Change Over Time Notes Continued

Plate Tectonics Theory:

The movements of Earth's continental & oceanic plates have caused mountains and deep ocean trenches to form and continually change the shape of Earth's crust throughout time.

- These same movements have caused these plates to pass through different climatic ones.
- The movements of the plates cause change in climate, in geographic features such as mountains, and in the types of living things in particular places.

Two Types of Plates:
Ocean Plates- Plates below the ocean Continental Plates- Plates below the continents

Wegner's Theory of Continental Drift:
Theory that continents were once part of a single landmass (Pangea) that broke apart (into 12 large plates) and have moved to their present locations, by convection currents of hot molten rock in the Earth's core. Wegner used evidence from landforms, fossils, and climate to support his theory.

Types of Boundaries:

- Divergent Boundaries: Boundary between two plates that are moving apart or rifting ← →
  Rifing causes seafloor spreading.
  In sea floor spreading, molten material rises from the mantle and erupts along mid ocean ridges.
- Convergent Boundaries: Boundaries between two plates that are colliding → ←
  This boundary type results in mountains or subduction.
- Transform Boundaries: Boundary between two plates that are sliding past each other.
  Earthquakes occur along faults.

What makes the plates move?
Hot magma in the Earth moves toward the surface, cools, then sinks again.
Creates convection currents beneath the plates that cause the plates to move.

What is evolution?
A history of change - life on Earth, shape of Earth's surface

Theory of Evolution: Scientific evidence that organisms (species) and landforms have changed over time.

What is the theory of evolution?
States that species change over time in response to the environment

Charles Darwin: the father of evolution
His theory is that all life is related and has descended from a common ancestor

What is biological evolution?
Change in living things over time in response to changes in the environment
Accounts for the diversity of species developed through gradual processes over many generations

How does evolution take place?

- Mutations: changes in the DNA sequence of an organism.
- Adaptations: helpful variations that increase a species chance of survival
- Natural Selection: "survival of the fittest"
- Extinction: when all of the members of a species no longer exist

What are biological adaptations?
Include structures, behaviors, or physiology that enhance survival and reproductive success in a particular environment

How do we know organisms are related?
Similarities between organisms can show the degree of relatedness

- **Homologous structures-** alike because of a shared ancestry
- **Analogous structures-** alike, but not because of shared ancestry
  Wings of insects and birds used for flying
  Fins of fish and flippers of whales (mammals)

Embryological similarities- organisms are alike in the early stages of life but develop differently

What is extinction?
Occurs when the environment changes and individual organisms of a species do not have the traits necessary to survive and reproduce.

- Extinction is common among species
- Most species that lived on earth are now extinct

What is biological classification?
Taxonomy- A system used to organize all life on earth that precisely describes organisms

- Allows scientists to examine relationships between organisms
- Scientists build evolutionary trees to show relationships between modern organisms and historical examples

What is the difference between genotype and phenotype?
Genotype: Combination of letters which represent inherited gene pairs
Phenotype: physical appearance of the trait

How does variation exist within a population?
Variations exists within phenotypes of the individuals in every population
An organisms phenotype can influence its ability to: find, obtain, & utilize resources and reproduce

How do changes in environment affect survival?
Changes in the environment can affect a single organism or an entire species

- Organisms with characteristics that are well suited for the new environment survive and reproduce at higher rates
- Favorable traits increase in frequency and slowly the species evolves

What is natural selection?
Random mutations occur in an organisms' genetic code.

- Beneficial mutations are preserved because they aid survival
- Natural selection: survival of the fittest
  - Beneficial mutations are passed to the next generation
  - Over time, beneficial mutations accumulate and result in an entirely new organism

Why is it important for a species to have a variation of phenotypic traits?
Variability in phenotypic traits leads to diversity of the organisms

- Greater diversity leads to greater chance of survival or species
  - Species can easily adapt to changes in environment