from flowers on one plant to another plant (rather than on the same plant) is called cross-pollination. Plants resulting from cross-pollination have greater genetic diversity and are more capable of withstanding environmental change.*
- *Has hairs, scales or feathers. Pollen grains from one flower get caught in the hairs, scales, and feathers then are brushed off on another flower as the pollinator moves from plant to plant collecting nectar.*
- *Has specialized mouth parts for collecting nectar from the plants it visits*

# Meet the Pollinators

*Trumpet honeysuckle*



*Ruby-throated hummingbird*

Hummingbirds are attracted to scarlet, orange, red or white tubular-shaped flowers with no distinct odors.

*Lesser long-nosed bat*



*Saguaro cactus*

Bats are attracted to dull white, green or purple flowers that emit strong, musty odors at night.

*Bumble bee*



*Raspberry*

Bees are attracted to bright white, yellow or blue flowers and flowers with contrasting ultraviolet patterns that have fresh, mild or pleasant odors.

*Hover fly  
(flower fly)*

*Daisy*



Flies are attracted to green, white or cream flowers with little odor or dark brown and purple flowers that have putrid odors.

*Monarch butterfly*



*Butterfly  
milkweed*

Butterflies are attracted to bright red and purple flowers with a faint but fresh odor.



*Hummingbird  
moth*

*Dense  
blazing  
star*

The hummingbird moth is active during the day however most moths are active at night and are attracted to pale red, purple, pink or white flowers that emit a strong, sweet odor at night.



*Soldier beetle*

*American  
black  
elderberry*

Beetles are attracted to white or green flowers with odors ranging from none to strongly fruity or foul.

## *Pollinators in Peril!*

*Pollinator populations are declining. The most probable causes include:*

- Habitat loss, fragmentation and degradation (including the introduction and spread of invasive plant species)*
- Misuse of pesticides*
- Disease, including parasites carried to the U.S. on introduced species*

# What You Can Do for Pollinators

*Plant a garden using native flowering plants:*

- Choose a variety of colors and shapes that will attract a variety of pollinators
- Choose plants that flower at different times providing nectar and pollen sources throughout the growing season.
- Plant in clumps rather than single plants to better attract pollinators

**For more information:** <http://pollinator.org/guides.htm>



## *Provide habitat for nesting and egg-laying, such as:*

- Shrubs, tall grasses, and low-growing plants
- Patches of fallen branches and k
- Small patches of bare ground
- Bee nesting block



**For more information:** <http://www.fws.gov/pollinators/PollinatorPages/YourHelp.html#bee>

## *Avoid or limit pesticide use:*

- For natural pest control provide a diverse garden habitat with a variety of plant sizes, heights, and types to encourage beneficial insects
- Expect and accept a little bit of pest activity
- Try removing pests by hand (wearing garden gloves)
- If you must use a pesticide, choose one that is the least toxic to non-pest species, does not persist on vegetation, and apply it in the evening when most pollinators are not as active



**For more information:** <http://www.fws.gov/pollinators/PollinatorPages/YourHelp.html#pesticide>



**U.S. Fish & Wildlife Service**  
<http://www.fws.gov/pollinators/>

**1/800 344 WILD**

**August 2011**

**Item # FW 7005**



*All Illustrations by  
USFWS/Tim Knepp*



# Germination

(Text adapted from Facts for Kids on Germination by Anne Goetz <http://everydaylife.globalpost.com/kids-germination-11874.html>)

Plant life, just like human life, begins with an **embryo**. In fact, seeds have a lot in common with humans when it comes to origin of life. Seeds have embryos stored inside. These embryos are tiny versions of the adult plant. They contain all the parts of an adult plant, and just as a human embryo needs care and nourishment to grow and mature, so does the embryo of a seed. In the plant kingdom, the growing of an embryo is called **germination**.

## Anatomy of a Seed

Seeds wear coats just like humans. The coat protects the seed from extremes of temperature, injury and invasion from parasites. The embryo, or baby plant, is safely stored inside the coat, awaiting the perfect conditions that will allow it to begin germinating—sending out roots and shoots. Some seeds such as nasturtium (na-stur-shum) have thicker, harder coats than others. These seeds need to pass through a process called **scarification**—the breaking of the hard seed coat to allow moisture to enter. Scarification can happen in several ways—cold weather, being eaten and passed by an animal, or pre-soaking.

