Name _____

Science vs. Religion

The Theory Of Evolution By Natural Selection (p. 276 – 282)

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I. Darwin Proposed A Mechanism For Evolution

1. Evolution is the process by which modern organisms descended from ancient organisms. (Not in the book.)

- 1809 - 1882
- English naturalist
- Beagle Voyage (1831 - started) → 5 years

2. In 1859, who published an explanation for a mechanism driving the process of evolution?

Charles Darwin

3. In Darwin's time, most people believed that a species is divinely created and unchanging.

Circle One : True False

Creationism
Earth = few thousand years old
= unchanged over time
= geologic features caused by catastrophic events
= literal interpretation of Bible

4. Explain the hypothesis of evolution created by Jean Baptiste de Lamarck. (INCORRECT!)

Selective use or disuse of organs led to acquisition or loss of traits during lifetime → traits passed to offspring
(Flapping Wings (Arms) → Flight) / (Muscle builders) / Giraffe Necks

5. Circle the letter of the sentence that is false about Darwin's voyage on the HMS *Beagle*.

a. Darwin made important observations on the Galapagos Islands, near South America.
b. He reported his findings soon after he returned home. (Disturbed by findings)
c. Darwin read Charles Lyell's book, *Principles Of Geology*. → Past events can be explained using observations today. (1833)
d. Discovered fossils of extinct animals.

James Hutton
- Geologic processes operate extremely slowly
(1795)

6. How did the economist, Thomas Malthus, influence Darwin? (1798)

Believed that war, famine, + disease limit human populations
(Gave him the ideas for natural selection)
Natality rates exceed Mortality rates
↓
Overpopulation (↑ competition for resources)

7. Define the term population.

Population – all the individuals of a species that live in a specific geographical area and can interbreed

II. Evolution By Natural Selection

1. Define the term natural selection.

I am wasting resources!

Natural Selection – organisms best-suited for their environment have higher chances of survival + reproduction

2. Define the term adaptation.

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Everything has a reason.

Adaptation – any inherited characteristic that increases an organism's chance of survival

3. List three critical adaptations that you possess as a human.

1. Brain 2. Opposable Thumb 3. Upright

Name _____

4. ***On The Origin Of Species*, presented a view of evolution that was widely accepted.**

Circle One : True (False)

Sensational Book (some agreed, some disagreed)

5. **List the four components of Darwin's theory of evolution by natural selection.**

Adapt or Die!

1. Inherited variation exists in every population.
2. Some individuals are better suited to survive + reproduce.
3. "Positive" traits tend to spread in a population.
4. Fossil evidence indicates that living species evolved from extinct species.

III. Darwin's Ideas Updated *(Questions 2 – 5 are not in the book.)*

1. **How does natural selection affect allele frequencies in populations?**

Certain alleles increase or decrease over time (Fitness = ability to pass genes)

2. ***What does the Hardy-Weinberg principle state?***

– Allele frequencies in a population will remain constant unless one or more factors cause them to change.

3. Genetic equilibrium ***occurs when allele frequencies are constant.***

Genetic Equilibrium Disruptions
1. Natural Selection – Peppered Moths
2. Mutations – Zebra Stripes
3. Genetic Drift – Goats around Mt. St. Helens
4. Non-Random Mating – Cattle yards
5. Small Populations – Inbreeding
6. Migration – Galapagos Finches → mainland to islands

4. ***List five conditions required to maintain genetic equilibrium.***

1. Random Mating
2. Very large population
3. No mutations
4. No natural selection
5. No movement in or out of population

5. ***Why is a large population size important for maintaining genetic equilibrium?***

Genetic drift (chance events) have less effect on large populations

6. **Define the term reproductive isolation.**

Reproductive Isolation – members of two species cannot interbreed + produce fertile offspring

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7. **How has reproductive isolation affected squirrel populations near the Grand Canyon?**

– Kaibab squirrel (North Rim – black belly) and Abert squirrel (South Rim – white belly) are now separate species

Salamanders
San Joaquin Valley
Single Species

8. **Differentiate between gradualism and punctuated equilibrium.**

Gradualism : Gradual change over a long period of time

Punctuated Equilibrium : Periods of rapid change of a species are separated by periods of little or no change

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Mass Extinctions?