Cliffside Park Public Schools

GRADE: 6

Unit 1: Growth, Development, and Reproduction of Organisms

CONTENT AREA: General Life Science	GRADES: 6	UNIT: 1 of 7
Pacing: Approx. 25 Days		

Engaging in Argument from Evidence	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models - Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s). Use an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific knowledge, principles, and theories. Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and	**LS1.B: Growth and Development of Organisms** • Animals engage in characteristic behaviors that increase the odds of reproduction. (MS-LS1-4) • Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction. (MS-LS1-4) • Genetic factors as well as local conditions affect the growth of the adult plant. (MS-LS1-5)	**Cause and Effect** Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.

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the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.		

Performance Expectations: MS-LS1-4 and MS-LS1-5

Evidence Statement(s): MS-LS1-4

Essential Question: What influences the growth and development of an organism?

21st Century Skills: CRP2, CRP4, CRP5, CRP 6, CRP7, CRP8 ,CRP11,CRP12

Technology: 8.1.8.A.1, 8.1.8.A.2, 8.1.8.A.3, 8.1.8.A.4, 8.1.8.A.5, 8.1.8.D.4, 8.1.8.D.5, 8.1.8.E.1, 8.2.8.A.2, 8.2.8.A.3, 8.2.8.B.1,

Technical Terms (Suggested)	Core Instructional Materials	Assessment Statement
Reproduction, nest building, herding, breeding, predators, germination, phenomena, organisms ** All terms should be taught in context rather than in isolation. These terms should be addressed after conceptual understanding.**	MS-LS1-4 - Chromebook, internet access, smartboard, notebook, pen, pencil, whiteboard. MS-LS1-5- Computer, Internet access, smartboard, notebook, pen, pencil, whiteboard.	Students who understand the concepts are able to: • Collect empirical evidence about animal behaviors that affect the animal's 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.

Modifications

English Language Learners	Special Education	At Risk	Gifted & Talented
Scaffolding	Word walls	Teacher tutoring	Curriculum compacting
Word walls	Visual aides	Peer tutoring	Challenge assignments
Sentence/paragraph frames	Graphic organizers	Study guides	Enrichment activities
Bilingual dictionaries/translation	Multimedia	Graphic organizers	Tiered activities
Think alouds	Leveled readers	Extended time	Independent research/inquiry
Read alouds	Assistive technology	Parent communication	Collaborative teamwork
Highlight key vocabulary	Notes/summaries	Modified assignments	Higher level questioning
Annotation guides	Extended time	Counseling	Critical/Analytical thinking tasks
Think-pair-share	Answer masking		Self-directed activities
Visual aides	Answer eliminator		
Modeling	Highlighter		
Cognates	Color contrast		

5E Model

Performance Expectation: MS-LS1-4

MS-LS1-4 Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.

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Engage: Anticipatory Set	Bald Eagle- Reproduction Pairs Maine http://participatoryscience.org/standard/ms-ls1-4
Exploration: Student Inquiry	Video & Lesson Series http://www.pbslearningmedia.org/resource/tdc02.sci.life.repro.lp_reproduce/reproduction/ Lead students through series of videos and related discussion questions. Construct an Argument Have students select one plant or animal. Students will research the characteristics and structures to answer the following questions: How do organisms (plants and animals) reproduce? What environmental factors/characteristics would help to make plants and animals reproduce successfully? What factors/characteristics would inhibit reproduction? What are some of the causes/effects of reproduction that plants and animals might experience within their habitat/ecosystem?
Explanation: Concepts & Practices	In these lessons: Teachers Should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students Should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): LS1.B: Growth and Development of Organisms Animals engage in characteristic behaviors that increase the odds of reproduction. Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction.
Elaboration: Extension Activity	Related Activities http://betterlesson.com/common_core/browse/2219/ngss-ms-ls1-4-use-argument-based-on-empirical-evidence-and-scientific-reasoning-to-support-an-explanation-for-how-characteristic","Better Lessons: MS-LS1-4
Evaluation: Assessment	Assessment Task A: Construct an Argument Use an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. Evaluation Criteria- Argument should include: Key terms Information regarding the reproduction characteristics of plant/animal

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	Factors that contribute to or inhibit reproduction Research-based evidence

