Minnesota Science

Grade 7

Adopted 2019

Grade 7

From Molecules to Organisms: Structures and Processes

1. Asking questions and defining problems. 7LM.1.1
    1. Students will be able to ask questions about aspects of the phenomena they observe, the conclusions they draw from their models or scientific investigations, each other's ideas, and the information they read. 7LM.1.1.1
        1. Ask questions about the processes and outcomes of various methods of communication between cells of multicellular organisms. 7LM.1.1.1.1
2. Planning and carrying out investigations. 7LM.1.2
    1. Students will be able to design and conduct investigations in the classroom, laboratory, and/or field to test students' ideas and questions, and will organize and collect data to provide evidence to support claims the students make about phenomena. 7LM.1.2.1
        1. Conduct an investigation to provide evidence that living things are made of cells, either one cell or many different numbers and types of cells. 7LM.1.2.1.1

1. Developing and using models. 7LM.3.1
    1. Students will be able to develop, revise, and use models to represent the students' understanding of phenomena or systems as they develop questions, predictions and/or explanations, and communicate ideas to others. 7LM.3.1.1
        1. Develop and use a model to describe the function of a cell as a whole and describe the way cell parts contribute to the cell's function. 7LM.3.1.1.1
        2. Develop and use a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism. 7L.3.1.1.2
2. Constructing explanations and designing solutions. 7LM.3.2
    1. Students will be able to apply scientific principles and empirical evidence (primary or secondary) to explain the causes of phenomena or identify weaknesses in explanations developed by the students or others. 7LM.3.2.1
        1. Construct an explanation based on evidence for how environmental and genetic factors influence the growth of organisms and/or populations. 7LM.3.2.1.1
        2. Construct an explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. 7LM.3.2.1.2

1. Engaging in argument from evidence. 7LM.4.1
    1. Students will be able to engage in argument from evidence for the explanations the students construct, defend and revise their interpretations when presented with new evidence, critically evaluate the scientific arguments of others, and present counter arguments. 7LM.4.1.1
        1. Support or refute an explanation by arguing from evidence for how the body is a system of interacting subsystems composed of groups of

cells. 7LM.4.1.1.1

2. Support or refute an explanation by arguing from evidence and scientific reasoning for how animal behavior and plant structures affect the probability of successful reproduction. 7LM.4.1.1.2

Heredity: Inheritance and Variation of Traits

1. Asking questions and defining problems. 7LH.1.1
    1. Students will be able to ask questions about aspects of the phenomena they observe, the conclusions they draw from their models or scientific investigations, each other's ideas, and the information they read. 7LH.1.1.1
        2. Ask questions that arise from careful observations of phenomena or models to clarify and/or seek additional information about how changes in genes can affect organisms. 7LH.1.1.1.2
1. Developing and using models. 7LH.3.1
    1. Students will be able to develop, revise, and use models to represent the students' understanding of phenomena or systems as they develop questions, predictions and/or explanations, and communicate ideas to others. 7LH.3.1.1
        4. Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. 7LH.3.1.1.4

Ecosystems: Interactions, Energy, and Dynamics

1. Analyzing and interpreting data. 7LE.2.1
    1. Students will be able to represent observations and data in order to recognize patterns in the data, the meaning of those patterns, and possible relationships between variables. 7LE.2.1.1
        1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. 7LE.2.1.1.1

1. Developing and using models. 7LE.3.1
    1. Students will be able to develop, revise, and use models to represent the students' understanding of phenomena or systems as they develop questions, predictions and/or explanations, and communicate ideas to others. 7LE.3.1.1
        3. Develop and use a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. 7LE.3.1.1.3

1. Engaging in argument from evidence. 7LE.4.1
    2. Students will be able to argue from evidence to justify the best solution to a problem or to compare and evaluate competing designs, ideas, or methods. 7LE.4.1.2
        1. Construct an argument supported by empirical evidence that changes in physical or biological components of an ecosystem affect populations. 7LE.4.1.2.1
        2. Evaluate competing design solutions for maintaining biodiversity or ecosystem services. 7LE.4.1.2.2

2. Obtaining, evaluating and communicating information. 7LE.4.2
    2. Students will be able to gather information about and communicate the methods that are used by various cultures, especially those of Minnesota American Indian Tribes and communities, to develop explanations of phenomena and design solutions to problems. 7LE.4.2.2
        1. Gather multiple sources of information and communicate how Minnesota American Indian Tribes and communities and other cultures use knowledge to predict or interpret patterns of interactions among organisms across multiple ecosystems. 7LE.4.2.2.1

Biological Evolution: Unity and Diversity

1. Analyzing and interpreting data. 7LB.2.1
    1. Students will be able to represent observations and data in order to recognize patterns in the data, the meaning of those patterns, and possible relationships between variables. 7LB.2.1.1
        2. Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth. 7LB.2.1.1.2
        3. Analyze visual data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy. 7L.2.1.1.3
2. Using mathematics and computational thinking. 7LB.2.2
    1. Students will be able to use mathematics to represent physical variables and their relationships; compare mathematical expressions to the real world; and engage in computational thinking as they use or develop algorithms to describe the natural or designed worlds. 7LB.2.2.1
        1. Use an algorithm to explain how natural selection may lead to increases and decreases of specific traits in populations. 7LB.2.2.1.1
2. Constructing explanations and designing solutions. 7LB.3.2
    1. Students will be able to apply scientific principles and empirical evidence (primary or secondary) to explain the causes of phenomena or identify weaknesses in explanations developed by the students or others. 7LB.3.2.1
        3. Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships. 7LB.3.2.1.3
        4. Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment. 7LB.3.2.1.4