## The Process of Germination

The germination of a seed begins when the combination of water, oxygen and proper temperature is right. Dry soil might be the first sign that your seed is germinating. That's because the seed is absorbing the moisture through its coat to hydrate the cells of the embryo. Once the embryo has absorbed enough moisture, it breaks through the seed coat and begins sending out roots. Shoots—the stems and leaves of a plant—form next.

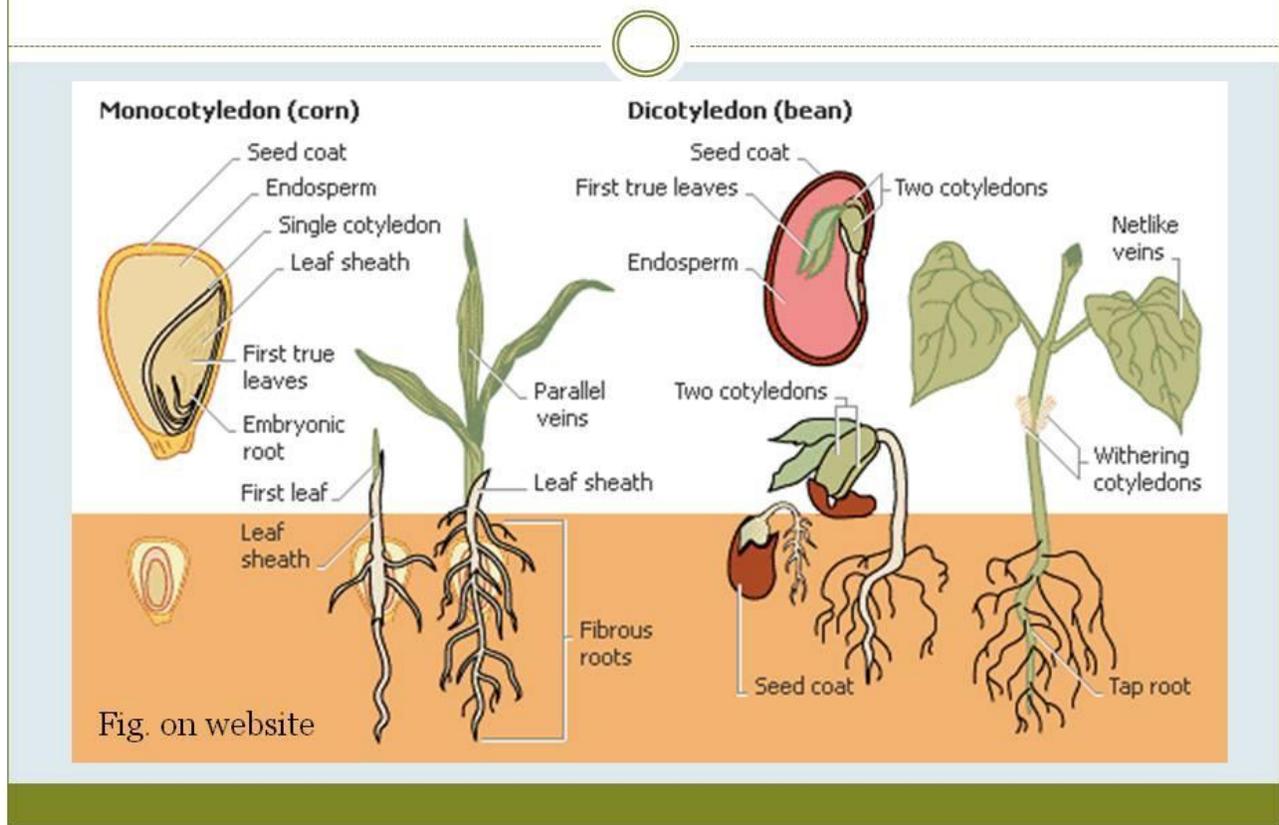
## Barriers to Germination

Conditions sometimes are not ideal and your seed might have a hard time germinating. Over-watering can interfere with the oxygen level your seed needs to grow. Alternately, not watering enough can stunt the seed when it's unable to absorb enough moisture to break through the coat. If you plant your seed too deep, it might use up all its stored energy before it ever breaks through the surface. Large seeds tend to contain more stored food, called **endosperm**. You can plant large seeds deeper and still see good germination.

