Core Idea LS4 Vocab.

Biological Evolution: Unity and Diversity

How can there be so many similarities among organisms yet so many different kinds of plants, animals, and microorganisms?

How does biodiversity affect humans?

- Biological evolution
- unity and the diversity of species
- unifying principle(s)
- diversity of life on Earth
- scientific evidence
- fossil record
- genetic relationships among species
- DNA and protein sequence analyses
- evolutionary relationships
- Evolution
- natural selection
- genetic variation
- population
- distribution of traits
- extinction of species
- environmental challenges
- emergence of new species
- similarities of genetic material across all species
- multitude of species existing in diverse conditions on Earth—its biodiversity
- natural resources
- ecological services
- sustainability

LS4.A: EVIDENCE OF COMMON ANCESTRY AND DIVERSITY

What evidence shows that different species are related?

- Biological evolution
- living things
- shared ancestors
- unity
- diversity of species
- similarities found between species;
- inheritance
- diversity of species

- common ancestry
- branching and diversification of lineages
- population
- adapt
- natural selection
- local circumstances/conditions
- evidence
- common ancestry
- fossil record
- comparative anatomy and embryology
- similarities of cellular processes and structures
- comparisons of DNA sequences between species
- evolutionary relationships
- plants and animals that once lived on Earth (e.g., dinosaurs)
- Fossils
    - provide evidence about the types of organisms (both visible and microscopic)
    - provide evidence about the nature of their environments.
    - can be compared with one another and to living organisms according to their similarities and differences.
- Fossils formation
- sedimentary rock
- chronological order (e.g., through the location of the sedimentary layers in which they are found or through radioactive dating
- diversity
- extinction
- conditions necessary for fossil preservation
- anatomical similarities and differences between various organisms living today and between them and organisms in the fossil record
- reconstruction of evolutionary history
- inference of lines of evolutionary descent
- embryological development
- amino acid sequences
- anatomical and embryological

LS4.B: NATURAL SELECTION

How does genetic variation among organisms affect survival and reproduction?

- Genetic variation
- Species
- range of traits
- survive and produce offspring

- natural selection
- inherited traits in a population and the suppression of others
- variation in the genetic information within a population
- survival
- reproductive ability
- specific environmental conditions
- reproductive success

Grade Band Endpoints for LS4.B

- advantages in surviving, finding mates, and reproducing
- predominance of certain traits in a population and the suppression of others
- *artificial* selection
- selective breeding
- Natural selection
    - (1) variation in the genetic information between organisms in a population
    - (2) variation in the expression of that genetic information—that is, trait variation

LS4.C: ADAPTATION

How does the environment influence populations of organisms over multiple generations?

- morphological, physiological, or behavioral traits
- reproductive advantage
- adaptation
- environmental change
- selective pressures
- survival and reproduction of organism
- generation
- distribution of traits in the population.
- offspring
- extinction
- adaptive
- speciation
- biodiversity
- emergence of antibiotic-resistant

Grade Band Endpoints for LS4.C

- survival
- organism
- habitat

- environment
- Adaptation
- natural selection
- generations
- environmental conditions
- traits
- survival
- reproduction
- distribution of traits in a population changes
- population
- reproductive isolation
- evolve
- speciation
- Natural selection is the result of four factors:
    - (1) the potential for a species to increase in number,
    - (2) the genetic variation of individuals in a species due to mutation and sexual reproduction,
    - (3) competition for an environment's limited supply of the resources that individuals need in order to survive and reproduce, and
    - (4) the ensuing proliferation of those organisms that are better able to survive and reproduce in that environment.
- adaptation—that is, to a population dominated by organisms that are anatomically, behaviorally, and physiologically well suited to survive and reproduce in a specific environment.
- differential survival

Adaptive changes due to natural selection, as well as the net result of speciation minus extinction, have strongly contributed to the planet's biodiversity.

- reproduction
- population
- advantageous heritable trait
- physical environment
- expansion of some species
- extinction
- evolution

LS4.D: BIODIVERSITY AND HUMANS

What is biodiversity, how do humans affect it, and how does it affect humans?

- Human beings

- Biodiversity—the multiplicity of genes, species, and ecosystems
- renewable resources
- ecosystem services
- climate stabilization
- decomposition of wastes
- pollination
- healthy (i.e., diverse and resilient) ecosystems
- biological communities
- sustainable limits
- ecosystems
- habitat destruction
- pollution of air and water
- overexploitation of resources
- introduction of invasive species
- climate change
- sustainable use of resources
- ecosystem degradation
- species extinction,
- loss of ecosystem services

Grade Band Endpoints for LS4.D

- classified
- living and nonliving resources
- Biodiversity
- adaptation
- terrestrial ecosystems
- marine ecosystems
- Biodiversity
- genetic variation
- species
- habitats
- ecosystem types (e.g., forests, grasslands, wetlands
- ecosystem services —for example, water purification and recycling
- speciation
- loss of species (extinction)
- Biological extinction (irreversible)
- natural capital
- overpopulation
- overexploitation
- habitat destruction

- pollution
- introduction of invasive species
- climate change
- biological extinctions—as many species or populations of a given species, unable to survive in changed environments, die out
- ecosystem functioning and
- preserving landscapes of recreational or inspirational value.