Name _____ **Period** _____

Chapter 14: How Biological Diversity Evolves

Guided Reading Activities

Chapter Content: The Origin of Species

Complete the following questions as you read the fourteenth chapter content—The Origin of Species:

1. _____is the formation of a new species through evolutionary mechanisms.

2. The meadowlarks in the following figure look very similar and yet they belong to different species. The humans shown in the same figure display a fair amount of diverse features and, yet, they are all members of the same species. Briefly explain why the birds are not members of the same species while the humans belong to the same species.

3. The answer to question 2 forms the basis for the _____ concept.

4. List the two types of reproductive barriers.

   A)

   B)

5. True or false: A reproductive barrier is a mechanism that prevents members of different species from mating with one another. If false, please make it a correct statement.

6. It is possible to produce an offspring from a zebra mating with a donkey. Indeed, in 2013 at a zoo in Florence, Italy, a male zebra climbed a zoo fence in order to mate with a female donkey. This resulted in the donkey giving birth to a live organism called Ippo. Ippo is considered a hybrid organism and is known as a zeedonk or a zonkey. While there is no doubt that Ippo is cute, this mating would likely never happen in the wild. Which reproductive barrier would prevent this from occurring?

7. Which of the following represents a post-zygotic barrier?

   A) Temporal

   B) Habitat

   C) Reduced hybrid viability

   D) Gametic

8. Two different species of spiders mate at different times of the year. One species breeds in late spring and one breeds in late summer. What type of reproductive barrier is this?

9. Complete the table that compares the different reproductive barrier mechanisms.

Genetic drift	Description with example
Behavioral isolation	
Temporal isolation	
Habitat isolation	
Mechanical isolation	
Gametic isolation	
Reduced hybrid viability	

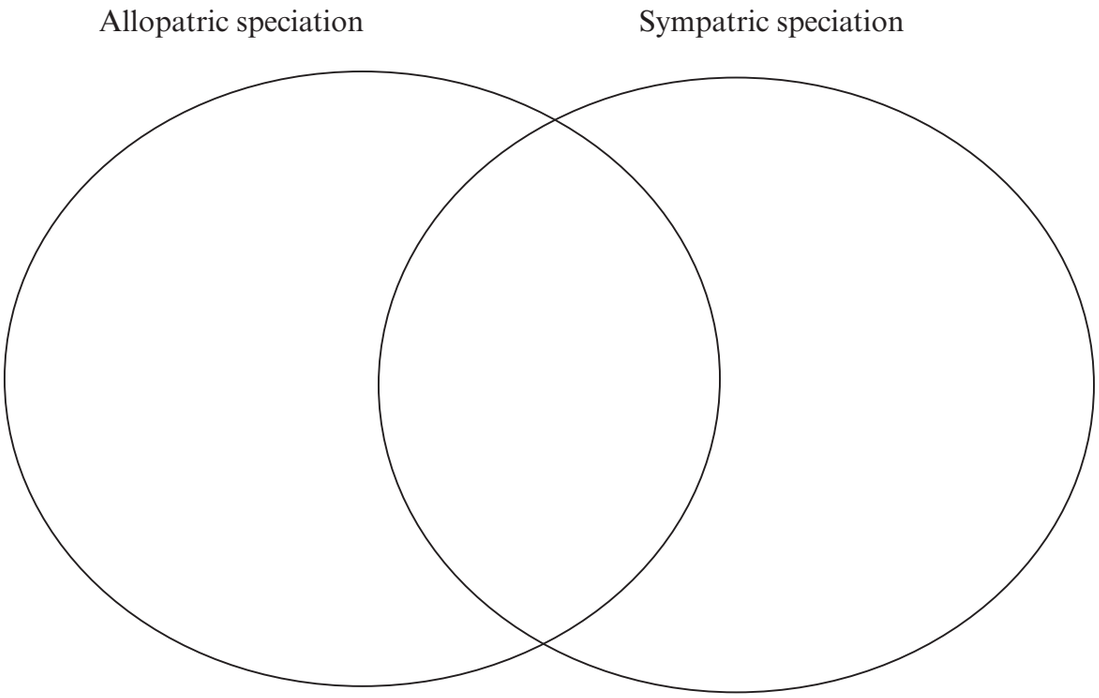
10. The creation of a new species without geographic isolation is known as _____.
    A) Allopatric speciation
    B) Polyploidy
    C) Sympatric speciation
    D) Reproductive barriers