## Dormancy

When a seed falls from a tree or plant in the fall, somehow it knows that now is not the right time to begin germinating—winter is near, and the young seedling would not survive the cold temperatures. Seeds can also wait through hot, dry conditions. Nature has provided a way for the seed to survive difficult conditions and begin germinating when the conditions are just right. This is called **dormancy**. Seeds that are dormant are in a sort of sleep-state until the conditions are right for growing.

# Monocot vs. Dicot Seeds



## Anatomy of a Seed

(Article adapted from an *The Parts of a Seed for Elementary Children* by Zee Kay from: [http://www.ehow.com/list\\_7334174\\_parts-seed-elementary-children.html](http://www.ehow.com/list_7334174_parts-seed-elementary-children.html))

Seeds are the beginnings of a new plant, with the sole purpose of reproducing. They lie dormant until they receive the things they need to grow, such as soil, water and sunlight. This process is called germination. All seeds are different and require different conditions to germinate and grow properly. Despite being different, most seeds have three main parts in common; the **seed coat**, **endosperm** and **embryo**.

### Seed Coat

Seeds have a thick or thin seed coat. Seed coats are used to protect the internal (inside) parts of the seed. This coat is what you see and feel when you hold a seed. The thicker seed coat keeps out water and sunlight. Seeds with thick coats are generally meant to be swallowed, digested and passed through the feces (poop) of animals. This process weakens the thick seed coat to allow for easy germination along with providing natural fertilizer for the seed. A thin seed coat is easily germinated because water and light can penetrate it easily. A hands-on project to learn about seed coats is to soak a lima bean in water overnight. The seed coat should now slip off the lima bean with a gentle pull. View the seed coat under a microscope.

## Endosperm



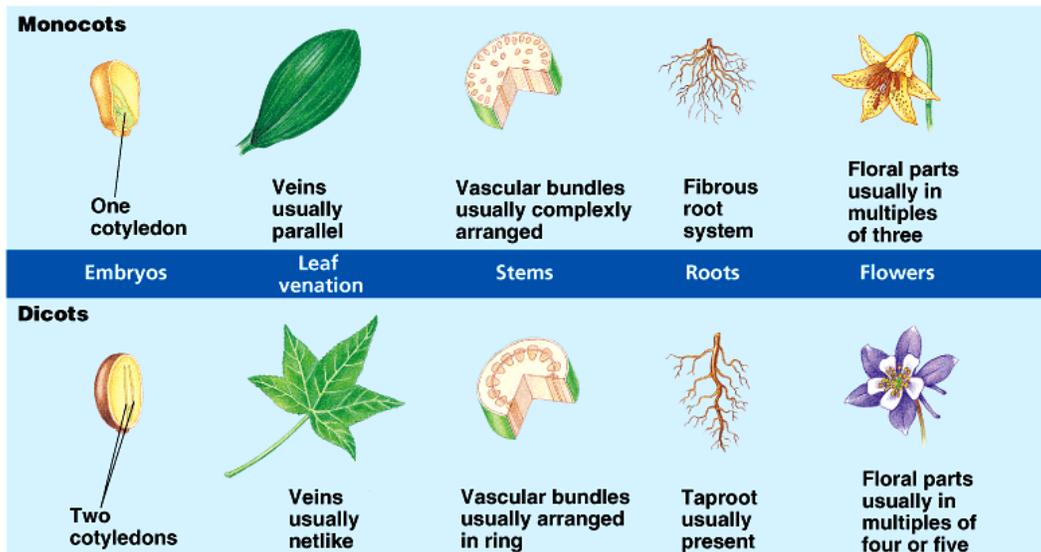
Endosperm even provides nutrients to humans! If you've ever eaten popcorn, oats, or wheat, you're eating endosperm.

The endosperm provides the embryo of the seed with nutrients, usually in the form of starch and proteins. These nutrients allow the seed to remain viable (able to germinate) while it waits to be germinated. The endosperm is located right underneath the seed coat and completely surrounds the embryo in most seeds. In a dicot, the endosperm is in the cotyledon. A great way for elementary kids to learn about the endosperm is to eat it. Foods like popcorn, shredded coconut and white rice are all endosperms. Two-thirds of all human calories come from endosperms.

