Grade 3 Science
Unit 5: From Molecules to Organisms: Structures and Processes

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(All worksheets are in Unit 5 Resource folder labeled Unit 5 Worksheets PDF)

Unit Question

Do all living things have the same life cycle?
Are there advantages to being different?

In this unit of study, students develop an understanding of the similarities and differences in organisms' life cycles. In addition, students use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. The crosscutting concepts of patterns and cause and effect are called out as organizing concepts for these disciplinary core ideas. Students demonstrate grade-appropriate proficiency in developing and using models and constructing explanations and designing solutions. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Student Learning Objectives:

- Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. [Clarification Statement: Changes organisms go through during their life form a pattern.] [Assessment Boundary: Assessment of plant life cycles is limited to those of flowering plants. Assessment does not include details of human reproduction.] (3-LS1-1)

- Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. [Clarification Statement: Examples of cause and effect relationships could be plants that have larger thorns than other plants may be less likely to be eaten by predators; and, animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring.] (3-LS4-2)

Science and Engineering Practices

- Develop models to describe phenomena. (3-LS1-1)
- Use evidence (e.g., observations, patterns) to construct an explanation. (3-LS4-2)

Disciplinary Core Ideas

LS1.B: Growth and Development of Organisms

- Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. (3-LS1-1)

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LS4.B: Natural Selection

- Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. (3-LS4-2)

Cross Cutting Concepts

Patterns

- Patterns of change can be used to make predictions. (3-LS1-1)

Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change. (3-LS4-2),(3-LS4-3)

Connections to Nature of Science Scientific Knowledge is Based on Empirical Evidence

- Science findings are based on recognizing patterns. (3-LS1-1)

LESSONS
Recommended Instructional Days: --

Part A (# of days?)
Part A Question:
Do all living things have the same life cycle?
Part A Concepts:

- Science findings are based on recognizing patterns.
- Similarities and differences in patterns can be used to sort and classify natural phenomena.
- Patterns of change can be used to make predictions.
- Reproduction is essential to the continued existence of every kind of organism.
- Plants and animals have unique and diverse life cycles.

Lesson 1
Days Needed: 7

Objective:

- Students will sort and classify living organisms according to their life cycles.
- Students will explain how organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.
- Students will create models of living things' life cycle stages.
- Students will be able to name and describe the four different life stages of a butterfly.
- Students will be able to describe what metamorphosis is.

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Standard(s):

- 3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

Activities:

*****Order your caterpillars ahead of time!*****

- Day 1 - Introduction/Vocabulary
  - MATERIALS NEEDED -- Bill Nye Video, Unit 5 Vocabulary Sheet (found in Unit 5 Resources folder) Insect Lore Original Butterfly Garden with Voucher, Butterfly Life Cycle Journal
  - Guiding Questions: What is special about life cycles?
    - Initially accept all answers, but guide the students towards the understanding that a cycle never ends, much like a circle (maybe mention The Circle of Life from The Lion King for students who have seen it). The teacher should explain that even though an individual member of a species might die, they can live on through their offspring that inherited their traits.
  - Watch Bill Nye the Science Guy Life Cycles.
  - Define the vocabulary terms on Unit 5 Vocabulary Sheet: life cycle, organism, predators, reproduction, generation, pollination, metamorphosis, adaptation, and camouflage.
  - **Check for Understanding:** Students will record 2 things they learned from the video on the Exit Ticket (Resource Folder and/or Canvas unit 5 quiz)

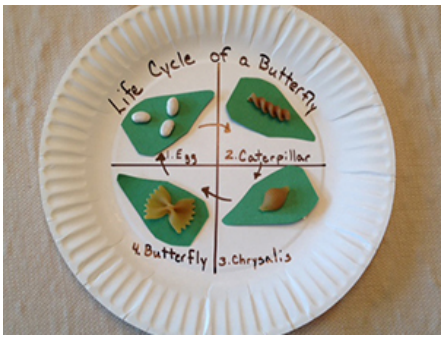
- **Ongoing: Butterflies**: My Butterfly Life Cycle Observation Journal (Resource Folder)
  - Students will witness metamorphosis happen right in the classroom!
  - **Check for Understanding:** Students will complete their Butterfly Life Cycle Journal whenever a stage changes (caterpillar → chrysalis → butterfly)

- Days 2 - 5 - Life Cycles Research
  - MATERIALS NEEDED : Animal Life Cycle Day 2-5 packet (Resource Folder and/or Canvas unit 5….in Canvas, each life cycle is separated)
  - Watch Animal Life Cycles 4 Slide PowerPoint
  - Students will work to research the life cycle of a living thing for each life cycle. There is a worksheet provided in the resource folder for the students to use. They can find all the information they need by using National Geographic Kids and Brain Pop Jr. (see some examples below)
    - Sea Turtle Info from National Geo Kids
    - Loggerhead Sea Turtle Nat Geo Kids
    - Plant Cycle Brain Pop Jr.
    - Each student will be given an organism for each life cycle each day.
      - Day 1 - Metamorphosis → most amphibians, insects, fish
      - Day 2 - Live birth → mammals other than humans
      - Day 3 - Hatching → birds, reptiles
      - Day 4 - Plants →mosses, fern trees, algae

- **Check for Understanding:** Research Activity and students will make a predictions: What is the life cycle of a _____? (Choose a living thing that was not researched)

- Days 6 - Life Cycle of a Butterfly
  Materials: pasta, paper plate, glue.
  Activity: Students will create a model of the butterfly life cycle using pasta.
  - **Check for Understanding:** They will then create a model of the organism's life cycle they researched using materials of your/their choice. Each student will then present their model to the class.

