CHAPTER 17 Darwin and Evolution

17.1 History of Evolutionary Thought

The pre-Darwinian world-view was different from the post-Darwinian.

1) The earth is young.
2) Each species was specially created and did not change
3) Variations are imperfections
4) Observations are to substantiate the prevailing worldview.

Mid-Eighteenth-Century Contributions

A. Carolus Linnaeus and Taxonomy

- What is taxonomy?
- What is binomial nomenclature?

B. Georges Louis Leclerc

- What is biogeography?

C. Erasmus Darwin

- Who was Erasmus?
- What principle did he suggest in Zoonomia?

3. Late Eighteenth-/Early-Nineteenth Century Contributions

A. Cuvier and Catastrophism

- What science was founded by Cuvier?
- What is catastrophism?

B. Lamarck's Acquired Characteristics

- What is wrong with Lamarck's hypothesis?

17.2 Darwin's Theory of Evolution

The Galápagos Islands

- Where are these islands?
- Why are they special?

Darwin's Finches

Finches on the Galápagos Islands resembled a mainland finch but there were more types.
Questions to Ponder:
Did the animals on the islands descend from one mainland ancestor?
What were the variations found on the finches?
Why were the island finches so different from mainland finches?
Why did the vampire finch evolve?

Natural Selection and Adaptation

Natural selection was proposed by both Alfred Russel Wallace and Darwin.

It is the driving mechanism of evolution caused by environmental selection of organisms most fit to reproduce, resulting in adaptation.

*Wallace was not given credit for the theory because Darwin published first, however, there is a geographical area named for him called the "Wallace Line" which separates Australia and Asia.*

What are three preconditions for natural selection?
1. 
2. 
3. 

There are two consequences of natural selection.
1. An increasing proportion of individuals will have the adaptive characteristics.
2. The result of natural selection is a population adapted to its local environment.

Natural selection can only utilize variations that are randomly provided; therefore there is **no directedness or anticipation of future needs**.

Pause and think: Thinking that evolution has a direction is a common misconception. Can you think of any statements you may have heard that suggest people think that evolution is directional?

Extinction occurs when previous adaptations are no longer suitable to a changed environment.

Examples:

How Evolution by Natural Selection Works

1. Variations exist in the population and are heritable:

Example:
2. Every individual struggles to exist, there are not enough resources.

Example:

3. Organisms Differ in Fitness
   a. Fitness is a measure of an organism's reproductive success
   b. Fitness does not necessarily mean stronger

Why measure reproductive success and not just survival?

4. Survivors pass traits to offspring

What is an adaptation?

Examples?

**Artificial Selection**

Describe how artificial selection works.

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**On the Origin of Species by Darwin**

1. After the HMS Beagle returned to England in 1836, Darwin waited over 20 years to publish.
2. He used the time to test his hypothesis that life forms arose by descent from a common ancestor and that natural selection is a mechanism by which species can change and new species arise.
3. Darwin was forced to publish Origin of Species after reading a similar hypothesis by Alfred Russel Wallace.

What is the definition of evolution?

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**Assignment:**

Imagine a Scenario of Evolution.....

1. Create a real or imagined organism
2. Describe 2-3 variations
3. Show how evolution would act on this population given a change in the environment (climate, predators, food change..)
4. Pay attention to which variations are beneficial, which are harmful.
5. Show how reproduction changes the overall population (with regard to these variations)
6. Be creative! You can map your organism through a few generations... You will present your scenario to the classs