

Organisms, their Characteristics, and Life Cycles

Science Grade 3

This unit is designed to introduce students to the characteristics and life cycles of different types of organisms. Students will create graphic representations, provide evidence from data analysis of inherited traits of plants and animals. Students will distinguish those traits that are inherited from those traits that are affected by the environment. At the end of the unit the students will complete a curriculum embedded performance assessment (CEPA) to demonstrate an understanding and application of these NGSS 3-LS1-1, 3-LS3-1, 3-LS3-2

A collaboration with Cape Cod Regional STEM Network, Susane Dunne, and Chaitra McCarty. © 2016

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Background information on the unit development. *In order to help others who are interested in this topic understand a bit more about what you created, we will write a short introduction to each unit and provide some images, in addition to posting the completed units on the Cape Cod Regional STEM Network website (www.capecodstemnetwork.org). Please help us by answering the questions below after you have completed your unit.*

1. Please provide us some background information on the unit development

Who helped to create this unit?

Names	School (Grade/course taught)
Susane Dunne	West Villages Elementary Grade 3
Chaitra McCarty	Hyannis West Elementary Grade 3

What were some sources of inspiration for this unit?

The NSTA website was essential in creating this unit.

What's the most important lesson you learned as you created this?

To be able to understand the life cycles as a whole and how organisms are influenced as they grow.

2. Please also provide information about this unit that will help us write a brief introduction to your unit.

- In your own words, what are you hoping students learn - big picture - through this unit?

The hope is that students develop a comprehensive approach and understanding to the life cycle of living organisms. It is also important for them to understand that parent characteristics can be inherited by offspring. It is also essential to understanding the traits of an organism can be acquired or adapted by the existing environment.

- What real world experiences did you incorporate? What science standards or requirements were you trying to emphasize?

Life Science Standards are important to be emphasized in this unit. Students can observe real life organisms which are native to the area as well as well known living organisms as a way to apply real life knowledge to understanding.

-What will students be most excited about at the end? (Will they have completed something, created something, etc.?)

Students will be most excited about growing and observing living organisms.

3. Anything else you would like fellow teachers or others to know about this unit?

This unit was developed as a tool to begin to gather resources needed to address and teach new Massachusetts Science Standards. While there is an abundance of resources for your classroom needs, it is essential that you as an educator understand that the layout of each lesson is designed in a flexible manner for you to meet the diverse needs of the students in your class. Please feel free to adjust, modify or extend the lessons to meet the needs of your learners.

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Stage 1 Desired Results

MA STE Standards

3-LS1-1 Use simple graphical representation to show that different types of organisms have unique and diverse life cycles. Describe that all have birth, growth, reproduction and death in common but there are a variety of ways in which these happen.

3-LS3-1 Provide evidence, including through the analysis of data, that plants and animals have traits inherited from parents and that variation of these traits exist in a group of similar organisms.

3-LS3-2 Distinguishing between inherited characteristics and those characteristics that result from a direct interaction with the environment. Give examples of characteristics of living organisms that are influenced by both inheritance and the environment.

ESSENTIAL QUESTIONS

Why is it important to understand the components of a life cycle?

How do plants and animals vary in their inherited traits?

How does the environment affect the traits of plants and animals?

UNDERSTANDINGS

Students will understand that...

- *The phases of a life cycle include: birth, growth, reproduction and death*
- *Plants and animals have a variety of traits that are inherited from their parents*
- *The environment can have direct effect on the characteristics of a plant or animal*

Students will be skilled at....

- *Being able to understand and explain, via a visual representation of the life cycle of a plant or animal*
- *Being able to provide that plants and animals inherit traits of their parents*
- *Explaining how the environment affects the traits of a plant or animal*

TRANSFER

Students will be able to independently use their learning to...

Cross-Curricular Connections

Stage 2 Evidence

Formative Assessment Ideas:

Students will demonstrate mastery through discussions, observations and exits tickets.

Summative Assessment Ideas:

Students will develop visual representations of the life cycle of plants and animals. The CEPA will also determine student mastery of understanding of life cycles, inherited and environmental traits.