## Embryo

The embryo is the central station and most important part of a seed. Within the embryo consist all the cells needed to develop into a mature plant. The embryo has three main parts; the **primary roots**, **cotyledons**, and **embryonic leaves**. The primary root is the first thing to emerge from the seed during germination. It creates a long anchor root deep in the soil to support the plant. The cotyledon provides nourishment to the various parts of the embryo during germination. It can resemble a tiny leaf in some plants or be fleshy in other plants like beans. It often emerges from the soil with the seedling as it grows. The embryonic leaves are the plant's first leaves to appear above the ground. A kid's science project to learn about the embryo is to split a seed in half to view how the embryo looks on the inside. Plant several of the same type of seed and dissect them during different parts of the growing phase.

(Article adapted from holganix.com. <http://www.holganix.com/blog/bid/59573/The-Science-Behind-Holganix-Monocots-vs-Dicots-What-You-Need-To-Know>)



Copyright © Pearson Education, Inc., publishing as Benjamin Cummings.

Plants can be separated into two distinct categories: monocots and dicots. What makes the two types different? The big difference that most people note about monocots and dicots is the formation of the plants' veins on leaves. However, there are many different things that separate monocots from dicots. In fact, monocots differ from dicots in four structural features: their leaves, stems, roots and flowers.

Within the seed lies the plant's **embryo** (baby plant); it is here that the first difference between the two types can be seen. Whereas monocots have one **cotyledon** (seed leaf), dicots have two. This small difference at the very start of the plant's life cycle leads each plant to develop vast differences.

Once the embryo begins to grow its roots, another structural difference occurs. Monocots tend to have "fibrous roots" that web off in many directions. These fibrous roots occupy the upper level of the soil in comparison to dicot root structures that dig deeper and create thicker systems. Dicot roots also contain one main root called the taproot, where the other, smaller roots branch off. The roots are essential to the plant's growth and survival, therefore encouraging a deeper and more extensive root system that can help increase the health of the plant.

As the monocots develop, their stems arrange the vascular tissue (veins of the plant) sporadically. This is extremely unique compared to dicots' organized fashion that arranges the tissue into a donut-looking structure (see figure). The way a stem develops is important to note. Stems are in charge of supporting the entire plant and help position

it to reach as much sunlight as possible. The vascular tissue within the stem can be thought of as a circulatory system for bringing nutrients to each part of the plant.

The differences don't end there. Both monocots and dicots form different leaves. Monocot leaves are characterized by their parallel (lines that all run the same direction) veins, while dicots form "branching veins." Leaves are another important structure of the plant because they are in charge of feeding the plant and carrying out the process of photosynthesis.

The last distinct difference between monocots and dicots are their flowers. Monocot flowers usually form in multiples of three whereas dicot flowers occur in groups of four or five.

\*\*\*\*\*

*Once you have read the article, respond to the following prompts:*

1. Circle at least 2 words that are new to you or that you don't totally understand.
2. Explain how the illustration helps the reader to understand the ideas in the text:
3. The article says that monocots differ from dicots in four main ways: their leaves, stems, roots, and flowers. Go back to the article and highlight the main sentence that explains the difference between monocot and dicot leaves. Then do the same for stems, roots, and flowers.
4. Write a single word that shows the main idea of each paragraph:

Paragraph 2	Paragraph 3	Paragraph 4	Paragraph 5	Paragraph 6

5. Ask a question that you could find the answer to in this article. Then draw a squiggly line under the sentence that answers your question.

My question:

6. On the line at the top of the article, write in a fitting title.

# Anatomy of a Seed

(Article adapted from an *The Parts of a Seed for Elementary Children* by Zee Kay from: [http://www.ehow.com/list\\_7334174\\_parts-seed-elementary-children.html](http://www.ehow.com/list_7334174_parts-seed-elementary-children.html))

Seeds are the beginnings of a new plant, with the sole purpose of reproducing. They lie dormant until they receive the things they need to grow, such as soil, water and sunlight. This process is called germination. All seeds are different and require different conditions to germinate and grow properly. Despite being different, most seeds have three main parts in common; the **seed coat**, **endosperm** and **embryo**.

## Seed Coat

Seeds have a thick or thin seed coat. Seed coats are used to protect the internal (inside) parts of the seed. This coat is what you see and feel when you hold a seed. The thicker seed coat keeps out water and sunlight. Seeds with thick coats are generally meant to be swallowed, digested and passed through the feces (poop) of animals. This process weakens the thick seed coat to allow for easy germination along with providing natural fertilizer for the seed. A thin seed coat is easily germinated because water and light can penetrate it easily. A hands-on project to learn about seed coats is to soak a lima bean in water overnight. The seed coat should now slip off the lima bean with a gentle pull. View the seed coat under a microscope.

