READING QUESTIONS for Chapter 22: Descent with Modification

1. Compare and contrast **artificial selection** and **natural selection**. (2 pts)

2. What are the key ideas/components of **natural selection**? Describe each (2 pts)

3. How does the concept of "descent with modification" explain both the unity and diversity of life? (2 pts)

4. Define and give examples of each: (6 pts)
   1. **Homologous structures**

   2. **Vestigial structures**

   3. **Analogous structures**

5. Define and give an example of **convergent evolution**.(2 pts)

6. What is a **theory**? (1 pt)

7. Explain why this statement is incorrect: "antibiotics have created drug resistance in MRSA." (1 pt)

Test Your Understanding – Record your answers to questions 1-5 on p. 468 (5 pts)

1) _____ 2) _____ 3) _____ 4) _____ 5) _____

Total Points Earned: _____ / 21

READING QUESTIONS for Chapter 23: Evolution of Populations

1. Why is it incorrect to say that *individuals* evolve? What is the smallest unit of evolution? (2 pts)

2. Differentiate between *discrete* characters and *quantitative* characters as they relate to variation. (p. 470) (2 pts)

3. Describe two ways of measuring genetic variability (p. 470-471). (2 pts)

4. Define and give an example of **geographic variation**. (2 pts)

5. Summarize the various **sources of genetic variation**. (4 pts)

6. Of all the mutations that occur in a population, why do only a small fraction become widespread? (1 pt)

7. Explain what it means for an allele to be *fixed* within a gene pool. (1 pt)

8. What does it mean for a population to be in Hardy-Weinberg equilibrium? (1 pt)

9. Outline the 5 conditions for **Hardy-Weinberg equilibrium**. (2 pts)

10. Summarize each of the following factors that can alter allele frequencies in a population: (4 pts)

1. **natural selection**

2. **genetic drift**

3. **the founder effect**

4. **the bottleneck effect**

11. What are the potential consequences/effects of genetic drift? (4 pts)

12. What is meant by the term "**gene flow**"? (1 pt)

13. Explain why this statement is false: "natural selection is random." (1 pt)

14. Which is more predictable: natural selection or genetic drift? Why? (2 pts)

15. Use the terms "**directional**," "**stabilizing**" or "**disruptive**" to identify each of the following scenarios. (2 pts)

1. The mice in the Arizona desert have either dark or light fur. _____
2. Birds produce 4-5 eggs per clutch. _____
3. The average human baby weighs 7 lbs. _____
4. Darwin's finches and beak size during drought. _____

16. Explain 3 ways sexual reproduction produces genetic diversity. (3 pts)

17. Define *and* give an example of **heterozygote advantage**. (2 pts)

18. Would individuals who are heterozygous for the sickle-cell allele be selector for or against in a region free of malaria? Explain. (1 pt)

19. What are four reasons for why natural selection cannot engineer perfect organisms? (4 pts)

Test Your Understanding – Record your answers to questions 1-6 on p. 486-487 (6 pts)

1) _____ 2) _____ 3) _____ 4) _____ 5) _____ 6) _____

Total Points Earned: _____ / 47

READING QUESTIONS Chapter 24: the Origin of Species

1. Define a **biological species**. *(1 pt)*

2. What is meant by **reproductive isolation**? *(1 pt)*

3. Draw a T-chart to contrast ***Pre-Zygotic*** and ***Post-Zygotic*** barriers to reproduction and provide examples of each. [Be sure to check out pp. 490-491] *(10 pts)*

4. Why is it important to understand other species concepts? (such as morphological, ecological, and phylogenetic species concepts) *(1 pt)*

5. Define **speciation**. (1 pt)
6. Contrast **allopatric** and **sympatric** speciation. Which type would include **geographic isolation**? What evidence do we have of each type? *(6 pts)*

7. What is **polyploidy**? What kinds of organisms is it common among? Does it result in allopatric or sympatric speciation? *(2 pts)*

8. What is a **hybrid zone** and how does it occur? *(2 pts)*

9. There are 3 ways hybrid zones may change over time. Match each with its description. *(3 pts)*

FUSION **STABILITY** **REINFORCEMENT**

1. _____: hybrids eventually stop forming as the reproductive barriers are strengthened
2. _____: hybrids continue to be produced
3. _____: two species fuse as reproductive barriers are weakened

10. There are 2 main tempos for evolution. Summarize **punctuated equilibrium**. How does this differ from **gradualism**? Draw and label a simple diagram to represent each tempo. *(4 pts)*

Test Your Understanding – Record your answers to questions 1-7 on p. 505-506 (7 pts)

1) _____ 2) _____ 3) _____ 4) _____ 5) _____ 6) _____ 7) _____

Total Points Earned: _____ / 38

READING QUESTIONS Chapter 25: The History of Life on Earth

1. *Draw/diagram* and label a four step process that could explain how the first cells would have evolved on Earth as outlined on p. 508. (4 pts)

2. *Describe and/or draw* what early Earth would have been like about 4 billion years ago. Refer to the information described on p. 508. (4 pts)

3. What hypothesis did Stanley Miller and Harold Urey test? _____
   Summarize the **Miller-Urey experiments**, and explain the significance of their findings. (5 pts)

4. What was most likely the first genetic material to evolve? Why? (p. 509-510) (2 pts)

5. When RNA performs enzyme-like catalytic functions, they are called _____. (1 pt)

6. You read that scientists have found fossilized stromatolites dating back to 3.5 bya. Create an outline or timeline that sequences the major characteristics in the evolution of life on Earth from the list below. (3 pts)
   HETEROTROPHIC PROKARYOTES
   AEROBIC PROKARYOTES
   PHOTOSYNTHETIC PROKARYOTES
   MULTI-CELLULAR EUKARYOTES
   SINGLE-CELLED, HETEROTROPHIC EUKARYOTES
   SINGLE-CELLED, PHOTOSYNTHETIC EUKARYOTES

7. What had to be present on Earth in order to support aerobic cells? _____ What cellular process produces this substance? _____ (2 pts)

8. The first appearance of free oxygen in the atmosphere likely triggered a massive wave of extinctions among the prokaryotes of the time. Why? (1 pt)

9. Carefully read through the **endosymbiont theory** and study the diagram on p. 517. Draw or summarize the key events of this process. (4 pts)

10. Why do scientists think that mitochondria evolved before plastids (chloroplasts)? (1 pt)

11. What evidence do scientists have that the endosymbiont theory is true? List. (3 pts)

12. Draw fossil layers to represent the order in which the following evolved on Earth. (9 pts)
    1. Reptiles
    2. Prokaryotes
    3. Humans
    4. Seed plants
    5. Vertebrate Fish
    6. Amphibians
    7. Vascular Land plants
    8. Mammals
    9. Aquatic Invertebrates (sponges, starfish, jellyfish)

13. How many mass extinctions have occurred on Earth? (1 pt)

14. What is **adaptive radiation**? What is the correlation between mass extinctions and adaptive radiation? (2 pts)

15. What are **homeotic genes**? (1 pt)

16. Why is it likely that *Hox* genes have played a major role in the evolution of novel (new) morphological forms? (1 pt)

Test Your Understanding – Record your answers to questions 1-8 on p. 532-533 (8 pts)

1) _____ 2) _____ 3) _____ 4) _____

5) _____ 6) _____ 7) _____ 8) _____ **Total Points Earned: _____ / 52**