Educational Resources from *Phenomenon Science Education*

Student Proficiency Goals for **NGSS MS-LS1-5**

Information about MS-LS1-5

NGSS Performance Expectation MS-LS1-5.

Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

Clarification Statement.

Examples of local environmental conditions could include availability of food, light, space, and water. Examples of genetic factors could include large breed cattle and species of grass affecting growth of organisms. Examples of evidence could include drought decreasing plant growth, fertilizer increasing plant growth, different varieties of plant seeds growing at different rates in different conditions, and fish growing larger in large ponds than they do in small ponds.

Assessment Limits.

Assessment does not include genetic mechanisms, gene regulation, or biochemical processes.

Science and Engineering Practice (Constructing Explanations and Designing Solutions)

- Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) 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.B: Growth and Development of Organisms)

- Genetic factors as well as local conditions affect the growth of the adult plant.

Crosscutting Concept (Cause and Effect)

- Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.

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Student Proficiency Goals for **NGSS MS-LS1-5**

Student Proficiency Goals

SEP (Constructing Explanations and Designing Solutions):

- Students identify and describe evidence that supports the idea that genetic and environmental conditions affect the growth of organisms.
- Students collect from their own experiments or from grade appropriate media, evidence that supports the idea that genetic and environmental conditions affect the growth of organisms.
- Students assume that aspects of the natural world described and explained by current laws and theories operate today as they did in the past and as they will in the future.
- Students identify strengths and weaknesses in their collected evidence, including the type of source the evidence came from and the relevance, validity, and reliability of the evidence.
- Students identify strengths and weaknesses in the ability of the evidence to support a scientific explanation for a phenomenon based on the idea that genetic and environmental conditions affect the growth of organisms.
- Students construct an explanation based on their strong evidence for a phenomenon based on the idea that genetic and environmental conditions affect the growth of organisms.

DCI (LS1.B Growth and Development of Organisms):

- Students know that genetic factors affect the growth of adult plants.
- Students know that environmental factors, such as local conditions or changes in local conditions, affect the growth of adult plants.
- Students know that growth of adult plants depends on a combination of genetic and environmental factors.

CCC (Cause and Effect):

- Students consider that phenomena related to differences in the growth of organisms in a system may have more than one cause.
- Students consider that, in interrelated systems related to the growth of organisms, some cause and effect relationships can only be described using probability.