Stage 3 Learning Plan

Summary of Key Learning Events and Instruction

- Through the use of experiments, graphic representations, and observations students will gain an in depth comprehension of life cycles of plants and animals.
- Through the use of experiments, graphic representations, and observations students will gain an in depth comprehension of inherited and environmental characteristics.

Introductory Lesson	Constructing Lesson	Practice Lesson	Assessment Lesson
Lesson that introduces the content. More teacher directed	Lessons that engage students in building and linking together understanding. Guided/collaborative. Student/teacher or partners/small group	Lessons or activities that students can complete relatively independently	Formative: Check-ins along the way to see if students “get it” Summative: Students showing what they know, when you feel they are ready

Stage 3 Learning Plan

Summary of Key Learning Events and Instruction

Lesson Name	Type (Introductory, Constructing, Practice, and Assessment)	Content Addressed	Standards Included (by number)
1. Plant Life Cycle - Introduction	Introduction	An introduction to the life cycle of plants	3-LS1-1
2. Plant Life Cycle - How does pollination work?	Constructing	Addresses how plants grow through pollination	3-LS1-1
3. Environmental Impact on Plant Adaptations	Constructing	The impact of environmental characteristics	3-LS3-2
4. Environmental Impact - What would happen if...?	Practicing	The effect of plants in extreme conditions	3-LS3-2
5. Animal Life Cycle - Introduction	Introductory	An introduction to the animal life cycle	3-LS1-1
6. Animal Life Cycle - Ladybugs and Butterflies	Constructing	Overview of the life cycle of ladybugs and butterflies	3-LS1-1
7. Inherited Traits	Introductory	Inherited traits of plants and animals	3-LS3-1
8. Animal Traits Affected by the Environment	Constructing	Environmental characteristics	3-LS3-2

Lesson 1: Plant Cycle Introduction

Overview of the Lesson:

Students and teacher will be discussing plants and animals and how they exist.

Time (minutes):

Standard(s):

- **3-LS1-1** Use simple graphical representation to show that different types of organisms have unique and diverse life cycles. Describe that all birth, growth, reproduction and death are in common but there are a variety of ways in which these happen.

Essential Question(s):

- Why is it important to understand the components of a life cycle?

Science Objectives

- Using a visual representation explain the life cycle of a plant.

Language Objectives and/or Targeted Academic Language

- Using Tier III vocabulary (birth, growth, reproduction and death) to explain the life cycle of a plant or animal
- Using Tier III vocabulary (seed, seedling, plant, blossom)

Anticipated Student Preconceptions/Misconceptions

- Life Cycle versus Cycle of Life

Instructional Materials/Resources/Tools

- *Backyard Book Series* by Judy Allen
- *Are You a Butterfly? Are You a Ladybug?* by Tudor Humphries
- <http://ngss.nsta.org/DisplayStandard.aspx?view=pe&id=53>

- Life Cycle of a Plant Book (How a Seed Grows)
<https://www.storyjumper.com/book/index/20903278/The-Life-Cycle-of-a-Bean-Plant#>
- KWL Chart

Assessment:

- Identify the stages of the life cycle of a plant

Science and Engineering Practices included (put the included ones in bold):

1. **Asking questions (for science) and defining problems (for engineering)**
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. **Obtaining, evaluating, and communicating information**

Lesson Opening/Engagement Strategy/Pre - Assessment:

- Have students write a paragraph about what they think a life cycle of a plant is. If students do not know what a life cycle is, they write what they think the plant life cycle is.
- Read: Introductory book about the life cycle of a plant.

During the Lesson:

- Students identify the stages of a plant and its growth seed (birth), seedling (growth), plant (adult), blossom (reproduction), and death.

Lesson Closing

- Class creates a chart that labels the phases of a plant life cycle.

Instructional Tips/Strategies/Suggestions for Teacher:

- 7 Step vocabulary should be used to introduce vocabulary for English Language Learners.
- Pictures can also be used to provide a visual representation of the stages.

Lesson 2: Plant Life Cycle - How does pollination work?

