

Standard 6.4.1

Strand 6.4: STABILITY AND CHANGE IN ECOSYSTEMS	<p>The study of ecosystems includes the interaction of organisms with each other and with the physical environment. Consistent interactions occur within and between species in various ecosystems as organisms obtain resources, change the environment, and are affected by the environment. This influences the flow of energy through an ecosystem, resulting in system variations. Additionally, ecosystems benefit humans through processes and resources, such as the production of food, water and air purification, and recreation opportunities. Scientists and engineers investigate interactions among organisms and evaluate design solutions to preserve biodiversity and ecosystem resources.</p>	
Standard: 6.4.1 MS-LS2-1	<p>Analyze data to provide evidence for the <u>effects</u> of resource availability on organisms and populations in an ecosystem. Ask questions to predict how changes in resource availability affects organisms in those ecosystems. Examples could include water, food, and living space in Utah environments.</p>	
	<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>Asking Questions and Defining Problems Asking questions and defining problems in grades 6–8 builds on grades K–5 experiences and progresses to specifying relationships between variables, and clarifying arguments and models.</p> <ul style="list-style-type: none"> Ask questions to identify and clarify evidence of an argument. 	<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.
DCI	<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. 	
Student Friendly Objectives	<p>I can analyze data about the effects of resource availability on organisms in ecosystems.</p>	
Anchor Phenomena	<p>Resource availability affects population.</p>	
Possible	<p>Fluctuations in populations of deer in Utah</p>	

Scenarios	Evolution of peppered moth during Industrial Revolution Removing shrubs and brush in area leads to less rabbits which leads to lower predator populations Impact of growing populations on resource availability	
Vertical Learning Progression Alignment	Previous Science Content (Discussed in K-5 Standards)	Future Science Content (Discussed in 9-12 Standards)
	<ul style="list-style-type: none"> Plants depend on water and light to grow, and also depend on animals for pollination or to move their seeds around. The food of almost any animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants, while decomposers restore some materials back to the soil. 	<ul style="list-style-type: none"> Ecosystems have carrying capacities resulting from biotic and abiotic factors. The fundamental tension between resource availability and organism populations affects the abundance of species in any given ecosystem.

What students should be doing:

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:
 - 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:
 - 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.