

**AP Biology**  
**Guided Reading Chapter 19**

Name \_\_\_\_\_

Overview

1. In the last chapter, you were asked about macroevolution. To begin this chapter, give some examples of macroevolution. Include at least one novel example not in your text.

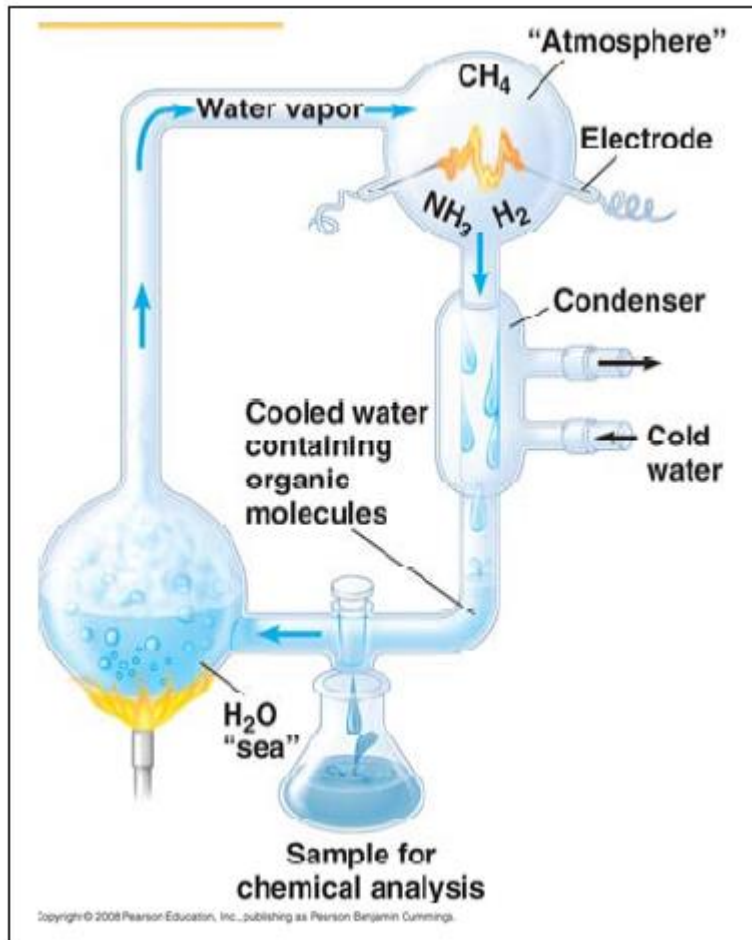
*19.1 Origin of Life*

2. How old is the planet? \_\_\_\_\_
3. How old is the earliest evidence of life on Earth? \_\_\_\_\_
4. The current theory of the origin of life suggests a sequence of four main stages. Look through this section and summarize them here.

1.	
2.	
3.	
4.	

5. In your chart above, the first stage is the synthesis of organic molecules. Consider the early planet, probably thick with water vapor and stinky with methane, ammonia, and hydrogen sulfide. What gas was missing from this early mix? Why?
6. A. I. Oparin and J. B. S. Haldane hypothesized that the early atmosphere was a reducing environment. What did they suggest was the source of energy for the early organic synthesis?

7. In 1953 at the University of Chicago, Stanley Miller and Harold Urey tested the Oparin-Haldane hypothesis with this apparatus. Explain the elements of this experiment, using arrows to indicate what occurs in various parts of the apparatus.



8. What did Thomas Cech propose was the first genetic material, DNA or RNA?  
\_\_\_\_\_
9. Explain the evidence for an early "RNA world."
10. What are protobionts? What properties of life do they demonstrate?
11. What was the earliest form of life on the planet? How long ago did this life-form first occur?
12. What unique ability was originated with cyanobacteria?

13. How is it hypothesized that the first membrane formed?

14. Was the first protocell an autotroph or a heterotroph?

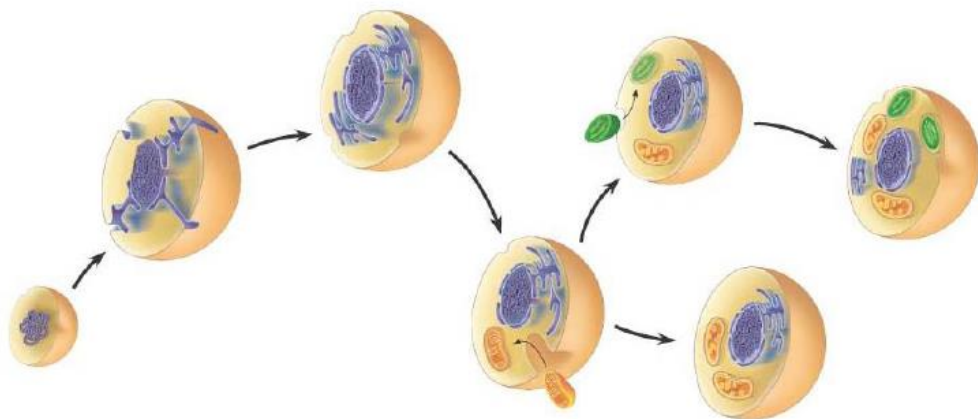
15. What evidence supports RNA being the first genetic material to evolve?

16. What are ribozymes?

17. What evidence supports the protein first hypothesis?

18. What does Cairns-Smith suggest?

19. The first eukaryotes did not appear until approximately 2.1 billion years ago. Using the figure, label and explain the evolution of eukaryotes by endosymbiosis. (Look back to Ch. 4)



20. Summarize three lines of evidence that support the model of endosymbiosis.

