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AP Biology

# Chapter 22-Descent with Modification

*As you study this chapter, read several paragraphs at a time to catch the flow of ideas and understand the reasoning that is being described. In some places, the text describes a narrative or story of events that led to Darwin's theory of evolution. Therefore, first read the narrative to absorb the big picture and then return to answer the few questions that accompany this material.*

3) How did each of the following sources view the origin of species?

***The Old Testament***

***Carolus Linnaeus***

***Georges Cuvier***

4) How did Charles Lyell and geological gradualism and uniformitarianism influence Darwin? Make sure you explain both of these ideas.

5) *Jean-Baptiste de Lamarck* proposed a mechanism for how life changes over time. Explain the two principles of his mechanism.

**use and disuse**

**inheritance of acquired characteristics**

6) Charles Darwin proposed that the mechanism of evolution is *natural selection* and that it explains how *adaptations* arise. What are *adaptations*? Give two examples of adaptations.

8) Let's try to summarize Darwin's observations that drive changes in species over time:

| Observation | Cite an Example |
|---|---|
| 1. Variations in traits exist. | |
| 2. These variations (traits) are heritable. | |
| 3. Species overproduce. | |
| 4. There is competition for resources; not all offspring survive. | |

9) From these four observations, which two inferences did Darwin make?

*Finally, if you are ever asked to explain Darwin's theory of evolution by natural selection (a common AP essay question), do not pull out the phrase "survival of the fittest." Instead, cite the points made in question 8 and explain the inferences that are drawn from them.*

11) Do antibiotics cause bacteria to become resistant? Explain your response.

12) How does the fossil record give evidence for evolution?

13) What is meant by each of the following terms? Give an example of each.

| Term | Example |
|---|---|
| *Homologous structures* | |
| *Vestigial structures* | |
| *Analogous structures* (see p. 465) | |

14) How do *homologous structures* give evidence for evolution?

16) Organisms that are only distantly related can resemble each other. Explain *convergent evolution*, and describe how *analogous structures* can arise.

**Study Tip**

***Homologous structures*** show evidence of relatedness**.** (whale fin, bat wing)

***Analogous structures*** are similar solutions to similar problems but do *not* indicate close relatedness.

(bird wing, butterfly wing)

17) What is *biogeography*? How is it affected by *continental drift* and the presence of *endemic species*?

*ORGANIZE YOUR THOUGHTS*

1. Evolution is change in species over time.
2. Heritable variations exist within a population.
3. These variations can result in differential reproductive success.
4. Over generations, this can result in changes in the genetic composition of the population.

*And remember*: Individuals do not evolve! *Populations* evolve.