Overview of the Lesson:

Time (5 minutes): Watch a video on plant pollination

Standard(s):

- **3-LS1-1** Use simple graphical representation to show that different types of organisms have unique and diverse life cycles. Describe that all have birth, growth, reproduction and death in common but there are a variety of ways in which these can happen.

Essential Question(s):

- Why is it important to understand the components of a life cycle?
- What organisms help in plant pollination?

Science Objectives

- Students will be able to identify the stages of the growth of a plant.

Language Objectives and/or Targeted Academic Language

- Using Tier III Vocabulary (pollinate)
- Using varied vocabulary pertaining to the structure of a plant or flower that helps students understand that the structure of a plant serves different purposes.

Anticipated Student Preconceptions/Misconceptions

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Instructional Materials/Resources/Tools *SOME PRE-PLANNING NEEDED*****

- <https://www.opened.com/video/plant-life-cycle-how-does-pollination-work/114152>
- *The Reason for a Flower* by Ruth Heller
- *Planting a Rainbow* by Lois Ehlert
- Materials for growing plants:
 - 3 pots
 - Bulbs/seeds
 - Soil
 - Labels
 - Rulers for measuring

Prepare 2 pots in advance to have plant samples for study - 1 pot about one month ahead (plant sample) and the 2nd pot about 2 weeks ahead (seedling sample)

Assessment:

- Students plant seeds and observe their growth over a period of time.
- Students create illustrations and sketches of plants and/or flowers through their growth process.

Science and Engineering Practices included (put the included ones in bold):

1. Asking questions (for science) and defining problems (for engineering)
- 2. Developing and using models**
- 3. Planning and carrying out investigations**
4. Analyzing and interpreting data
- 5. Using mathematics and computational thinking**
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

Lesson Opening/Engagement Strategy/Pre - Assessment:

- Students watch the video “How does pollination work?”
- Read: *Planting a Rainbow* and *The Reason for a Flower*

During the Lesson:

- While reading the book *Planting a Rainbow*, teacher asks questions
 - “What do you notice when...?”
 - “What comparisons can you make between seeds, seedlings and bulbs?”

Lesson Closing

- Label the parts of a plant.
- Using pictures of a plant and seed catalogs, have students create a strategy based collage on the parts of a plant.

Instructional Tips/Strategies/Suggestions for Teacher:

Lesson 3: Environmental Impact on Plant Adaptations

Overview of the Lesson:

Students will be investigating the impact that the environment has on the adaptations of a plant.

Time: 5 minutes

Standard(s):

- **3-LS3-2** Distinguish between inherited characteristics and those characteristics that result from a direct interaction with the environment.
Give examples of characteristics of living organisms that are influenced by both inheritance and the environment.

Essential Question(s):

- How does the environment affect the traits of plants and animals?

Science Objectives

- Explain how the environment and inherited traits affect a plant or animal.

Language Objectives and/or Targeted Academic Language

- Using Tier III Vocabulary students will be able to understand how the environment affects the growth of a plant (inherited, environment, trait, change).

Anticipated Student Preconceptions/Misconceptions

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Instructional Materials/Resources/Tools

- Egg cartons, cotton balls, seeds (grass, radish or alfalfa), soil, plastic spoons
- Science journals

Assessment:

Science and Engineering Practices included (put the included ones in bold):

- 1. Asking questions (for science) and defining problems (for engineering)**
- 2. Developing and using models**
- 3. Planning and carrying out investigations**
- 4. Analyzing and interpreting data**
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
- 7. Engaging in argument from evidence**
- 8. Obtaining, evaluating, and communicating information**

Lesson Opening/Engagement Strategy/Pre - Assessment:

- Let students examine some seeds and draw pictures of them in their science journals. Guide students in the planting process.
- Ask students “*What does a plant need*” “*What happens if they don’t get...?*”
- Place a few cotton balls in egg carton, sprinkle about $\frac{1}{8}$ tsp of seeds into each section. Cover with a bit of cotton.
- Write names on the outer edge of the carton to identify their cup.
- Plant additional seeds for scientific comparison.
- Place cotton balls in 3 extra cups, add seeds and cover with cotton. Label one “No Water”, the other “Too Much Water” and the last cup “No Light”
- Fill a fourth section halfway with soil, sprinkle seeds and cover with a bit of soil. (This is a *control* or basis of comparison).
- Saturate the cotton in the “Too Much Water” shell with water. Add a teaspoon of water to the section labeled “No Light” and cover it with a piece of cardboard. Add a teaspoon of water to the section filed with soil.
- Ask students to predict and record which seeds they think will sprout. - *Will these seeds sprout? Those with no water or too much water? How about those with no light?*

- Have students make daily observations of the seeds in their science journals. Ask - *How have the seeds changed from yesterday? What part of the plants can you see?*
- When the cotton or soil feels too dry, add water to all but the “No Water” cup. Make sure the “Too Much Water” cup stays soaked.
- In a few days, the seeds in all sections, except for the “No Water” or “Too Much Water” should grow hairlike sprouts. When this happens, ask - *What do you think seeds need to germinate?*

During the Lesson:

- Students make guesses about various growing conditions of plants - too hot, too cold, not enough sunlight, not enough water, too much water.
- Students plant seeds in varying growing conditions, observe them over the next few days.

Lesson Closing

- Students make predictions about the production of seeds.

Instructional Tips/Strategies/Suggestions for Teacher:

Lesson 4: Environmental Impact - What would happen if...?

Overview of the Lesson: Students listen to the story *June 29, 1999* by David Wiesner and share environmental outcomes on plants.

Time (minutes):

Standard(s):

- **3-LS3-2** Distinguish between inherited characteristics and those characteristics that result from a direct interaction with the environment.
Give examples of characteristics of living organisms that are influenced by both inheritance and the environment.

Essential Question(s):

<ul style="list-style-type: none"> • How does the environment affect the traits of plants and animals?
<p>Science Objectives</p> <ul style="list-style-type: none"> • Students will make scientific predictions based on their knowledge of plant growth and what plants need to be able to thrive.
<p>Language Objectives and/or Targeted Academic Language</p> <ul style="list-style-type: none"> • Students will be able to make predictions by analytically listening to the reading of the book.
<p>Anticipated Student Preconceptions/Misconceptions</p> <ul style="list-style-type: none"> •
<p>Instructional Materials/Resources/Tools</p> <ul style="list-style-type: none"> • Reading Rainbow Link: http://app.discoveryeducation.com/learn/videos/24750d38-c5fc-442a-98ae-e51cfec33a51?hasLocalHost=false <ul style="list-style-type: none"> ○ Need login • <i>June 29, 1999</i> by David Wiesner
<p>Assessment:</p> <ul style="list-style-type: none"> • Students have created a narrative with a beginning, middle and end describing the changes a seed undergoes.
<p>Science and Engineering Practices included (put the included ones in bold):</p> <ol style="list-style-type: none"> 1. Asking questions (for science) and defining problems (for engineering) 2. Developing and using models 3. Planning and carrying out investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations (for science) and designing solutions (for engineering) 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information
<p>Lesson Overview:</p>
<p>Opening/Engagement Strategy/ Pre - Assessment:</p> <ul style="list-style-type: none"> • Explain that you will be reading <i>June 29, 1999</i> by David Wiesner <ul style="list-style-type: none"> ○ Have children predict what the story will be about after looking at the cover
<p>During the Lesson:</p> <ul style="list-style-type: none"> • Stop on the very first printed page in the book and ask the students <i>what they notice about the picture</i>. Try to trigger the response of the little girl waving goodbye, and then have them include this information in their predictions.

- Stop on the first page of the actual story after reading it, and ask the students *why they think that Holly is launching vegetable seedlings into the air*.
- After finding out why on the second page, ask the students *what they think would happen, and why*.
- Stop on the page with the broccoli, and ask the class *what Holly might be thinking. Is she happy with the results?*
- On the page where it first mentions arugula, ask the students *how they think the arugula got there* since Holly never sent any off.
- After Holly asks herself what happened to her vegetables, and wonders whose big vegetables these are, ask the students *what they think the answer to these questions are*.
- When the aliens ask themselves where their food is going to come from, ask the students *what do they think*.