5E Model

Performance Expectation: MS-LS1-5 **MS-LS1-5 From Molecules to Organisms: Structures and Processes**

Engage: Anticipatory Set	Population Growth Patterns: http://www.ck12.org/life-science/Population-Growth-Patterns-in-Life-Science/lesson/Population-Growth-Patterns-Basic/?referrer=concept_details Limiting Factors: https://www.tracy.k12.ca.us/sites/mitrajuarez/Shared%20Documents/chapter05_section02.htm
Exploration: Student Inquiry	Limiting Factors to Population Growth: http://www.ck12.org/life-science/Limiting-Factors-to-Population-Growth-in-Life-Science/ Lead students in exploration of articles, videos and related discussion questions. Carousel Activity: Develop a set of questions that will provide students with situations and data about how specific factors will affect an organism, its habitat and its growth potential. These questions will be hung on the walls around the room. Students will pair up and like a Carousel move from station to station sharing their ideas of how to answer the question. Students will also provide feedback to other answers (students) and whether they agree (Check Mark) or disagree (X) with what was presented before them. Questions should include an organism, a genetic or environmental factor being discussed and how that factor may/may not affect the growth potential of that organism. Example Questions: What basic environmental factors do organisms need to survive (water, air, habitat and food)? What environmental factors would affect how an organism grows within its environment? How would an abundance of or lack of water, food, air and habitat affect an organism's growth potential? Are there any environmental hazards that would contribute to the growth of an organism within its habitat (drought, size of habitat vs. size of organism, human influence - fertilizer, etc.)?

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Explanation: Concepts & Practices	In these lessons: Teachers Should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students Should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): LS1.B: Growth and Development of Organisms Genetic factors as well as local conditions affect the growth of the adult plant.
Elaboration: Extension Activity	Related Activities: http://betterlesson.com/next_gen_science/browse/2220/ngss-ms-ls1-5-construct-a-scientific-explanation-based-on-evidence-for-how-environmental-and-genetic-factors-influence-the-growt","Better Lessons: MS-LS1-5
Evaluation: Assessment	Assessment Task A: Carousel Evaluation Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. Evaluation Criteria- Explanation should include: Key terms Explanation of how environmental and genetic factors influence growth of organisms

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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.

#	STUDENT LEARNING OBJECTIVES	CORRESPONDING PEs and DCIs
1	**Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.** [Clarification Statement: Examples of behaviors that affect the probability of animal reproduction could include nest building to protect young from cold, herding of animals to protect young 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. Examples of plant structures could include bright flowers attracting butterflies that transfer pollen, flower nectar and odors that attract insects that transfer pollen, and hard shells on nuts that squirrels bury.] MS-LS1-4	LS1.4
2	**Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.** [Clarification 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 decreasing plant growth, fertilizer increasing plant growth, different varieties of plant seeds growing at different rates in different conditions, and fish growing larger in large ponds than they do in small ponds.] [Assessment Boundary: Assessment does not include genetic mechanisms, gene regulation, or biochemical processes.]MS-LS1-5	LS1.5

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The Student Learning Objectives above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Engaging in Argument from Evidence	**LS1.B: Growth and Development of Organisms**	**Cause and Effect**
Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s). Use an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.	Animals engage in characteristic behaviors that increase the odds of reproduction. Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction.	Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.

Connections to other DCIs in this grade-band:
MS.LS2.A

Articulation of DCIs across grade-bands:

Common Core State Standards Connections:
ELA: RST.6-8., WHST.6-8.1

Math: 6.SP.A.2, 6.SP.B.4

ELA/Literacy -

- Cite specific textual evidence to support analysis of science and technical texts. (MS-LS1-4),(MS-LS1-5) RST.6-8.1
- Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions. (MS-LS1-5) RST.6- 8.2
- Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not. (MS-LS1-4) RI.6.8
- Write arguments focused on discipline content. (MS-LS1-4) WHST.6-8.1
- Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (MS-LS1-5) WHST.6-8.2
- Draw evidence from informational texts to support analysis, reflection, and research. (MS-LS1-5) WHST.6-8.9

Mathematics -

- Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape. (MS-LS1-4),(MS-LS1-5) 6.SP.A.2
- Summarize numerical data sets in relation to their context. (MS-LS1-4),(MS-LS1- 5) 6.SP.B.4