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Date: _____

CHAPTER 14 : Evolution – How Change Occurs

Read and study pp. 304 - 313, then answer the following questions on a separate piece of paper.

Species and Niches: pp. 304 - 306

1. Define "Speciation".
2. Describe what a niche is and what happens when two species occupy the same niche.
3. Which of the two species will survive in that given niche?
4. What changes in the environment led to the extinction of the Dodo Bird?
5. Under what conditions does a new species form from within a current species?
6. Why is reproductive isolation necessary to create a new species from an old one?
7. List some ways in which reproductive isolation can form?
8. What criteria must be met before they can be considered two different species?

Darwin's Finches: p. 306-308

9. Describe why Galapagos Island Finches have different shaped beaks.
10. Give a brief but accurate account of the five steps that took place for the 14 species of finches to form from one ancestral species.
11. List the two names given to this type of evolution where one species, gives rise to many.
12. Describe what "Convergent Evolution" is. (Use the glossary)
13. Define what "Analogous Structures" are, and give an example.

Evolutionary Theory Evolves: pp. 310-313

14. Can evolution take place without "Natural Selection"?
15. What is meant by "Genetic Drift"?
16. Give an example of how genetic drift can take place.
17. In what size of a population does genetic drift work best?
18. According to naturalists' interpretations, does the African Rhinoceros have a significant edge in fitness than that of an Indian Rhinoceros?
19. Give another example of two animal species that vary in a specific phenotype, but the variation is probably NOT due to Natural Selection.
20. One type of living fossil is the crocodile, name one other species that has lived relatively unchanged for hundreds of millions of years.
21. What time frame is considered to be a short period of time in the geological time scale?
22. Explain both why and how mass extinction of several species can actually give rise to new species through adaptive radiation.

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23. Compare the theory of "Gradualism" to the theory of "Punctuated Equilibrium".

"Giant Rodent" Article

24. How long ago did this species live, and where was it located?

25. Describe this rodent's diet

26. After it became extinct, its niche was left vacant, think of some animals that could now come in and fill that niche.

Giant rodent astonishes scientists

WASHINGTON (AP) — A rodent the size of a buffalo? Researchers say they have found fossils for a 700-kilogram giant that thrived millions of years ago in a swampy South American forest.

"Imagine a weird guinea pig, but huge, with a long tail for balancing on its hind legs and continuously growing teeth," said Marcelo Sanchez-Villagra of the University of Tubingen in Germany, the first author of a study appearing this week in the journal *Science*.

The formal name of the rodent is *Phoberomys pattersoni*. The last term is in honour of Brian Patterson, a Harvard professor who led a fossil-collection expedition to Venezuela in the 1970s. Informally, the skeleton is called Goya.

Researchers found the fossils in a semi-desert area of Venezuela, about 400 kilometres west of Caracas.

When Goya lived there, some six million to eight million years ago, the area was a lush paradise for a large plant eater.

"At the time, it was forested and swampy, with a big river and a lot of vegetation," said Sanchez-Villagra.

The giant rodent grazed on grasses, which he must have eaten in large amounts to support his great size. Goya had fur, a smooth head with small ears and eyes, and a large tail that enabled it to balance on two hind



The Associated Press

The largest rodent that ever lived, *Phoberomys pattersoni*, seen in this artist's rendering, was roughly the size of a buffalo and roamed Venezuelan river banks about eight million years ago. Researchers have recently found in Venezuela the most complete skeleton to date of a giant rodent, which is an evolutionary sibling to modern-day guinea pigs.

legs to watch for predators, said Sanchez-Villagra.

And there were a lot of predators to worry about, he said.

"We know that there were crocodiles in the same location where we found this animal," said Sanchez-Villagra. "They were some of the largest crocs ever — more than 10 metres long."

He said the closest living relative to *Phoberomys pattersoni* is probably the pacarana, a slow-moving rodent that

can grow to 15 kilograms and lives in the tropical forest of the western Amazon River basin. It is considered rare.

The largest living rodent is another South American animal, the capybara, which can weigh up to 50 kilograms. The most common rodents are mice, which weigh about 28 to 55 grams, and rats, which can weigh up to about 300 grams. The rodent clan also includes squirrels, beavers and prairie dogs.