  Homework: The Butterfly Life Cycle Worksheet (Resource Folder)



- Day 7 - Life Cycles Sort: **Life Cycle Sort Quiz 1**
  - MATERIALS NEEDED -- Life Cycle Sort (located in Unit 5 Resource Folder and/or on Canvas unit 5 quiz)
  - Students will sort each living organism based on their life cycles. They will take a large piece of construction paper and divide into 4 sections. Students will glue the picture of the animal under the correct life cycle. It will be collected and graded as a quiz.
    - Metamorphosis
    - Live birth
    - Hatching
    - Plant Life Cycle
  - **Check for Understanding:** Students are to work independently to cut the pictures and headings and create a sorting chart.
  - **Homework:**The Plant Life Cycles (Resource Folder)

Grouping Notes:
- Students will work in partners or small groups depending on activity.

Formative Assessment(s):
Teachers will utilize daily checks to determine level of understanding:

- Science Notebooks (ongoing)
- Exit tickets
- Teacher/Student Questions
- Student Responses and Discussion
- Life cycle models & sort

Students who understand the concepts are able to:

- Sort organisms' inherited traits using similarities and differences in patterns.
- Make predictions using patterns of change.
- Develop models to describe phenomena.
- Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. (I.e., Changes organisms go through during their life form a pattern.) *(Assessment of plant life cycles is limited to those of flowering plants. Assessment does not include details of human reproduction.)*

Summative Assessment(s):

Students will be measured on their understandings of the disciplinary core ideas, science and engineering practices, and crosscutting concepts using the End of Unit 5 Rubric.

Part B(# of days?)
Part B Question:
Are there advantages to being different?
Part B Concepts:

- Cause-and-effect relationships are routinely identified and used to explain change.
- Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing.

Lesson 1
Days Needed: 3

Objective:

- Students will hypothesize how variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

Standard(s):

- 3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

Activities:

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- Day 1 - Mystery Science: Why are Butterflies so Colorful? **The Life Cycle of a Frog Quiz (includes Vocabulary)**
- https://mysteryscience.com/trending/mystery-6/butterflies-adaptation/258?r=20326448
    - MATERIALS NEEDED -- Butterfly Worksheet, crayons, scissors
- Activity: Students will discover how butterflies' colors can help them blend into their habitat or scare away predators. In the activity, students design their own butterflies by choosing colors that will help the butterflies survive. Students will watch video one and discuss: Why do some butterflies have bright colors and patterns that stand out?
  Students will watch video 2 and then students will create their own butterflies. Students will discuss how butterfly patterns and colors help them survive. Students will color in their own butterflies. Once their butterfly is complete and cut out. They will practice flying their butterfly. Stop the video after slide 12: They do not need to make the card. This is optional if you have time.

  Day 2:How Animals Survive
  Materials: All About Adaptation Worksheet (CW), The Floor of Defenses Worksheet and Here we Grow Again (HW) (Resource Folder), scissors and glue.
  *Adaptation digital worksheets have been added into Canvas as an alternative to the above paper worksheets. Use either or both!
  Activity: Teacher will start the lesson by explaining how animals use its characteristics to survive, find mates, and reproduce?
    - What does the organism do to adapt to changes in the weather/seasons or environments?
        - Guide students to relate how adaptation means to chance something about your appearance, behavior, or surroundings to make it easier to live or survive.
    - Make sure to include the following during discussion:
        - Plants that have larger thorns than other plants may be less likely to be eaten by predators.
        - Animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to have offspring/reproduce.
    - Whole Group: The Floor of Defense Worksheet: Students will learn how animals have characteristics they use to defend themselves against their predators.Students will work with a partner to complete the All About Adaptation Worksheet. **(CW Grade)**
    - **Homework:** Here we Grow Again Worksheet (Resource Folder)
    - **Check for Understanding:** Teacher and student discussions and completed worksheets.

  Day 3: End of Unit Test

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Formative Assessment(s) for the Unit:
Teachers will utilize daily checks to determine level of understanding:

- Life Cycle Sort (Quiz Grade)
- Plant Life Cycles (HW)
- The Butterfly Life Cycle (HW)
- The Life Cycle of a Frog Quiz (includes Vocabulary)
- Here we Grow Again OR Animal Adaptation digital worksheet on Canvas (HW)
- All About Adaptation OR Animal Adaptation digital worksheet on Canvas (CW)

Summative Assessment(s) for the unit:

- End-of-Unit Test (LinkIt)

Students who understand the concepts are able to:

- Identify cause-and-effect relationships in order to explain change.
- Use evidence (e.g., observations, patterns) to construct an explanation.
- Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. Examples of cause-and-effect relationships could include:
  - ✓ Plants that have larger thorns than other plants may be less likely to be eaten by predators.
  - ✓ Animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring.