

Georgia Performance Standards Environmental Standards
 Alignment to
National Science Education Standards

Life Science

THE INTERDEPENDENCE OF ORGANISMS

SEV

<ul style="list-style-type: none"> • The atoms and molecules on the earth cycle among the living and nonliving components of the biosphere. 	1 a, d, e
<ul style="list-style-type: none"> • Energy flows through ecosystems in one direction, from photosynthetic organisms to herbivores to carnivores and decomposers. 	1 a, d, e
<ul style="list-style-type: none"> • Organisms both cooperate and compete in ecosystems. The interrelationships and interdependencies of these organisms may generate ecosystems that are stable for hundreds or thousands of years. 	3 b, c, d, e
<ul style="list-style-type: none"> • Living organisms have the capacity to produce populations of infinite size, but environments and resources are finite. This fundamental tension has profound effects on the interactions between organisms. 	3a 5 a
<ul style="list-style-type: none"> • Human beings live within the world's ecosystems. Increasingly, humans modify ecosystems as a result of population growth, technology, and consumption. Human destruction of habitats through direct harvesting, pollution, atmospheric changes, and other factors is threatening current global stability, and if not addressed, ecosystems will be irreversibly affected 	5 a, b, c, d

MATTER, ENERGY, AND ORGANIZATION IN LIVING SYSTEMS

SEV

<ul style="list-style-type: none"> • The distribution and abundance of organisms and populations in ecosystems are limited by the availability of matter and energy and the ability of the ecosystem to recycle materials. 	1 c, d 5 d
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<ul style="list-style-type: none"> As matter and energy flows through different levels of organization of living systems--cells, organs, organisms, communities--and between living systems and the physical environment, chemical elements are recombined in different ways. Each recombination results in storage and dissipation of energy into the environment as heat. Matter and energy are conserved in each change 	<p>1 a, b, c, d 2 a, b, c, d</p>
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POPULATION GROWTH

SEV

<p>Populations grow or decline through the combined effects of births and deaths, and through emigration and immigration. Populations can increase through linear or exponential growth, with effects on resource use and environmental pollution.</p>	<p>5 a, b, c, d</p>
<p>Various factors influence birth rates and fertility rates, such as average levels of affluence and education, importance of children in the labor force, education and employment of women, infant mortality rates, costs of raising children, availability and reliability of birth control methods, and religious beliefs and cultural norms that influence personal decisions about family size.</p>	<p>5 a, b</p>
<p>Populations can reach limits to growth. Carrying capacity is the maximum number of individuals that can be supported in a given environment. The limitation is not the availability of space, but the number of people in relation to resources and the capacity of earth systems to support human beings. Changes in technology can cause significant changes, either positive or negative, in carrying capacity.</p>	<p>1 b 5 a</p>

NATURAL RESOURCES

SEV

<p>Human populations use resources in the environment in order to maintain and improve their existence. Natural resources have been and will continue to be used to maintain human populations.</p>	<p>4 d 5 a</p>
<p>The earth does not have infinite resources; increasing human consumption places severe stress on the natural processes that renew some resources, and it depletes those resources that cannot be renewed.</p>	<p>4 d 5 a, c</p>
<p>Humans use many natural systems as resources. Natural systems have the capacity to reuse waste, but that capacity is limited. Natural systems can change to an extent that exceeds the limits of organisms to adapt naturally or humans to adapt technologically.</p>	<p>4 b, d 5 d</p>

ENVIRONMENTAL QUALITY

SEV

Natural ecosystems provide an array of basic processes that affect humans. Those processes include maintenance of the quality of the atmosphere, generation of soils, control of the hydrologic cycle, disposal of wastes, and recycling of nutrients. Humans are changing many of these basic processes, and the changes may be detrimental to humans.	4 a
Materials from human societies affect both physical and chemical cycles of the earth.	5 d
Many factors influence environmental quality. Factors that students might investigate include population growth, resource use, population distribution, over consumption, the capacity of technology to solve problems, poverty, the role of economic, political, and religious views, and different ways humans view the earth.	5 b

NATURAL AND HUMAN-INDUCED HAZARDS

SEV

Some hazards, such as earthquakes, volcanic eruptions, and severe weather, are rapid and spectacular. But there are slow and progressive changes that also result in problems for individuals and societies. For example, change in stream channel position, erosion of bridge foundations, sedimentation in lakes and harbors, coastal erosions, and continuing erosion and wasting of soil and landscapes can all negatively affect society.	4 f 5 c
Natural and human-induced hazards present the need for humans to assess potential danger and risk. Many changes in the environment designed by humans bring benefits to society, as well as cause risks. Students should understand the costs and trade-offs of various hazards--ranging from those with minor risk to a few people to major catastrophes with major risk to many people. The scale of events and the accuracy with which scientists and engineers can (and cannot) predict events are important considerations.	4 f 5 e, d

SCIENCE AND TECHNOLOGY IN LOCAL, NATIONAL, AND GLOBAL CHALLENGES

SEV

Humans have a major effect on other species. For example, the influence of humans on other organisms occurs through land use--which decreases space available to other species--and pollution--which changes the chemical composition of air, soil, and water.	4 c 5 c, d
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