Louisiana Science

Life Science

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From Molecules to Organisms: Structures and Processes

1 Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells. HS-LS1-1

2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. HS-LS1-2

3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis in living organisms. HS-LS1-3

4 Use a model to illustrate the role of the cell cycle and differentiation in producing and maintaining complex organisms. HS-LS1-4

5 Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy. HS-LS1-5

6 Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules. HS-LS1-6

7 Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed, resulting in a net transfer of energy. HS-LS1-7

8 Obtain, evaluate, and communicate information about (1) viral and bacterial reproduction and adaptation, (2) the body's primary defenses against infection, and (3) how these features impact the design of effective treatment. HS-LS1-8

Ecosystems: Interactions, Energy and Dynamics

1 Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity, biodiversity and populations of ecosystems at different scales. HS-LS2-1

4 Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. HS-LS2-4

6 Evaluate the claims, evidence and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem. HS-LS2-6

7 Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity HS-LS2-7

Heredity: Inheritance and Variation of Traits

1. Formulate, refine, and evaluate questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring. HS-LS3-1
2. Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors. HS-LS3-2
3. Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population. HS-LS3-3

Biological Evaluation: Unity and Diversity

1. Analyze and interpret scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence. HS-LS4-1
2. Construct an explanation based on evidence that biological diversity is influenced by (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment. HS-LS4-2
3. Apply concepts of statistics and probability to support explanations that populations of organisms adapt when an advantageous heritable trait increases in proportion to organisms lacking this trait. HS-LS4-3
4. Construct an explanation based on evidence for how natural selection and other mechanisms lead to genetic changes in populations. HS-LS4-4
5. Evaluate evidence supporting claims that changes in environmental conditions can affect the distribution of traits in a population causing: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species. HS-LS4-5