

2. Grade 07 - Growth, Development and Reproduction of an Organism

Content Area: **Science**
Course(s):
Time Period: **Generic Time Period**
Length: **38**
Status: **Not Published**

Unit Overview

What influences the growth and development of an organism?

Students use data and conceptual models to understand how the environment and genetic factors determine the growth of an individual organism. They connect this idea to the role of animal behaviors in animal reproduction and to the dependence of some plants on animal behaviors for their reproduction. Students provide evidence to support their understanding of the structures and behaviors that increase the likelihood of successful reproduction by organisms. The crosscutting concepts of *cause and effect* and *structure and function* provide a framework for understanding the disciplinary core ideas. Students demonstrate grade-appropriate proficiency in *analyzing and interpreting data, using models, conducting investigations, and communicating information*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

This unit is based on MS-LS1-4 and MS-LS1-5.

Standards

Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. [Clarifying examples: behaviors that affect the probability of animal reproduction could include nest building to protect young from cold, herding from predators, and vocalization of animals and colorful plumage to attract mates for breeding. Examples of animal behaviors that affect the probability of plant reproduction could include transferring pollen or seeds, and creating conditions for seed germination and growth could include bright flowers attracting butterflies that transfer pollen, flower nectar and odors that attract insects that transfer pollen, and squirrels burying nuts.] ([MS-LS1-4](#))

Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth and development of organisms. Statement: Examples of local environmental conditions could include availability of food, light, space, and water. Examples of genetic factors could include large breed cattle and species of grass affecting growth of organisms. Examples of evidence could include drought affecting plant growth, fertilizer increasing plant growth, different varieties of plant seeds growing at different rates in different conditions, and fish growing faster in large ponds than they do in small ponds.] [Assessment Boundary: Assessment does not include genetic mechanisms, gene regulation, and protein synthesis.] ([MS-LS1-5](#))

Big Idea

Instruction should result in students being able to use arguments based on empirical evidence and scientific reasoning to support an explanation of how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants. Students may observe examples of plant structures that could affect the probability of plant reproduction, including bright flowers attracting butterflies that transfer pollen, flower nectar and odors that attract pollen-transferring insects, and hard shells on nuts that squirrels bury. Possible activities could include plant experiments (e.g., students could count the number of butterflies on brightly colored plants vs. the number of butterflies on other types of plants and record the data they collect in a table), using microscopes/magnifiers to view plant structures (e.g., dissecting a lily), going on field trips, both virtual and actual (e.g., butterfly garden/botanical garden).

Students may observe examples of animal behaviors that affect the probability of plant reproduction, which could include observing how animals can transfer pollen or seeds and how animals can create conditions for seed germination and growth (e.g., students may conduct an experiment using rapid cycling *Brassica rapa* [Fast Plant] and collect data on how many plants produce seeds with and without the aid of a pollinator).

Students could then observe examples of animal behaviors (using videos, Internet resources, books, etc.) that could affect the probability of successful animal reproduction. These behaviors could include nest building to protect young from cold, herding of animals to protect young from predators, and colorful plumage and vocalizations to attract mates for breeding. Students may be able to identify and describe possible cause-and-effect relationships in factors that contribute to the reproductive success of plants and animals by using probability data from the rapid-cycling *Brassica rapa* (Fast Plant) experiments and drawing conclusions about one relationship between animals and plants.

At this point, students can present an oral and/or written argument supported by evidence and scientific reasoning that characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants, respectively. Students may use evidence from experiments or other sources to identify the role of pollinators in plant reproduction.

Instruction that results in students being able to construct an evidence-based scientific explanation for how environmental and genetic factors influence the growth of organisms could begin with students conducting experiments and collecting data on the environmental conditions that effect the growth of organisms (e.g., the effect of variables such as food, light, space, and water on plant growth).

Students could then examine genetic factors (inherited traits) that influence the growth of organisms, including parental traits and selective breeding. *It is important to note that at this grade level, Mendelian genetics are not a part of student learning. Mendelian genetics will be covered in future grades.* This unit of study could end with students using an oral and/or written argument, supported by evidence and scientific reasoning from their experiments, to explain how environmental conditions and genetic factors affect the growth of an organism.

Content

- Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction.
- There are a variety of ways that plants reproduce.
- Specialized structures for plants affect their probability of successful reproduction.
- Some characteristic animal behaviors affect the probability of successful reproduction in plants.
- Animals engage in characteristic behaviors that affect the probability of successful reproduction.
- There are a variety of characteristic animal behaviors that affect their probability of successful reproduction.
- There are a variety of animal behaviors that attract a mate.
- Successful reproduction of animals and plants may have more than one cause, and some cause-and-effect relationships in systems can only be described using probability.
- Genetic factors as well as local conditions affect the growth of organisms.
- A variety of local environmental conditions affect the growth of organisms.
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Genetic factors affect the growth of organisms (plant and animals)

- The factors that influence the growth of organisms may have more than one cause.
- Some cause-and-effect relationships in plant and animal systems can only be described using probability.

