

## HS Environmental Science Standards and Benchmarks Confirmed

### **Standard 1: Understands atmospheric processes and the water cycle** **Benchmarks:**

- 1.1 Knows how winds and ocean currents are produced on the Earth's surface (e.g., effects of unequal heating of the Earth's land masses, oceans, and air by the Sun; effects of gravitational forces acting on layers of different temperatures and densities in the oceans and air; effects of the rotation of the Earth)

### **Standard 6: Understands relationships among organisms and their physical environment** **Benchmarks:**

- 6.1 Knows how the interrelationships and interdependencies among organisms generate stable ecosystems that fluctuate around a state of rough equilibrium for hundreds or thousands of years (e.g., growth of a population is held in check by environmental factors such as depletion of food or nesting sites, increased loss due to larger numbers of predators or parasites)
- 6.2 Knows how the amount of life an environment can support is limited by the availability of matter and energy and the ability of the ecosystem to recycle materials
- 6.3 Knows that as matter and energy flow through different levels of organization in living systems and between living systems and the physical environment, chemical elements (e.g., carbon, nitrogen) are recombined in different ways
- 6.4 Knows that because all matter tends toward more disorganized states, living systems require a continuous input of energy to maintain their chemical and physical organizations
- 6.5 Knows ways in which humans can alter the equilibrium of ecosystems, causing potentially irreversible effects (e.g., human population growth, technology, and consumption; human destruction of habitats through direct harvesting, pollution, and atmospheric changes)

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### Standard 7: Understands biological evolution and the diversity of life

#### Benchmarks:

- 7.1 Knows that heritable characteristics, which can be biochemical and anatomical, largely determine what capabilities an organism will have, how it will behave, and how likely it is to survive and reproduce
- 7.2 Understands the concept of natural selection (e.g., when an environment changes, some inherited characteristics become more or less advantageous or neutral, and chance alone can result in characteristics having no survival or reproductive value; this process results in organisms that are well suited for survival in particular environments)
- 7.3 Knows how variation of organisms within a species increases the chance of survival of the species, and how the great diversity of species on Earth increases the chance of survival of life in the event of major global changes

### Standard 11: Understands the nature of scientific knowledge

#### Benchmarks:

- 11.2 Knows that scientific explanations must meet certain criteria to be considered valid (e.g., they must be consistent with experimental and observational evidence about nature, make accurate predictions about systems being studied, be logical, respect the rules of evidence, be open to criticism, report methods and procedures, make a commitment to making knowledge public)

### Standard 12: Understands the nature of scientific inquiry

#### Benchmarks:

- 12.1 Understands the use of hypotheses in science (e.g., selecting and narrowing the focus of data, determining additional data to be gathered; guiding the interpretation of data)
- 12.2 Designs and conducts scientific investigations (e.g., formulates testable hypotheses; identifies and clarifies the method, controls, and variables; organizes, displays, and analyzes data; revises methods and explanations; presents results; receives critical response from others)
- 12.4 Uses technology (e.g., hand tools, measuring instruments, calculators, computers) and mathematics (e.g., measurement, formulas, charts, graphs) to perform accurate scientific investigations and communications

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### Standard 13: Understands the scientific enterprise

#### Benchmarks:

- 13.5 Understands that science involves different types of work in many different disciplines (e.g., scientists in different disciplines ask different questions, use different methods of investigation, and accept different types of evidence to support their explanations; many scientific investigations require the contributions of individuals from different disciplines; new disciplines of science, such as geophysics and biochemistry, often emerge at the interface of older disciplines)