Lesson Closing:

- After finishing the story, ask the students *what they think about this happening*. Also ask them *what they think the aliens are thinking*, and ask about *what Holly is thinking*. Ask them *what they would think if this actually happened*.
- Evaluation: By listening to the students' responses, notice how well they are using their analytical skills, and also note if they are making reasonable predictions.
- Have students design their own seed experiments in a creative writing piece and write a picture book about their results.

Instructional Tips/Strategies/Suggestions for Teacher:

- <http://www.hmhbooks.com/wiesner/>

Lesson 5: Animal Life Cycle - Introduction

Overview of the Lesson:

This lesson will serve as an introductory lesson for the life cycle of an animal, or animals.

Time: 15 minutes
Standard(s): <ul style="list-style-type: none"> • 3-LS1-1 Use simple graphical representation to show that different types of organisms have unique and diverse life cycles. Describe that all have birth, growth, reproduction and death in common but there are a variety of ways in which these happen.
Essential Question(s): <ul style="list-style-type: none"> • Why is it important to understand the components of a life cycle?
Science Objectives <ul style="list-style-type: none"> • Students will understand that animals are born, grow, reproduce and die in a specific order.
Language Objectives and/or Targeted Academic Language <ul style="list-style-type: none"> • Using words birth, growth, life cycle, reproduction and death, students will be able to understand and explain the life cycle of an animal.
Anticipated Student Preconceptions/Misconceptions <ul style="list-style-type: none"> • Teaching the stages of the life cycle, as opposed to focusing on each stage of the life cycle.
Instructional Materials/Resources/Tools <ul style="list-style-type: none"> • Life Cycle of a Mealworm - http://www.softschools.com/science/beetles/mealworm_life_cycle/ • Life Cycle of a Butterfly - http://www.softschools.com/science/butterfly/life_cycle.jsp • Life Cycle of a Frog - http://www.softschools.com/science/frog/life_cycle.jsp • <i>Are You a Butterfly? Are You a Ladybug? Are You a Spider? Are You a Snail?</i> - Backyard Book Series • Baby animal books <ul style="list-style-type: none"> ○ <i>A Tiger Cub Grows Up</i> ○ <i>A Flamingo Chick Grows Up</i> ○ <i>A Harbor Seal Pup Grows Up</i> ○ <i>A Kangaroo Joey Grows Up</i>
Assessment: <ul style="list-style-type: none"> • Students will take the test on the provided website.
Science and Engineering Practices included (put the included ones in bold): <ol style="list-style-type: none"> 1. Asking questions (for science) and defining problems (for engineering) 2. Developing and using models 3. Planning and carrying out investigations 4. Analyzing and interpreting data

5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

Lesson Opening/Engagement Strategy/Pre - Assessment:

- Students complete a John Collins type on writing prompt
(Students are given 3 minutes to think about a specific topic and then given another 3 minutes to write about a designated topic “*What is an animal life cycle?*”.)

During the Lesson:

- Students will observe life cycles of a variety of organisms such as a frog and a meal worm.
 - Links are provided in **Instructional Materials**

Lesson Closing

- Students then are administered a Type 2 writing an asked “*What is a life cycle?*”. Students then provide a drawing or written explanation of a life cycle.

Instructional Tips/Strategies/Suggestions for Teacher:

- Visual representations would be helpful for struggling learners. Also providing visual representation of the pictures will be helpful to students.

Lesson 6: Life Cycles of Animals- Ladybugs and Butterflies

Overview of the Lesson:

Students will be analyzing the life cycle of a ladybug and a butterfly using the provided PDF Links

Time (minutes):

Standard(s):

- **3-LS1-1** Use simple graphical representation to show that different types of organisms have unique and diverse life cycles. Describe that all birth, growth, reproduction and death are in common but there are a variety of ways in which these happen.

Essential Question(s):

- Why is it important to understand animal life cycles?
- How can observing life cycles help you to make generalizations about living things?