11. A geographic barrier to _____ can give rise to _____ speciation.

12. True or false: Geographic isolation always leads to speciation. If false, make it a correct statement.

13. Which of the following refers to having more than two complete sets of chromosomes?
    A) Speciation
    B) Polyploid
    C) Sympatric
    D) Allopatric

14. Complete the Venn diagram that compares sympatric speciation with allopatric speciation.



Chapter Content: Earth History and Macroevolution

Complete the following questions as you read the fourteenth chapter content—Earth History and Macroevolution:

1. Researchers have identified a series of speciation events that has created a new group of organisms. Which of the following terms best describes what has occurred?
   A) Macroevolution
   B) Biogeography
   C) Microevolution
   D) Geologic time scale

Use Table 14.1 on page 280 of your textbook to answer questions 2–4.

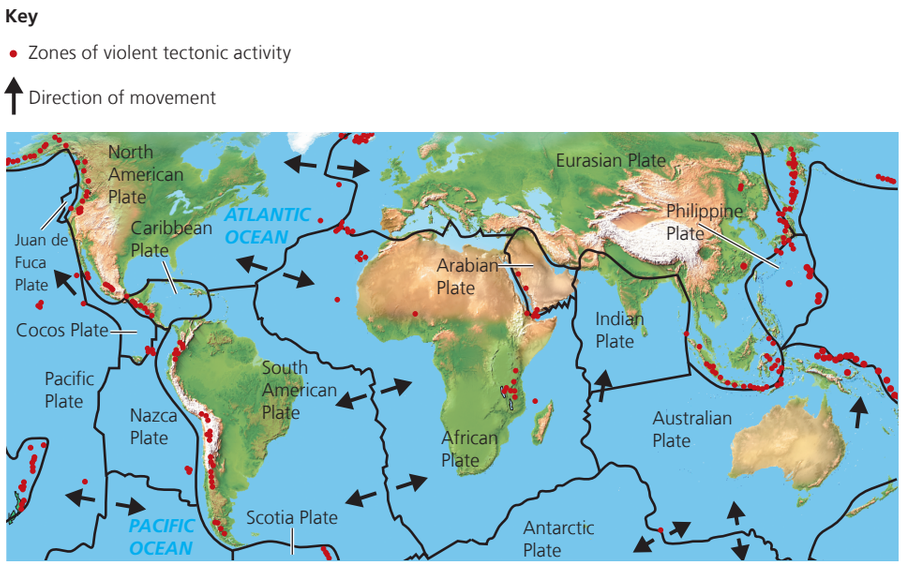
2. How old is the oldest known animal fossil?

3. What group of organisms appeared in the cretaceous period?

4. Consider the answer to question 3 when answering this question. Would this be an example of microevolution or macroevolution?

5. True or false: Radiometric dating is based on the decay of radioactive isotopes over time. If false, make it a correct statement.

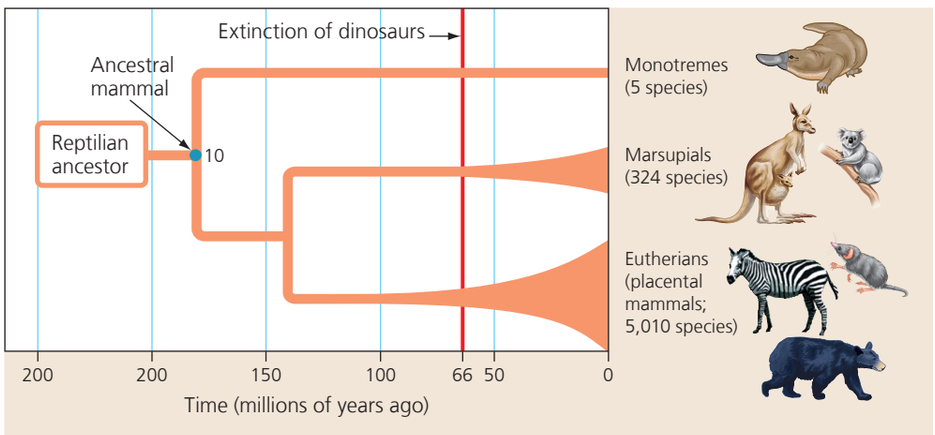
6. Is it possible for North and South America to "drift" apart? Briefly explain your answer using the following figure.



7. _____ is the study of the distribution of organisms both past and present.

8. Earth has witnessed several mass extinctions. It would seem obvious that a mass extinction is not desirable. However, is there any upside to a mass extinction?

