6th Grade Science Placemat

Last update 8/08/18

From Molecules to Organisms: Structure and Processes

Structure and Function

LS1.A.1 Prove that LO are made of cells which carry out all the basic functions of life
Provide evidence that Organisms (unicellular and multicellular) are made of cells and that a single cell must carry out all of the basic functions of life. [Clarification Statement: Emphasis is on developing evidence that living things are made of cells, distinguishing between living and non-living things, and understanding that living things may be made of one cell or many and varied cells.]

LS1.A.2 Dev/use model to describe functions of a cell as a whole/ways parts contribute
Develop and use a model to describe the function of a cell as a whole and ways parts of the cells contribute to that function. [Clarification Statement: Emphasis is on the cell functioning as a whole system and the primary role of identified parts of the cell, specifically the nucleus, chloroplasts, mitochondria, cell membrane, and cell wall.]

LS1.A.3 Dev w/evidence an argument for how multicellular organisms are organized
Develop an argument supported by evidence for how multicellular Organisms are organized by varying levels of complexity; cells, tissue, organs, organ System.

LS1.A.4 Present evidence that body systems interact to carry out key body functions
Present evidence that body System interact to carry out key body functions, including providing nutrients and oxygen to cells, removing carbon dioxide and waste from cells and the body, controlling body motion/activity and coordination, and protecting the body.

Growth and Development of Organisms

LS1.B.1 Const explanation for how behaviors/structures affect the probability of rep
Construct an explanation for how characteristic animal behaviors as well as specialized plant structures affect the probability of successful reproduction of animals and plants respectively. [Clarification Statement: Examples of animal 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 that affect the probability of plant reproduction 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.]

LS1.B.2 Const explanation w/evidence for how enviro & genetic factors influence growth
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.]

Organization for Matter and Energy Flow in Organisms

LS1.C.1 Const explanation w/evidence for role of PS/CR in cycling matter/energy flow
Construct a scientific explanation based on evidence for the role of photosynthesis and cellular respiration in the cycling of matter and flow of energy into and out of Organisms.

Ecosystems: Interactions, Energy, and Dynamics

Interdependent Relationships in Ecosystems

LS2.A.1 Analyze/interpret data for effects of resource availability on individuals & pop
Analyze and interpret data to provide evidence for the effects of resource availability on individual Organisms and populations of Organisms in an ecosystem. [Clarification Statement: Emphasis is on cause and effect relationships between resources and growth of individual Organisms and the numbers of Organisms in Ecosystems during periods of abundant and scarce resources.]

LS2.A.2 Const exp. predicts patterns of interactions among/between bio & abio factors
Construct an explanation that predicts the patterns of interactions among and between the biotic and abiotic factors in a given ecosystem. [Clarification Statement: Relationships may include competition, predation, and symbiosis.]

Cycles of matter and Energy Transfer in Ecosystems

LS2.B.1 Dev model to describe cycling of matter/energy flow among living/nonliving
Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. [Clarification Statement: Emphasis is on describing the conservation of matter and flow of energy into and out of various Ecosystems, including food chains and food webs.]

Ecosystems Dynamics, Functioning and Resilience	
LS2.C.1 Const argument w/evi to explain how changes to components of an eco affect pops Construct an argument supported by empirical evidence that explains how changes to physical or biological components of an ecosystem affect populations. [Clarification Statement: Emphasis is on recognizing patterns in data and making inferences about changes in populations, defining the boundaries of the system, and on evaluating empirical evidence supporting arguments about changes to Ecosystems.]	**LS2.C.2 Evaluate benefits/limitations of diff design solutions for maintaining an eco** Evaluate benefits and limitations of differing design solutions for maintaining an ecosystem. [Clarification Statement: Examples of design solutions could include water, land, and species protection, and the prevention of soil erosion. Examples of design solution constraints could include scientific, economic, and social considerations.]

Biological Evolution; Unity and Diversity
Evidence of Common Ancestry and Diversity
LS4.A.1 Analyze/interp fossil record to find patterns of enviro change causing LO change Analyze and interpret evidence from the fossil record to infer patterns of environmental change resulting in extinction and changes to life forms throughout the history of the Earth. [Clarification Statement: Examples of evidence include sets of fossils that indicate an environment, anatomical structures that indicate the function of an organism in the environment, and fossilized tracks that indicate behavior of Organisms.]
Natural Selection

LS4.B.1 Const exp to describe how genes increase prob of surviving & rep in an enviro 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. [Clarification Statement: Emphasis is on using simple probability statements and proportional reasoning to construct explanations.]	**LS4.B.2 Gather/syn info about tech that has changed the way we affect inher of traits** Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in Organisms. [Clarification Statement: Emphasis is on synthesizing information from reliable sources about the influence of humans on genetic outcomes in artificial selection (such as genetic modification, animal husbandry, and farming practices).]

Adaptation
LS4.C.1 Interp graphs to support exp of how NS may lead to specific traits in pop Interpret graphical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.

Engineering, Technology, and Application of Science			
Defining and Delimiting Engineering Problems 6-8	**Developing Possible Solutions**		
ETS1.A.1: Define constraints of design using scientific principles & impacts on environment Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. (MS-STS1-1)	**ETS1.B.1: Evaluate solutions to determine if they meet criteria & constraints of the problem** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. (MS-ETS1-2)	**ETS1.B.2: Analyze design solutions, identify best elements & combined into a new solution** Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. (MS-ETS1-3)	**ETS1.B.3: Develop model to generate data for iterative testing to achieve optimal design** Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved. (MS-ETS1-4)