

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**
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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**