9. Use Figure 14.18 from your textbook to answer the following question. What key event allowed for mammals to significantly increase in the number of different species? Approximately when did this occur?



Chapter Content: Mechanisms of Macroevolution

Complete the following questions as you read the fourteenth chapter content—Mechanisms of Macroevolution:

1. Structures that evolve under a certain set of circumstances but prove useful for a separate function are called _____.

   A) Paedomorphosis

   B) Gradual refinements

   C) Biological novelties

   D) Exaptations

2. The discovery of _____in 1996 was a key moment in our understanding of feather evolution because it was the first feathered _____ to be found.

3. Evidence suggests that feathers evolved before flight. List a possible function served by feathers prior to their use as an instrument of flight.

4. True or false: Most complex structures evolved suddenly. If false, please make it a correct statement.

5. Provide an example of a complex structure that has evolved in numerous small increments.

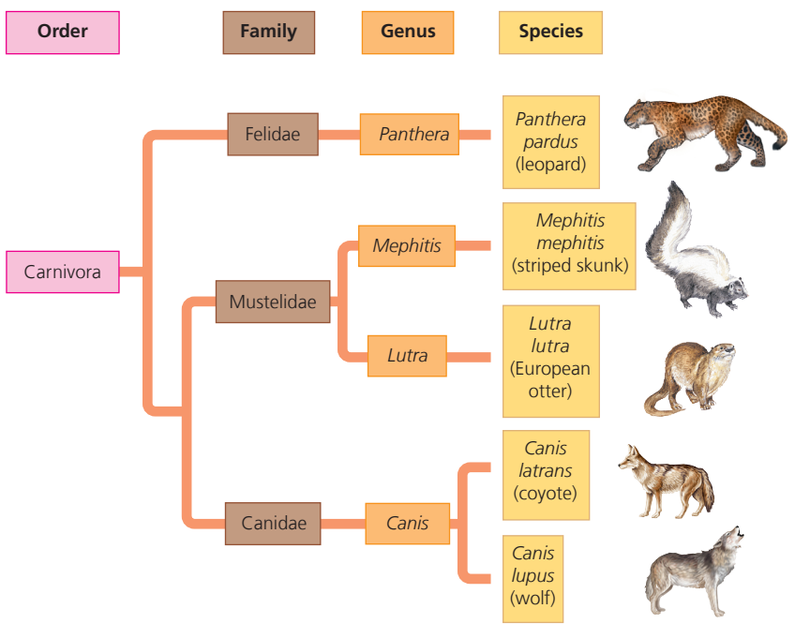
Chapter Content: Classifying the Diversity of Life

Complete the following questions as you read the fourteenth chapter content—Classifying the Diversity of Life:

1. _____ is the area of biology that focuses on classification and evolutionary relationships.

2. True or false: A phylogenetic tree represents a hypothesis about the evolutionary history of an organism. If false, make it a correct statement.

3. What do the leopard, striped skunk, European otter, coyote, and wolf all have in common? Use Figure 14.22 on page 286 of your textbook.



4. Which of the following taxonomic levels include all of the others? Use Figure 14.22 on page 286 of your textbook.

   A) Genus

   B) Order

   C) Family

   D) Species

5. What kind of evolution gives rise to analogy? _____.

6. Briefly compare analogy to homology.

7. True or false: The skulls of humans and chimpanzees are an example of analogy. If false, make it a correct statement.

8. A group of species descended from a common ancestor is known as a _____.
   A) Speciation
   B) Phylogenetic tree
   C) Population
   D) Clade

9. You are a research biologist working at the U.S. research station in Antarctica. You discover a new single-celled organism that is able to survive in the frigid conditions. During your research you observe that the organism has a nucleus. Which domain would this new organism be classified into? Briefly explain your answer.

Major Theme Connection:

1. A biologist discovers that the genes that code for crucial enzymes in glycolysis (look back at Chapter 6) are remarkably similar in humans, bread mold, and maple trees. What can she infer from these data?

Common Thread Connection:

1. Isle Royale National Park consists of a series of islands located in Lake Superior. Initially, there were no wolves on any of the islands since they were in the middle of Lake Superior. However, in 1949, an unusually long and cold winter produced an ice bridge between Canada and the islands of the National Park. During this winter, a pair of wolves used the ice bridge to travel inadvertently to Isle Royale. Today there continues to be a wolf population on the main island descended from that original pair. Has allopatric speciation occurred yet with respect to the mainland wolves? If not, could it? How would you determine if it has occurred?

