HS. Structure and Function

A Performance Expectations HS.LS1.SF

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 HS.LS1.3

B Science and Engineering Practices HS.SF.SEP

1 Developing and Using Models HS.SF.SEP.1

a Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2) HS.SF.SEP.1A

2 Planning and Carrying Out Investigations HS.SF.SEP.2

a Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-LS1-3) HS.SF.SEP.2A

3 Constructing Explanations and Designing Solutions HS.SF.SEP.3

a Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (HSLS1-1) HS.SF.SEP.3A

4 Scientific Investigations Use a Variety of Methods HS.SF.SEP.4

a Scientific inquiry is characterized by a common set of values that include: logical thinking, precision, open-mindedness, objectivity, skepticism, replicability of results, and honest and ethical reporting of findings. (HS-LS1-3) HS.SF.SEP.4A

C Disciplinary Core Ideas HS.SF.DCI

1 Structure and Function HS.SF.DCI.LS1.A

a Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) HS.SF.DCI.LS1.A.1

b All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (HS-LS1-1) (Note: This Disciplinary Core Idea is also addressed by HS-LS3-1.) HS.SF.DCI.LS1.A.2

c Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HS-LS1-2) HS.SF.DCI.LS1.A.3

d Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3) HS.SF.DCI.LS1.A.4

e (NYSED) Disease is a failure of homeostasis. Organisms have a variety of mechanisms to prevent and combat disease. Technological advances including vaccinations and antibiotics have contributed to the prevention and treatment of disease. (HS-LS1-2),(HS-LS1-3) HS.SF.DCI.LS1.A.5

D Crosscutting Concepts HS.SF.CC

1 Systems and System Models HS.SF.CC.1

a Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions— including energy, matter, and information flows— within and between systems at different scales. (HS-LS1-2) HS.SF.CC.1A

2 Structure and Function HS.SF.CC.2

a Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (HS-LS1-1) HS.SF.CC.2A

3 Stability and Change HS.SF.CC.3

a Feedback (negative or positive) can stabilize or destabilize a system. (HSLS1-3) HS.SF.CC.3A