

MS-LS2-1 Ecosystems: Interactions, Energy, and Dynamics

Students who demonstrate understanding can:

- MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.** [Clarification Statement: Emphasis is on cause and effect relationships between resources and growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources.]

The performance expectation above was developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p>Analyzing and Interpreting Data Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.</p> <ul style="list-style-type: none"> Analyze and interpret data to provide evidence for phenomena. 	<p>LS2.A: Interdependent Relationships in Ecosystems</p> <ul style="list-style-type: none"> Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors. In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction. Growth of organisms and population increases are limited by access to resources. 	<p>Cause and Effect</p> <ul style="list-style-type: none"> Cause and effect relationships may be used to predict phenomena in natural or designed systems.

Observable features of the student performance by the end of the course:	
1	Organizing data
a	Students organize the given data (e.g., using tables, graphs, and charts) to allow for analysis and interpretation of relationships between resource availability and organisms in an ecosystem, including: <ol style="list-style-type: none"> i. Populations (e.g., sizes, reproduction rates, growth information) of organisms as a function of resource availability. ii. Growth of individual organisms as a function of resource availability.
2	Identifying relationships
a	Students analyze the organized data to determine the relationships between the size of a population, the growth and survival of individual organisms, and resource availability.
b	Students determine whether the relationships provide evidence of a causal link between these factors.
3	Interpreting data
a	Students analyze and interpret the organized data to make predictions based on evidence of causal relationships between resource availability, organisms, and organism populations. Students make relevant predictions, including: <ol style="list-style-type: none"> i. Changes in the amount and availability of a given resource (e.g., less food) may result in changes in the population of an organism (e.g., less food results in fewer organisms). ii. Changes in the amount or availability of a resource (e.g., more food) may result in changes in the growth of individual organisms (e.g., more food results in faster growth). iii. Resource availability drives competition among organisms, both within a population as well as between populations. iv. Resource availability may have effects on a population's rate of reproduction.