**Chapter 19 Active Reading Guide: Descent with Modification Mrs. Javon**

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# Overview

1. How did Darwin define evolution?
2. What does that phrase mean?

# Section 1

1. Was evolution Darwin’s idea? Explain.
2. What was Carolus Linnaeus’ contribution to biology?
3. Most fossils are found in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ rock formed from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Explain the role of fossils in rock strata as a window to life in earlier times.
5. What is paleontology and who developed its early study?
6. How would Georges Cuvier have explained the appearance of the record of life shown in the rock strata?
7. James Hutton and Charles Lyell were geologists whose ideas strongly influenced Darwin’s thinking. What were the ideas each of them contributed?

James Hutton:

Charles Lyell:

1. What is the principle of uniformitarianism?
2. 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:

1. How is the bonsai tree in Figure 19.4 an example of “acquired traits cannot be inherited?”

# Section 2

1. 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.
2. Explain the process of natural selection.
3. Let’s try to summarize Darwin’s observations that drive changes in species over time:

|  |  |
| --- | --- |
| Observation | Cite and 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. |  |

1. From these four observations, what two inferences did Darwin make?

1.

2.

1. To demonstrate your understanding of this section, complete the following sentence:

do not evolve. evolve.

Hold the ideas in this section firmly in your brain! 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 15 and explain the inferences that are drawn from them.

# Section 3

1. Use Figure 19.14 in your text to explain how research with soapberry bugs demonstrated observable evolutionary change.
2. MRSA is in the news today because it is becoming increasingly more common. What is it?
3. How did it become so dangerous? Explain the evolution of MRSA’s resistance to methicillin.
4. Do antibiotics cause bacteria to become resistant? Explain your response.
5. Let’s make a list of the four evidences for evolution that are described in this concept. Give an example of each.

|  |  |
| --- | --- |
| Evidence for Evolution | Example |
| Direct observations of evolutionary change |  |
| Homology |  |
| Fossil Record |  |
| Biogeography |  |

1. How does the fossil record give evidence for evolution?
2. What is meant by each of the following terms? Give an example of each.

Homologous structures

Vestigial structures

Analogous structures

1. How do homologous structures give evidence for evolution?
2. What is summarized in an evolutionary tree?
3. Figure 19.20 in your text shows an evolutionary tree. What is indicated by each branch point in the figure?
4. Organisms that are only distantly related can resemble each other. Explain convergent evolution, and describe how analogous structures can arise.
5. Convergent evolution might be summarized like this: Similar problem, similar solution. Can you give two examples of convergent evolution?

**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).

1. What is biogeography? How is it affected by continental drift and the presence of endemic species?

**Let’s wrap up all of these ideas with a final summary.**

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.