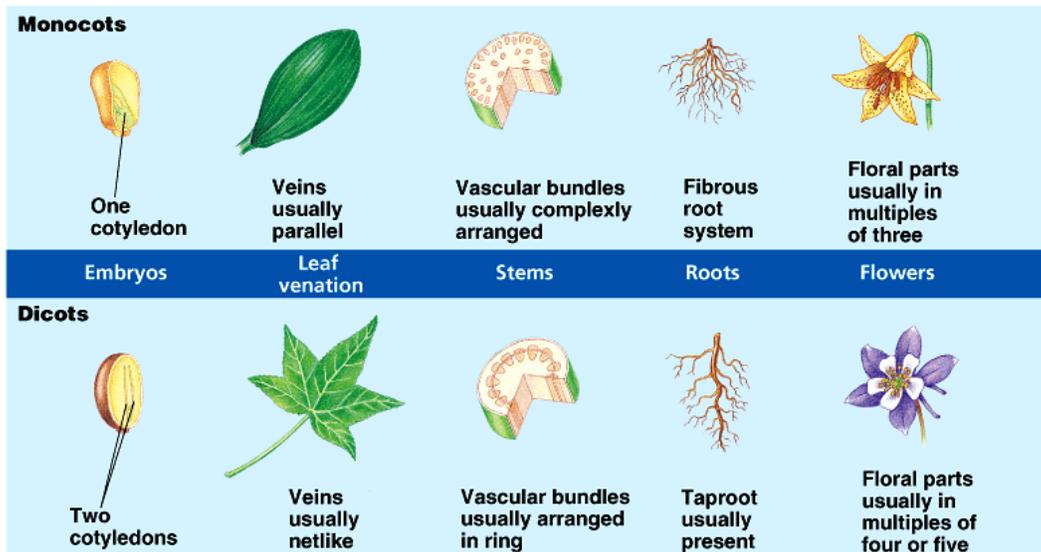
## Endosperm

The endosperm provides the embryo of the seed with nutrients, usually in the form of starch and proteins. These nutrients allow the seed to remain viable (able to germinate) while it waits to be germinated. The endosperm is located right underneath the seed coat and completely surrounds the embryo in most seeds. A great way for elementary kids to learn about the endosperm is to eat it. Foods like popcorn, shredded coconut and white rice are all endosperms. Two-thirds of all human calories come from endosperms.

## Embryo

The embryo is the central station and most important part of a seed. Within the embryo consist all the cells needed to develop into a mature plant. The embryo has three main parts; the **primary roots**, **cotyledons**, and **embryonic leaves**. The primary root is the first thing to emerge from the seed during germination. It creates a long anchor root deep in the soil to support the plant. The cotyledon provides nourishment to the various parts of the embryo during germination. It can resemble a tiny leaf in some plants or be fleshy in other plants like beans. It often emerges from the soil with the seedling as it grows. The embryonic leaves are the plant's first leaves to appear above the ground. A kid's science project to learn about the embryo is to split a seed in half to view how the embryo looks on the inside. Plant several of the same type of seed and dissect them during different parts of the growing phase.

(Article adapted from holganix.com. <http://www.holganix.com/blog/bid/59573/The-Science-Behind-Holganix-Monocots-vs-Dicots-What-You-Need-To-Know>)



Copyright © Pearson Education, Inc., publishing as Benjamin Cummings.

Plants can be separated into two distinct categories: monocots and dicots. What makes the two types different? The big difference that most people note about monocots and dicots is the formation of the plants' veins on leaves. However, there are many different things that separate monocots from dicots. In fact, monocots differ from dicots in four structural features: their leaves, stems, roots and flowers.

Within the seed lies the plant's **embryo** (baby plant); it is here that the first difference between the two types can be seen. Whereas monocots have one **cotyledon** (seed leaf), dicots have two. This small difference at the very start of the plant's life cycle leads each plant to develop vast differences.

Once the embryo begins to grow its roots, another structural difference occurs. Monocots tend to have "fibrous roots" that web off in many directions. These fibrous roots occupy the upper level of the soil in comparison to dicot root structures that dig deeper and create thicker systems. Dicot roots also contain one main root called the taproot, where the other, smaller roots branch off. The roots are essential to the plant's growth and survival, therefore encouraging a deeper and more extensive root system that can help increase the health of the plant.

