

CH 22: Evolution

22.1 (megan)

Carolus Linnaeus- created binomial nomenclature which a two part naming system that includes the organism's genus and species

Jean-Baptiste de Lamarck- developed an early theory of evolution based on two principles

- **Use and Disuse** is the idea that parts of the body that are used extensively become larger and stronger, while those that are not used deteriorate.
- **Inheritance of Acquired Characteristics** assumes that characteristics acquired during an organism's lifetime could be passed on to the next generation.
- *Importance:* **Lamarck recognized** that species evolve and the match of organisms to their environment occurs through gradual evolutionary change. His explanatory mechanism, however was later proved to be flawed.

22.2

Individuals do not evolve. Populations evolve.

-Darwin's mechanism for evolution: natural selection

-Lamarck's mechanism for evolution: inheritance of acquired characteristics

Natural selection: explains how adaptations arise

-**Adaptations:** heritable characteristics that enhance organisms' ability to survive and reproduce in specific environments.

ex) Desert foxes have large ears, which radiate heat. Arctic foxes have small ears, which conserve body heat.

Darwin's theory of natural selection

1. Individuals in a population vary in their traits, many of which are heritable
2. A population can produce far more offspring than can survive. With more individuals than the environment can support, competition is inevitable.
3. Individuals with inherited traits that are better suited to the local environment are more likely to survive and reproduce than individuals less well-suited. Sometimes called "differential reproductive success."
4. Evolution occurs as the unequal reproductive success of individuals ultimately leading to adaptation to their environment. Over time, natural selection can increase the match between organisms and their environment.

Artificial selection: process by which species are modified by humans.

ex) Selective breeding for milk or meat production; development of dog breeds.

22.3 (Alex and Tyller)

- Evidence for Evolution

- **Direct observation:** Evolution of drug-resistant viruses and antibiotic resistant bacteria.

ex) insect populations can rapidly become resistant to pesticides

- **Homology and convergent evolution:** Homology characteristics in related species can have an underlying similarity even though they have different functions (common ancestry)

- Homologous structures are anatomical signs of evolution.

ex) forelimbs of mammals, used for flying, swimming. Common ancestor for walking

- Embryonic homologies: Comparison of early stages of animal development reveals many anatomical homologies in embryos that are not visible in adult organisms.

ex) All vertebrate embryos have a post- anl tail and pharyngeal pouches

- Vestigial organs are structures of marginal, served important functions in organisms' ancestors

- Molecular homologies are shared characteristics on the molecular level.

ex) finding ancestors with common DNA

- Convergent evolution explains why distantly related species can resemble one another. Two organisms developed similarities as they adapted to similar environmental challenges. The likenesses that result from convergent evolution are considered analogous rather than homologous.

- The fossil record

-Paleontology is the study of fossils.

-Fossils are the remains or traces of organisms from the past. Found in sedimentary rock.

-Fossils show that evolutionary changes have occurred over time and the origin of new organisms.

-Darwin's theory of evolution through natural selection.

- **Biogeography:** the geographic distribution of species

-Species in a discrete geographic area tend to be more closely related to each other than distant geographic areas

-Continental drift can explain why similar species are on continents that are distant

-Endemic species are found at a certain geographic location and nowhere else

ex) Marine Iguanas are endemic to the Galapagos.

Chapter 22 Test (clicker)

1. Darwin's Mechanism for evolution was...
 - a. inheritance of acquired characteristics
 - b. natural selection
 - c. photosynthesis
 - d. energy
2. Whose mechanism for evolution was inheritance of acquired characteristics?
 - a. Darwin's
 - b. Lamarck's
 - c. Linnaeus'
 - d. Lyell's
3. Direct observations of evolutionary change, homology and convergent evolution, the fossil record, and biogeography are...
 - a. natural selection
 - b. evidence for evolution
 - c. artificial selection
 - d. adaptations
4. _____ do not evolve. _____ evolve.
 - a. humans; pigs
 - b. individuals; populations
 - c. biomes; landscape
 - d. populations; communities
5. The likenesses that result from convergent evolution are considered...
 - a. homologous
 - b. analogous
 - c. molecules
 - d. armadillos
6. Homologous structures are...
 - a. The number of toes on a bird
 - b. Anatomical signs of evolution
 - c. Animal skeletons that all appear the same
 - d. Convergent evolution
7. Paleontology is the study of...
 - a. plants
 - b. fossils
 - c. animals
 - d. planets
8. Inheritance of acquired characteristics assumes...
 - a. that parts of the body that are not used will be passed on to the next generation

- b. that characteristics acquired during an organism's lifetime could be passed on to the next generation
 - c. that all species are modified by humans
 - d. that the only way to get species diversity is through mating animals with plants
9. Biogeography is...
- a. how many tries it takes an organism to climb a tree
 - b. the geographic distribution of species
 - c. the study of fossils
 - d. how biomes survive harsh winters
10. Who developed binomial nomenclature?
- a. Carolus Linnaeus
 - b. Charles Darwin
 - c. Fish
 - d. Jean-Baptiste de Lamarck