Science Objectives

- Conduct, observe and record findings of classroom experiment in a science journal

Language Objectives and/or Targeted Academic Language

- Engage with nonfiction texts for a genuine purpose and to answer their own questions using print resources.

Anticipated Student Preconceptions/Misconceptions

-

Instructional Materials/Resources/Tools

- Ladybugs - http://static.nsta.org/files/sc1509_59.pdf
- Butterflies - http://static.nsta.org/files/sc0211_16.pdf
- Animal Detectives - http://static.nsta.org/files/sc1502_55.pdf
- *Ladybugs* by Gail Gibbons - student copies - <http://www.gailgibbons.com/Ladybugs.html>

Assessment:

- Observation of science journals and clay models that show accurate representation of the ladybug life cycle.

Science and Engineering Practices included (put the included ones in bold):

1. Asking questions (for science) and defining problems (for engineering)
- 2. Developing and using models**
- 3. Planning and carrying out investigations**
4. Analyzing and interpreting data

5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence

8. Obtaining, evaluating, and communicating information

Lesson Opening/Engagement Strategy/ Pre - Assessment:

- Ask students to arrange a set of photos of a butterfly life cycle in sequential order.
(See internet resources in ladybug PDF for downloading photos)

During the Lesson:

- Using a photo of ladybug eggs, have students describe and record in their science journals illustrations and descriptive words about the photo.
- Using a photo of ladybug larvae, have students examine and predict what will happen to the larvae in 1 week. Record in their journals.

Lesson Closing

- Discuss with students the classroom procedures for observing and recording the phases of the ladybug life cycle.

Instructional Tips/Strategies/Suggestions for Teacher:

Lesson 7: Inherited Traits

Overview of the Lesson:

Students will be analyzing inherited traits of various organisms.

Time (minutes):

Standard(s):

- 3-LS3-1 Provide evidence, including through the analysis of data, that plants and animals have traits inherited from parents and that variation of these traits exist in a group of similar organisms.

Essential Question(s):

- How do plants and animals vary in their inherited traits?

Science Objectives

- Students will be able to understand that organisms inherit traits of their parents.

Language Objectives and/or Targeted Academic Language

- Using the Tier III vocabulary words inherit, traits, features, characteristics, and behaviors, students will be able to identify inherited traits of various organisms.

Anticipated Student Preconceptions/Misconceptions

- It is important for students to understand that animals vary, and that species of the same kind can inherit traits.

Instructional Materials/Resources/Tools

- <http://earthsbirthday.org/bugs>
- List of Ladybug Species - <http://www.lostladybug.org/summary-page-555.php>
- Animal Detectives - http://static.nsta.org/files/sc1502_55.pdf
- Inherited Traits of Dogs - <http://pets.thenest.com/inherited-traits-dogs-6027.html>
- <http://siemensscienceday.com/pdf/ChipOfftheOldBlock.pdf>

Assessment:

- Students will be given 2 organisms and they will need to create a picture of 2 types of offspring that may be produced from the parents.
- Students will need to provide explanation as to why they chose the specific features of the offspring.

Science and Engineering Practices included (put the included ones in bold):

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
- 6. Constructing explanations (for science) and designing solutions (for engineering)**
- 7. Engaging in argument from evidence**
- 8. Obtaining, evaluating, and communicating information**

Lesson Opening/Engagement Strategy/ Pre - Assessment:

During the Lesson:

- Students will look at Snapdragons and answer the following questions: (Taken from the National Geographic Exploring Science)
 - *What evidence can you provide to show that the offspring have inherited traits from their parents?*
 - *What evidence can you provide to show that the offspring have traits that vary from each other?*
- Students will look at parakeets and answer the following questions: (Taken from the National Geographic Exploring Science)
 - *What evidence can you provide to show that the offspring have inherited traits from their parents?*
 - *What evidence can you provide to show that the offspring have traits that vary from each other?*
- Students will also look at inherited traits of dogs - Link in **Materials**.
- Use Animal Detectives to also extend understanding of inherited traits of organisms. - Link in **Materials**.

