Science: Life Science

FROM MOLECULES TO ORGANISMS: STRUCTURES AND PROCESSES	1a	Relate DNA molecules to the way cells store and use information to guide their functions. LC-HS-LS1-1A
	1b	Relate groups of specialized cells (e.g., heart cells, nerve cells, muscle cells, epithelial cells, fat cells, blood cells) within organisms to the performance of essential functions of life. LC-HS-LS1-1B
	1c	Identify evidence supporting an explanation of how a substance called DNA carries genetic information in all organisms which codes for the proteins that are essential to an organism. LC-HS-LS1-1C
	2a	Using model(s), identify that different systems of the body carry out essential functions (e.g., digestive system, respiratory system, circulatory system, nervous system). LC-HS-LS1-2A
	2b	Using model(s), identify the hierarchical organization of systems that perform specific functions within multicellular organisms. LC-HS-LS1-2B
	3a	Identify how different organisms react (e.g., heart rate, body temperature) to changes in their external environment. LC-HS-LS1-3A
	3b	Identify examples of how organisms use feedback mechanisms to maintain dynamic homeostasis. LC-HS-LS1-3B
	4a	Identify how growth and/or maintenance (repair/replacement) occurs when cells multiply (i.e., mitosis) using a model. LC-HS-LS1-4A
	5a	Identify model of photosynthesis, which shows the conversion of light energy to stored chemical energy. LC-HS-LS1-5A
	6a	Using a model(s), identify how organisms take in matter and rearrange the atoms in chemical reactions to form different products allowing for growth and maintenance. LC-HS-LS1-6A
	7a	Using a model(s), identify respiration as the transfer of stored energy to the cell to sustain life's processes (i.e., energy to muscles or energy for maintaining body temperature). LC-HS-LS1-7A
FROM MOLECULES TO ORGANISMS: STRUCTURES AND PROCESSES	8a	Identify the process by which a virus uses a host cell's functions to make new viruses. LC-HS-LS1-8A

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STRUCTURES AND PROCESSES	**8b**	**Recognize that most bacteria reproduce asexually resulting in two cells exactly like the parent cell.** LC-HS-LS1-8B
	8c	**Identify ways to protect against infectious diseases to maintain a body's health (e.g., eat nutritious food, washing hands, rest, exercise, etc.).** LC-HS-LS1-8C
	8d	**Identify treatments and/or prevention of viral and/or bacterial infections (e.g., antibiotics and vaccines).** LC-HS-LS1-8D
ECOSYSTEMS: INTERACTIONS, ENERGY AND DYNAMICS	**1a**	**Recognize that the carrying capacities of ecosystems are related to the availability of living and nonliving resources and challenges (e.g., predation, competition, disease).** LC-HS-LS2-1A
	1b	**Use a graphical representation to identify carrying capacities in ecosystems as limits to the numbers of organisms or populations they can support.** LC-HS-LS2-1B
	4a	**Use a graphical or mathematical representation to identify the changes in the amount of matter as it travels through a food web.** LC-HS-LS2-4A
	4b	**Use a graphical or mathematical representation to identify the changes in the amount of energy as it travels through a food web.** LC-HS-LS2-4B
	6a	**Use evidence to identify how modest biological or physical changes versus extreme changes affect stability and change (e.g., number and types of organisms) in ecosystems.** LC-HS-LS2-6A
	6b	**Evaluate explanations of how living things in an ecosystem are affected by changes in the environment (e.g., changes to the food supply, climate change, or the introduction of predators).** LC-HS-LS2-6B
	6c	**Evaluate explanations of how interactions in ecosystems maintain relatively stable conditions, but changing conditions may result in a new ecosystem.** LC-HS-LS2-6C
	7a	**Describe how people can help protect the Earth's environment and biodiversity (e.g., preserving ecosystems) and how a human activity would threaten Earth's environment and biodiversity (e.g., pollution, damaging habitats, over hunting).** LC-HS-LS2-7A
	7b	**Evaluate or refine a solution to changes in an ecosystem (biodiversity) resulting from a human activity.** LC-HS-LS2-7B
HEREDITY: INHERITANCE AND VARIATION OF TRAITS	**1a**	**Identify that DNA molecules in all cells contain the instructions for traits passed from parents to offspring.** LC-HS-LS3-1A
		Identify appropriate questions about the relationships between DNA and chromosomes and how traits are passed from parents to offspring. LC-HS-LS3-1B

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	2a Identify a model showing evidence that parents and offspring may have different traits. LC-HS-LS3-2A
	2b Identify that meiosis is a process which distributes genetic material among the new cells (i.e., gametes) produced, which results in genetic variation. LC-HS-LS3-2B
	2c Identify that when DNA makes a copy of itself, sometimes errors occur that may lead to genetic variations. LC-HS-LS3-2C
	2d Identify examples of mutations in DNA caused by environmental factors. LC-HS-LS3-2D
	2e Use evidence to support a claim about a source of inheritable genetic variations. LC-HS-LS3-2E
	3a Calculate the probability (e.g., two out of four) of a particular trait in an offspring based on a completed Punnett square. LC-HS-LS3-3A
	3b Identify examples, using data, of environmental factors which affect the expression of traits, and so then affect the probability of occurrences of traits in a population. LC-HS-LS3-3B
BIOLOGICAL EVOLUTION: UNITY AND DIVERSITY	**1a** Identify patterns (e.g., DNA sequences, fossil records) as evidence to a claim of common ancestry. LC-HS-LS4-1A
	2a Recognize that as a species grows in number, competition for limited resources also increases. LC-HS-LS4-2A
	2b Recognize that different individuals have specific traits that give advantages (e.g., survive and reproduce at higher rates) over other individuals in the species. LC-HS-LS4-2B
	2c Identify how evolution may be a result of genetic variation through mutations and sexual reproduction in a species that is passed on to their offspring. LC-HS-LS4-2C
	3a Use patterns in data to identify how heritable variations in a trait may lead to an increasing proportion of individuals within a population with that trait (i.e., an advantageous characteristic). LC-HS-LS4-3A
	4a Use data to provide evidence for how specific biotic or abiotic differences in ecosystems (e.g., ranges of seasonal temperature, acidity, light, geographic barriers) support the claim that organisms with an advantageous heritable trait are better able to survive over time. LC-HS-LS4-4A
	5a Identify the relationship between naturally occurring or human-induced changes in the environment (e.g., drought, flood, deforestation, fishing, application of

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fertilizers) and the expression of traits in a species (e.g., peppered moth studies). LC-HS-LS4-5A

5b Identify the relationship between naturally occurring or human-induced changes in the environment (e.g., drought, flood, deforestation, fishing, application of fertilizers) and the emergence of new species over time. LC-HS-LS4-5B

5c Identify that species become extinct because they can no longer survive and reproduce given changes in the environment. LC-HS-LS4-5C