

Year at a Glance – Ninth Grade Science

Guiding Crosscutting Concept: Interactions between the biosphere and the rest of Earth’s systems occur at various **scales of time and size.**

Official 2019-20 Version

What Students Learn

The interactions between the biosphere and the rest of Earth’s systems influence students every day, from the food they eat to the air they breathe. In high school, students can fully explain **patterns** and **ask and answer questions** about core ideas learned in prior grade levels. Some interactions occur in the blink of an eye while others take millions of years to unfold. No matter the variability in **scale**, students **use evidence**, **evaluate claims**, and **develop models** to **interpret** the unseen. Through analyses of phenomena, students enhance their understanding of core ideas in biological & earth science.

Units	Key Learning Outcomes
Ecosystem Interactions & Energy	<ul style="list-style-type: none"> ● HS-LS2-2: Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales (only graphing, not formulas.) ● HS-LS1-7: Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed, resulting in a net transfer of energy. ● HS-ESS2-6: Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. The carbon cycle is a property of the Earth system that arises from interactions among the hydrosphere, atmosphere, geosphere, and biosphere. ● HS-LS4-2: Construct an explanation based on evidence that the process of evolution primarily results from four factors: 1) the potential for a species to increase in number 2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction 3) competition for limited resources and 4) the proliferation of those organisms that are better able to survive and reproduce in the environment. ● HS-ESS3-1: Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
History of Earth’s Atmosphere: Photosynthesis & Respiration	
Evolution	
Inheritance of Traits	
Structure, Function & Growth	
Ecosystem Stability & the Response to Climate Change	