

# Educational Resources from *Phenomenon Science Education*

## Student Proficiency Goals for **NGSS HS-LS1-1**



### Information about HS-LS1-1

#### **NGSS Performance Expectation 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.

#### **Clarification Statement.**

*No clarification statement is listed for this Performance Expectation.*

#### **Assessment Limits.**

*Assessment does not include identification of specific cell or tissue types, whole body systems, specific protein structures and functions, or the biochemistry of protein synthesis.*

#### **Science and Engineering Practice (Constructing Explanations and Designing Solutions)**

- 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.

#### **Disciplinary Core Idea (LS1.A: Structure and Function)**

- Systems of specialized cells within organisms help them perform the essential functions of life.
- 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.

#### **Crosscutting Concept (Structure and Function)**

- 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.

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### Student Proficiency Goals for **NGSS HS-LS1-1**



#### Student Proficiency Goals

##### SEP (Constructing Explanations and Designing Solutions):

- Students identify and describe evidence that the structure of DNA determines the structure of proteins and that proteins carry out essential functions of life through systems of specialized cells.
- Students assume that the current theories and laws that describe the natural world have operated and will continue to operate as they do today.
- Students collect evidence from their own investigations, models, theories, or peer review.
- Students identify strengths and weaknesses in the collected evidence, including the type of source the evidence came from; the relevance, validity, and reliability of the evidence; and the ability of the evidence to support a scientific explanation that the structure of DNA determines the structure of proteins and that proteins carry out essential functions of life through systems of specialized cells.
- Students construct an explanation based on their strong evidence that the structure of DNA determines the structure of proteins and that proteins carry out essential functions of life through systems of specialized cells.

##### DCI (LS1.A Structure and Function):

- Students know that all cells contain DNA which carries genetic information.
- Students know that DNA molecules contain regions called genes.
- Students know that some genes carry instructions which code for proteins.
- Students know that proteins do many of the functions of the work of cells.
- Students know that organisms have systems of specialized cells.
- Students know that systems of specialized cells perform essential functions which support life.
- Students know that the correct function of cells depends on the correct function of proteins.

##### CCC (Structure and Function):

- Students use detailed examinations of the structure of cells to understand and/or develop evidence that specialized systems of cells result in the essential functions of life.
- Students use detailed examinations of the structure of DNA to understand and/or develop evidence that the gene sequences can carry instructions that code for proteins.
- Students consider the connections between the structure of DNA, the structure of proteins, the structure of cell components, and systems of specialized cells that function to carry out the essential functions of life.