Lesson Closing

- Students complete activity looking at 2 organisms of the same type and creating 2 offspring. The offspring must vary in features, as many offspring look differently.

Instructional Tips/Strategies/Suggestions for Teacher:

Lesson 8: Animal Traits Affected by the Environment

Overview of the Lesson:

Students will be studying plants and animals that have traits which are inherited by the environment.

Time (minutes):

Standard(s):

- **3-LS3-2** Distinguish between inherited characteristics and those characteristics that result from a direct interaction with the environment.
Give example of characteristics of living organisms that are influenced by both inheritance and the environment.

Essential Question(s):

- How does the environment affect the traits of plants and animals?

Science Objectives

- After completing this activity, students should be able to distinguish between characteristics that are inherited and those that are a result from an individual's interaction with the environment.

Language Objectives and/or Targeted Academic Language

- Students will be able to compare and contrast inherited traits with those characteristics affected by the environment.

Anticipated Student Preconceptions/Misconceptions

Instructional Materials/Resources/Tools

- Compare and contrast inherited traits versus traits affected by the environment - http://siemensscienceday.com/pdf/MixNMatchTraits_FINAL.pdf
- Environmental Effects of Butterflies in Space - <http://www.bioedonline.org/lessons-and-more/resource-collections/experiments-in-space/butterflies-in-space/>

Assessment:

- Students will be given 2 organisms and they will need to create a picture of 2 types of offspring that may be produced from the parents.

- Students will need to provide explanation as to why they chose the specific features of the offspring.

Science and Engineering Practices included (put the included ones in bold):

- 1. Asking questions (for science) and defining problems (for engineering)**
2. Developing and using models
3. Planning and carrying out investigations
- 4. Analyzing and interpreting data**
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
- 7. Engaging in argument from evidence**
- 8. Obtaining, evaluating, and communicating information**

Lesson Overview:

- An exploration to distinguish between inherited and learned traits. An exploration of to explain a person's own characteristics.

Lesson Opening/Engagement Strategy/ Pre - Assessment:

- Students engage in a Type One about "Why are Flamingos Pink? "

During the Lesson:

- Visit:
 - Animal Adaptations - <http://www.animalplanet.com/wild-animals/migration>
- Teacher discusses characteristics of animals and how they are affected by their environment
- Discuss what makes a flamingo pink. Include ways trees grow due to wind speeds and sunlight location. - <http://www.livescience.com/17263-yellowstone-wolf-environment-change.html> (*Wolves of Yellowstone* - Nature's Balance Reach for Reading)
- Students will participate in a scavenger hunt with their peers to classify inherited and learned traits. The scavenger hunt will include characteristics like:
 - Rolling your tongue
 - Speaking another language
 - Hair color
- Butterflies in Space
 - November 16, 2009 painted butterfly (*Vanessa cardui*) larvae (that hatched 6 days earlier) flew aboard Space Shuttle Atlantis to the International Space Station. While in space, they were monitored continually, with photos and video transmitted hourly to BCM and BioServe teams on Earth.
 - Students can use original photos from the mission to conduct an open-ended scientific investigation to learn how gravity and microgravity affect the life cycle of painted lady butterflies.

Lesson Closing

- Engage students in a discussion about how scientists conduct experiments about plant and animal adaptations.
- Introduce the CEPA Observe Growing Plants

Instructional Tips/Strategies/Suggestions for Teacher:

Information to Support Teaching Learning

What additional resources can support teachers in developing background understanding of content or ideas in this unit?

- NSTA.org - <http://www.symbaloo.com/mix/ngsscriculumresources>

List of Unit Resources (in lesson sequence)

What additional resources can support the teaching and learning of this unit? What resources can support the teacher in implementing the unit?

Curriculum Embedded Performance Assessment (CEPA; if applicable)

Detail the performance assessment and include any rubrics or resources

Teacher will provide a list of plants and animals (Sample below included but not limited to)

- Frog
- Horseshoe Crab
- Parakeet
- Jalapeno
- Ladybug
- Bee
- Butterfly
- Snap Dragons
- Carnations

- Roses

Students will work in partners to choose an organism. In small groups, they will research this organism. They will research the life cycle of this organism, including a visual representation of its life cycle. Students also will analyze the traits that can be inherited by this organism and traits that the organism can inherit to their offspring. Students will then determine how this organism can be affected by acquired traits such as the environment or specific adaptations. Students can demonstrate this project in many ways - students can create a poster, ibook or powerpoint.

