

## **BIOL 200, Introductory Evolution Muskegon Community College**

### **General Objectives:**

The student will:

1. Discover and recognize biological diversity and variation among individuals in a population and unity of all organisms.
2. Compare historical hypotheses surrounding the development of the biological evolution theory.
3. Explain the biological evolution theory and its co-acting mechanisms of change.
4. Provide supporting evidence for the biological evolution theory including some current examples.
5. Describe how speciation occurs.
6. Explore the hypotheses on the origin of organic molecules and the tree of life.

### **Specific Objectives:**

1. Define and compare: science, scientific process (method), religion, faith, theory, law, hypothesis, evolution.
2. Explain the importance of the scientific method for science.
3. Explain how variation exists within the gene pool of populations and that traits of individuals are a consequence of genes and to some degree, the environment.
4. Explain that mutations are "the raw material for evolution," and how other new gene combinations develop through meiosis, fertilization, and conjugation.
5. Distinguish the difference between relative dating and radiometric dating.
6. Discuss at least two examples illustrating each of these types of evolutionary evidence: fossil, biogeographical, anatomical, developmental, molecular (genetic or biochemical).
7. Compare micro and macro evolution.
8. Discuss Cuvier's catastrophism explanation, Lamarkian's hypothesis, and Paley's hypothesis and "evidence" used to support these hypotheses.
9. Critically compare the above hypotheses and the Theory of Evolution (Darwin and Wallace).
10. List and explain the postulates of natural selection model.
11. Describe evidence for natural selection.
12. Explain why silent mutations are not subject to natural selection.
13. Define adaptation and give two examples.
14. Distinguish directional, stabilizing and disruptive natural selection.

15. Differentiate between natural selection and other types of selection, such as sexual selection.
16. Differentiate between adaptive and non-adaptive evolution.
17. Discuss types of non-adaptive evolution: genetic drift and mutations. Give one example of founder effect and bottleneck.
18. Define species and discuss the historical attempts to explain the concept.
19. Analyze data and construct phylogenetic trees.
20. Distinguish these speciation mechanisms: prezygotic isolating and postzygotic isolating.
21. Distinguish between these types of speciation: allopatric, sympatric, and parapatric.
22. Distinguish between divergent, convergent, and parallel evolution and give an example of each type.
23. Define co-evolution and give one example.
24. Define cline, polymorphism, and interspecific variation.
25. Explain adaptive radiation and give two examples.
26. Give at least two examples from current populations of the effect of evolutionary processes.
27. Explain that extinction is a result of evolution.
28. Explore the tree of life.
29. Discuss hypotheses on the origin of organic life and state scientific support for the hypotheses: Oparin and Miller's hypothesis, Panspermia hypothesis, and RNA world hypothesis.
30. Define life and list at least 5 characteristics that living things exhibit.