

## EVOLUTIONARY THEORY

### EVOLUTION:

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### LAMARCK

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### DARWIN

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## QUESTIONS:

1. Evolution can be defined as "change through time". What is changing?

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2. Match the description or theory with the correct individual or belief.

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| A. Aristotle               | E. Linnaeus |
| B. Cuvier                  | F. Lyell    |
| C. Hutton                  | G. Plato    |
| D. Judeo-Christian culture |             |

\_\_\_\_\_ Believed in 2 worlds – one is ideal and eternal and the other was imperfect because it was viewed through human senses

\_\_\_\_\_ Species are permanent and perfect; living forms are organized on a scale of increasing complexity

\_\_\_\_\_ Species were created in their current forms and have not changed since the original creation; dominated by natural theology – the philosophy dedicated to discovering the Creator's plan by studying nature

\_\_\_\_\_ Sought to discover order in the diversity of life "for the greater glory of God"; founder of the science of taxonomy

\_\_\_\_\_ Developed the science of paleontology; recognized that extinction was a common occurrence

\_\_\_\_\_ Catastrophism

\_\_\_\_\_ Gradualism

\_\_\_\_\_ Uniformitarianism

3. Match the description with the correct term.

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|------------------|----------------------|
| A. Catastrophism | C. Uniformitarianism |
| B. Gradualism    |                      |

\_\_\_\_\_ History of Earth marked by floods or droughts that resulted in extinctions

\_\_\_\_\_ Profound change is the cumulative product of slow but continuous processes

\_\_\_\_\_ Geological forces at work today are the same forces that shaped the Earth in the past

4. How did the work of James Hutton and Charles Lyell influence the work of Charles Darwin?


5. Lamarck proposed a mechanism to explain how specific adaptations evolved. This mechanism incorporated the ideas of use & disuse and acquired traits. Explain each of these ideas.

IDEA	EXPLANATION
<b>USE &amp; DISUSE</b>	
<b>ACQUIRED TRAITS</b>	

6. In what ways does Lamarck's theory of evolution not agree with present evidence?

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7. Consider the giraffe's long neck. Explain how this came about using Lamarck's concept of evolution (inheritance of acquired traits.)

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8. The embryologist Charles H. Waddington treated fly larvae with heat shock. As a result of this treatment, some of the adult flies showed the abnormal condition "crossveinless" (some of their wing veins were missing.) After several generations of this treatment, he let a generation of flies develop without heat treatment and many of them were also crossveinless. Does this experiment provide convincing proof of Lamarckism? If not, what other explanation can you suggest, and what experiments would you perform to test your suggestions?

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9. Consider the giraffe's long neck. Explain how this came about using Darwin's mechanism of evolution (natural selection.)

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10. Define natural selection.

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11. What is meant by the phrase "survival of the fittest"?

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12. Why is there a constant struggle for survival among organisms within a population?

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13. What is(are) the difference(s) between natural selection and adaptation?

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14. Natural selection occurs through interaction of two factors? What are they?

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15. An individual acquires many traits during its lifetime. How important are these acquired characteristics to evolution? Explain.

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16. Define the term population.

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17. Explain why populations and not individuals evolve.

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18. The English peppered moth, *Biston betularia*, has two distinct varieties – light colored with speckles of pigments and uniformly dark color. These moths spend their days on trees in the area. Birds feed on the moths.

a. In the late 18<sup>th</sup> century, the trees in England were a light color.

Which variety of the moth was better able to survive in the environment of the late 18<sup>th</sup> century?

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Why was it better able to survive?\_\_\_\_\_

\_\_\_\_\_

b. In the mid-19<sup>th</sup> century, the environment changed because of industrialization. During this time, pollutants were released into the air. This pollution darkened the trees.

What happened to the # of light colored moths?\_\_\_\_\_

Why did this happen?\_\_\_\_\_

\_\_\_\_\_

What happened to the # of dark colored moths?\_\_\_\_\_

Why did this happen?\_\_\_\_\_

\_\_\_\_\_

c. Explain why this is an example of natural selection.

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19. Define biogeography.

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20. Explain how each of the following provide evidence in support of Darwin's principle of common descent (evolution).

CATEGORY	HOW IT SUPPORTS EVOLUTION
Biogeography	
Fossil record	
Taxonomy	
Comparative anatomy	
Comparative Embryology	
Molecular Biology	

21. Define and give examples of each of the following.

STRUCTURE	DEFINITION	EXAMPLES
Homologous		
Vestigial		

22. There is evidence that the Koala bear uses its appendix to detoxify the leaves it eats. Is the appendix a vestigial organ in this animal? Explain

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23. Define:

Ontogeny	
Phylogeny	

24. Does ontogeny recapitulate phylogeny? Explain.

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