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| NGSS Biology | | **Standards-Based Education Priority Standards** |
| **9th Grade** | | |
| *Life Structures and Processes* | | |
| HS-LS1-1 | 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-LS1-2 | Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. | |
| HS-LS1-3 | Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. | |
| HS-LS1-4 | Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms. | |
| HS-LS1-5 | Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy. | |
| HS-LS1-6 | 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-LS1-7 | 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. | |
| *Ecosystems* | | |
| HS-LS2-1 | Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales. | |
| HS-LS2-2 | Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales. | |
| HS-LS2-3 | Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions. | |
| HS-LS2-4 | Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. | |
| HS-LS2-5 | Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere. | |
| HS-LS2-6 | 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-LS2-7 | Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity. | |
| HS-LS2-8 | Evaluate the evidence for the role of group behavior on individual and species’ chances to survive and reproduce. | |
| *Heredity* | | |
| HS-LS3-1 | Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring. | |
| HS-LS3-2 | Make and defend a claim based on evidence that inheritable genetic variability may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors. | |
| HS-LS3-3 | Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population. | |
| *Evolution* | | |
| HS-LS4-1 | Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence. | |
| HS-LS4-2 | Construct an explanation based on evidence that the process of evolution primarily results from four factors: (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-LS4-3 | Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait. | |
| HS-LS4-4 | Construct an explanation based on evidence for how natural selection leads to adaptation of populations. | |
| HS-LS4-5 | Evaluate the evidence supporting claims that changes in environmental conditions may result in: (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-LS4-6 | Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity. | |
| *Engineering* | | |
| HS-ETS1-1 | Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. | |
| HS-ETS1-2 | Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. | |
| HS-ETS1-3 | Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. | |
| HS-ETS1-4 | Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem. | |
| *Literacy in Science* | | |
| 9-10.RST.1 | Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. | |
| 9-10.RST.2 | Determine the central ideas or conclusions of a text; trace the text’s explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. | |
| 9-10.RST.3 | Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. | |
| 9-10.RST.9 | Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. | |
| 9-10.WHST.1 | Write arguments focused on discipline-specific content. | |
| 9-10.WHST.7 | Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. | |