As the monocots develop, their stems arrange the vascular tissue (veins of the plant) sporadically. This is extremely unique compared to dicots' organized fashion that arranges the tissue into a donut-looking structure (see figure). The way a stem develops is important to note. Stems are in charge of supporting the entire plant and help position

it to reach as much sunlight as possible. The vascular tissue within the stem can be thought of as a circulatory system for bringing nutrients to each part of the plant.

The differences don't end there. Both monocots and dicots form different leaves. Monocot leaves are characterized by their parallel (lines that all run the same direction) veins, while dicots form "branching veins." Leaves are another important structure of the plant because they are in charge of feeding the plant and carrying out the process of photosynthesis.

The last distinct difference between monocots and dicots are their flowers. Monocot flowers usually form in multiples of three whereas dicot flowers occur in groups of four or five.

\*\*\*\*\*

*Once you have read the article, respond to the following prompts:*

1. Circle at least 2 words that are new to you or that you don't totally understand.
2. Explain how the illustration helps the reader to understand the ideas in the text:
3. The article says that monocots differ from dicots in four main ways: their leaves, stems, roots, and flowers. Go back to the article and highlight the main sentence that explains the difference between monocot and dicot leaves. Then do the same for stems, roots, and flowers.

4. Write a single word that shows the main idea of each paragraph:

Paragraph 2	Paragraph 3	Paragraph 4	Paragraph 5	Paragraph 6

5. Ask a question that you could find the answer to in this article. Then draw a squiggly line under the sentence that answers your question.

My question:

6. On the line at the top of the article, write in a fitting title.

# Poster Title

*your name*

*Diagram of germinated seed goes here*

## Paragraph 1 Heading

*First paragraph goes in this space*

## Paragraph 2 Heading

*Second paragraph goes in this space*



## Presentation Rubric      Name: \_\_\_\_\_

Score	<b>1</b>	<b>2</b>	<b>3</b>
Did the speaker <b>stand up straight</b> ?	No—not at all	Some of the time	Almost the whole time
Did the speaker use the right <b>volume</b> ?	No. It was either far too quiet or far too loud.	It was a little too loud or a little too quiet.	The volume was just right.
Did the speaker speak at an understandable <b>speed</b> ?	No. It was far too slow or far too fast.	It was a little too fast or a little to slow.	The speed was just right.
Did the speaker <b>look</b> at all members of the audience?	No. The speaker looked only at the presentation, the teacher or his/her notes.	The speaker looked at some of the audience some of the time.	The speaker maintained eye contact with audience except to glance at the slides now and then.
Did the speaker speak <b>clearly</b> ?	No. I couldn't understand most of what the speaker said.	I had trouble understanding some parts.	Everything was clear and easy to understand.
Did the speaker stay on <b>topic</b> ?	The speaker got off topic a few times.	The speaker got off topic once.	The speaker stayed focused and on topic.

Life Cycle of Flowering Plants Lesson 10: Practicing and Presenting Oral Presentations

## Presentation Rubric      Name: \_\_\_\_\_

Score	<b>1</b>	<b>2</b>	<b>3</b>
Did the speaker <b>stand up straight</b> ?	No—not at all	Some of the time	Almost the whole time
Did the speaker use the right <b>volume</b> ?	No. It was either far too quiet or far too loud.	It was a little too loud or a little too quiet.	The volume was just right.
Did the speaker speak at an understandable <b>speed</b> ?	No. It was far too slow or far too fast.	It was a little too fast or a little to slow.	The speed was just right.
Did the speaker <b>look</b> at all members of the audience?	No. The speaker looked only at the presentation, the teacher or his/her notes.	The speaker looked at some of the audience some of the time.	The speaker maintained eye contact with audience except to glance at the slides now and then.
Did the speaker speak <b>clearly</b> ?	No. I couldn't understand most of what the speaker said.	I had trouble understanding some parts.	Everything was clear and easy to understand.
Did the speaker stay on <b>topic</b> ?	The speaker got off topic a few times.	The speaker got off topic once.	The speaker stayed focused and on topic.

Life Cycle of Flowering Plants Lesson 10: Practicing and Presenting Oral Presentations