Biological Evolution Standard 1 & 2 Study Guide

Standard 1: Explain how our understanding of biological evolution has changed over time with new scientific research and discoveries

Science is based on three characteristics. They are:

1. _Testable_
2. _Changeable_
3. _Collaborative_

Describe the following scientists contributions to our understanding of biological evolution:

- Robert Malthus: _Suggested that life (he was talking about humans) produces more offspring than can be supported_
- Charles Lyell: _Developed idea of Uniformitarianism: Processess/mechanisms present today have always existed_
- Charles Darwin: _Natural selection: species change due to natural selection_
- Jean Baptise de Lamarck: _Suggested aquired traits during on individual's life time are passed to offspring_
- Alfred Wallace: _Also proposed, after Darwin, that species change over time by natural selection_
- Hutton: _Suggested the idea of geological time and uniformitarianism_

Both Lamarck and Darwin suggested ways that organisms inherit traits. **State** their theories **and** **explain** the difference between their theories.

Lamarck: Species aquire traits through use or disuse of trait

Darwin: Species change by those best fit survive to pass on genes to offspring

- Lamarck thought individuals change during their lifetime results in being passed on

Using absolute and relative dating techniques, data suggests the earth is _4.5 – 4.6 billion_ _____ years old (don't forget units). The _Law of Superposition_

suggests that older rock layers and fossils are found on the bottom and younger on the top. The age of fossil samples can be calculated using ___radiometric___ dating. The ___geological timescale___ describes the relationships and timing of events during the history of earth. Three examples of fossils include ___cast___, ___el tree___, and ___amber___.

Standard 2: Identify and explain different mechanisms (processes) that contribute to species changing over time.

Explain the following terms in relation to biological evolution:

- Fitness: ___Ability of individual to survive in it's envt. and have reproducing off spring ⇒ pass on genes___
- Natural Selection: ___Change in population over time caused by some individuals being better fit for their envt.___
- Genetic Variation: ___Differences in traits of individuals in some species ⇒ bell curve___
- Competition: ___Individuals in some species (and diff. species) compete for food, shelter, mates___
- Adaptation: ___Structure, behavior, internal process that helps organism survive in its envt.___
- Competition: ___

~ not on Standard 2 assessment, Standard 4

Due to selection, populations are always changing. In polygenic traits, a ___bell curve___ shows the distribution or range of phenotypes for the trait. If one extreme of the trait is best fit for the environment this represents ___directional___ selection; if both extremes of the trait are best fit for the environment this represents ___disruptive___ selection; if the middle or average form of the trait is best fit for the environment this represents ___stabilizing___ selection. ___Sexual___ Selection occurs when an individual selects a mate based on specific trait characteristics. For example, male peacocks have brightly colored feathers to attract mates.

Over time, competition, genetic variation within population, over production of offspring, adaptation, and natural selection can cause a ___population___ to evolve.

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_____Populations_____ Evolve, _____individuals_____ do not.

Types of Adaptations:

Explain adaptation: _____Structure, behavior or internal process that helps an organism to survive in its envt._____

Explain the three types of adaptations and give an example of each:

- **Behavioral:** _____behavior (action) that helps an organism survive in it's envt._____
  - a. Example: _____Birds migrate in winter_____
- **Structural:** _____Physical trait that helps an organism survive in it's envt._____
  - a. Example: _____Thorns on plants to protect them_____
- **Physiological:** _____Internal process that helps an organism maintain homeostasis (balance) & survive_____
  - a. Example: _____Humans make enzyme that causes blood to clot when they get a cut_____