Essential Questions

How can one cell become a multicellular organism?

Why is the result of the cell cycle important?

How do unicellular and multicellular organisms differ?

How does cell differentiation lead to the organization within a multicellular organism?

Why do living things reproduce?

What is sexual reproduction and why is it beneficial?

What is the order of meiosis and what happens during each phase?

\What is asexual reproduction and why is it beneficial?

How do the types of sexual reproduction differ?

Skills

Students who understand the concepts are able to:

- Collect empirical evidence about animal behaviors that affect the animals' probability of successful reproduction and also affect the probability of plant reproduction.
- Collect empirical evidence about plant structures that are specialized for reproductive success.
- Use empirical evidence from experiments and other scientific reasoning to support oral and written arguments that explain the relationship among plant structure, animal behavior, and the reproductive success of plants.
- Identify and describe possible cause-and effect relationships affecting the reproductive success of plants and animals using probability.
- Support or refute an explanation of how characteristic animal behaviors and specialized plant structures affect the probability of successful plant reproduction using oral and written arguments.
 - Conduct experiments, collect evidence, and analyze empirical data.
 - Use evidence from experiments and other scientific reasoning to support oral and written explanations of how environmental and genetic factors influence the growth of organisms.
 - Identify and describe possible causes and effects of local environmental conditions on the growth of organisms.

Identify and describe possible causes and effects of genetic conditions on the growth of organisms.

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Stage 2: Assessment Evidence

Assessment

- Collect evidence about animal behaviors that affect the animals' probability of successful reproduction and

also affect the probability of plant reproduction.

- Collect evidence about plant structures that are specialized for reproductive success.
- Use evidence from experiments and other scientific reasoning to support oral and written arguments that explain the relationship among plant structure, animal behavior, and the reproductive success of plants.
- Identify and describe possible cause-and effect relationships affecting the reproductive success of plants and animals using probability.

Academic vocabulary activities such as journals, E-flashcards, word parts, foldables

Mini-labs

Launch Labs

Interactive technology classroom presentations, science videos, transparencies, interactive white board

Stage 3: Learning Plan

Learning Activities

Interactive technology classroom presentations, science videos, transparencies, interactive white board

Academic Vocabulary Activities: journals, e-flash cards, puzzles, e-games

Mini-Labs (student engagement)

Launch Labs (teacher and/or student led)

Inquiry Labs (use of inquiry skills)

Interactive technology: classroom presentations, science videos, transparencies, interactive whiteboard activities, online assessments

Language arts strategies: make tables, answer guiding questions, organizing ideas, illustrating ideas, outlines, infer meaning, compare and contrast, make connections

Accommodations for students with IEPs and learning difficulties:

- visual sentence frames using academic vocabulary for discussion
- graphic organizers and sentence starters for literary analysis writing
- Graphic organizers for comparing and contrasting of characters, plot, and theme in order to create a written narrative.
- Graphic organizers/worksheets for book club roles that explains in detail about what each role entails
- Use visuals to show important vocabulary for students to make connections
- Have students share their text to text, text to world, and text to self-connections
- One on one teacher support for comprehension and fluency
- Modeling and scaffolding to highlight specific moments, vocabulary, and figurative language, and using context clues to use inference skills
- Show and discuss exemplar writing pieces before students being their own
- Close reading chapters/chunks
- Re-reading key sections for fluency and comprehension
- Colored overlays and reading windows to reduce visual distractions
- Sentence starters for writing assignments
- Vocabulary word banks and strategies (Say it, Define it, Act it)
- Think aloud and Think-Pair-Share

For ELL students:

- visuals for vocabulary
- Word wall
- Additional word work such as illustrating vocabulary and playing vocabulary games
- Partner reading
- Choral reading

- Think-aloud while modeling writing
- Analyze sample summaries before writing
- Color-coded sticky notes for close reading to identify which sticky notes pertain to vocabulary
- Questions about text, etc.
- When students make an error in speaking, answer or restate what they said using the correct form without drawing attention to the mistake.

For gifted students:

- Have students complete extended research projects on a related issue of their choice as it pertains to a content area
- Students perform a written/oral debate on topics related to content

Resources

Glencoe Life Science Scie

Chapter 3 & 4

ConnectEd.Mcgraw-hill.com resources

BrainPop videos

Various movies and video clips

Meiosis chart

mitosis chart

Pool Noodles Representation of mitosis

Book Quest on asexual reproduction

Part of the Flower worksheet

Angiosperm worksheet

Microscopes to observe hydra

Article: Animal Cloning: Double Trouble

Movie: Body By Design movie

"Alien George's Parent" worksheet

Making Fossils

Unit Reflections & Teacher Notes