Student Name: _____

Date: _____

4 Application and demonstration of standards at a complex level	3 Proficient demonstration of standards	2 Making progress towards standards	1 Minimal progress towards standards
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Teacher Notes:

Students Notes:

Unit Resources

Unit 1: Plant Life Cycle - Introduction

- Curriculum Guide by NSTA: <http://ngss.nsta.org/DisplayStandard.aspx?view=pe&id=53>
- Book: *Backyard Book Series* by Judy Allen
- Book: *Are You a Butterfly? Are You a Ladybug?* by Tudor Humphries
- Book: *The Life Cycle of a Bean Plant* by Andrea Chavez
<https://www.storyjumper.com/book/index/20903278/The-Life-Cycle-of-a-Bean-Plant#>

Unit 2: Plant Life Cycle - How does pollination work?

- Video: <https://www.opened.com/video/plant-life-cycle-how-does-pollination-work/114152>
- Book: *The Reason for a Flower* by Ruth Heller
- Book: *Planting a Rainbow* by Lois Ehlert

Unit 3: Environmental Impact on Plant Adaptations

Unit 4: Environmental Impact - What would happen if..?

- Reading Rainbow Link: <http://app.discoveryeducation.com/learn/videos/24750d38-c5fc-442a-98ae-e51cfec33a51?hasLocalHost=false>
- Book: *June 29, 1999* by David Wiesner

Unit 5: Animal Life Cycle - Introduction

- Website with helpful links to ideas: <http://thirdgradetotheedge.blogspot.com/2014/12/organisms-are-unique-life-cycles-3-ls1-1.html>
- Website Activity: Life Cycle of a Mealworm - http://www.softschools.com/science/beetles/mealworm_life_cycle/
- Website Activity: Life Cycle of a Butterfly - http://www.softschools.com/science/butterfly/life_cycle.jsp
- Website Activity: Life Cycle of a Frog - http://www.softschools.com/science/frog/life_cycle.jsp
- Books: *Are You a Butterfly? Are You a Ladybug? Are You a Spider? Are You a Snail?* - Backyard Book Series
- Baby animal books
 - *A Tiger Cub Grows Up*
 - *A Flamingo Chick Grows Up*
 - *A Harbor Seal Pup Grows Up*
 - *A Kangaroo Joey Grows Up*

Unit 6: Animal Life Cycle - Ladybugs and Butterflies

- Website Reading: Ladybugs - http://static.nsta.org/files/sc1509_59.pdf
- Website Reading: Butterflies - http://static.nsta.org/files/sc0211_16.pdf
- Website Reading and Activity: Animal Detectives - http://static.nsta.org/files/sc1502_55.pdf
- *Ladybugs* by Gail Gibbons - student copies - <http://www.gailgibbons.com/Ladybugs.html>

Unit 7: Inherited Traits

- Resources for Learning About Bugs: <http://earthsbirthday.org/bugs>
- Website: List of Ladybug Species - <http://www.lostladybug.org/summary-page-555.php>
- Website Reading and Activity: Animal Detectives - http://static.nsta.org/files/sc1502_55.pdf
- Website: Inherited Traits of Dogs - <http://pets.thenest.com/inherited-traits-dogs-6027.html>
- Activity with Curriculum and Outline: <http://siemsscience.com/pdf/ChipOfftheOldBlock.pdf>

Unit 8: Animal Traits Affected by the Environment

- Activity: Compare and contrast inherited traits versus traits affected by the environment - http://siemsscience.com/pdf/MixNMatchTraits_FINAL.pdf
- Activity: Environmental Effects of Butterflies in Space - <http://www.bioedonline.org/lessons-and-more/resource-collections/experiments-in-space/butterflies-in-space/>

