

## BSCS Chapter 17 Study Guide

1. Assume the sun and solar system formed from common dense matter. Based on this assumption what could one predict about the composition of the entire solar system?
2. What does the big bang theory attempt to explain?
3. What type of dating is used to determine the age of our solar system?
4. List the gases of the primitive atmosphere.
5. Are the hydrogen and oxygen atoms which are found on the earth today the same as when the planet was originally formed?
6. Where did the earth's atmosphere originate from?
7. Were the first organisms aerobic or anaerobic? What evidence helped you choose your answer?
8. Where did the oxygen which eventually became part of the evolving atmosphere come from?
9. Why is the suggestion that life on our planet could have come from another planet not helpful in terms of studying the origin of life?

10. Due to the presence of \_\_\_\_\_ life as we know it today on earth is possible.
11. Explain why amino acids did not come from meteorites even though they might contain amino acids.
12. Why would a biologist not attempt to debate the origin of life by creation?
13. Name the gas that contributed the amino group to the first amino acids.
14. Name the gas that contributed the carbon to the first organic compounds.
15. Name the gas most abundant in our atmosphere.
16. Name the gas most toxic to early organisms?
17. The formation of more complex molecules is crucial to the Oparin-Haldane hypothesis because it
  - a. demonstrates that living things are mainly protein.
  - b. shows how small organisms may have formed.
  - c. shows that complex molecules can occur in nature.
  - d. shows how proteinlike substances may have formed.
18. According to the RNA world hypothesis which of the following would be true?
  - a. DNA formed first so that it could produce RNA.
  - b. RNA must have served as both an information molecule and a catalyst.
  - c. RNA would not have to reproduce itself completely.
  - d. DRNA must serve only as an information molecule.
19. In order to replicate proteins need the help of \_\_\_\_\_.
20. Can short strands of RNA metabolize methane?

21. The understanding that we can no longer consider enzymes as only proteins reminds us that
  - a. we will never fully understand the function of DNA or RNA.
  - b. Biology is a body of established facts.
  - c. The ideas and hypotheses given in our biology text will not change.
  - d. Biology is an experimental science and a process of discovery.
22. True or False: Biological evolution consists of mutation through chemical evolution.
23. According to Carl Woese life began before or after the planet was fully formed.
24. If the first life-form was a functioning system, what structure was it most likely similar to in structure?
25. According to microfossil records life could have existed on our planet how many years ago?
26. Modern \_\_\_\_\_ resembles the oldest fossil remains.
27. What provides the strongest evidence for the age of the earliest organisms?
28. Are the prokaryotic organisms found in Australia more or less organized structures than those found today?
29. According to \_\_\_\_\_ methanogens may have been the Earth's first organisms.
30. Where can methanogens be found?
31. From the following list which process is the most recent?
  - a. photosynthesis
  - b. heterotrophy
  - c. synthesis of organic compounds from inorganic molecules
  - d. formation of the atmosphere

32. What are some differences between prokaryotes and eukaryotes? From these which would be the most major difference?

33. If a cell has a chloroplast would that cell be a prokaryote or eukaryote?

34. What type of cell are plants and animal cells?

35. According to Lynn Margulis mitochondria and chloroplasts originated as \_\_\_\_\_.

36. Name the commonalities of mitochondria and chloroplasts.

37. Refer to this diagram for the next 3 questions.

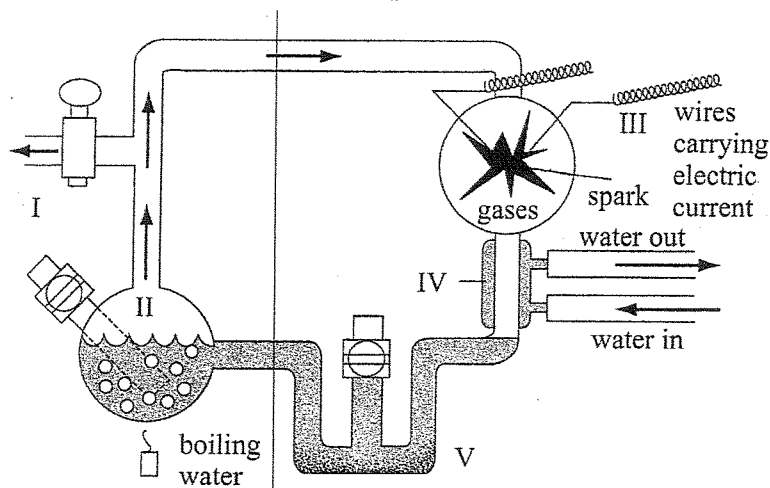


Figure 17.01

In which part of the apparatus would vapors condense that were circulating?

Which part of the apparatus simulated the temperature and relative humidity of the ancient atmosphere?

Which part of the apparatus provided the energy for making and breaking chemical bonds?

38. What type of tool[s] do astronomers, anthropologists and molecular biologists use to study events occurring long before humans were around to make observations and record them?
39. Define: inferences, redshift, blueshift.
40. True or False: Life on earth could be older than earth itself.
41. Provide the best current estimate for the formation of the earth, moon rock formation and meteor formation.
42. Is the moon older, younger or the same age as the earth?
43. According to the text what do scientists believe about meteor formation?
44. What source do geologists use as evidence to understand the history of the earth?
45. What do scientists use to measure for dating rocks and fossils?
46. Describe carbon 14 and its use.
47. Do rocks typically contain too much or too little carbon?
48. Are the majority of rocks too young or too old to date?
49. Provide evidence that indicates the earth's interior is hot.

50. List the primary sources of heat energy within the earth.
51. In the early atmosphere oxygen was bound to what materials?
52. When did oxygen in the atmosphere reach modern levels?
53. List reasons why the surface of the earth 4.6 billions years ago would have been hostile to modern life.
54. How much oxygen was probably in the atmosphere when life began?
55. According to Oparin and Haldane what “ingredients” were in the early atmosphere?
56. According to Oparin and Haldane what energy sources were available to cause gases in the early atmosphere to react and form compounds?
57. List the three major steps for the origin of life, according to the Oparin-Haldane version.
58. Name the gas Miller found was needed to produce more complex amino acids.
59. In Miller’s experiments formaldehyde was needed to form \_\_\_\_\_.
60. According to biochemists how did simple organic molecules form?

61. True or False. Catalysts which helped the first organic polymers to form may have included asteroids.
62. Define: ribozymes.
63. List the characteristics for something to be considered alive.
64. List the possibilities for the first life-forms.
65. What does the discovery of microscopic fossils in northwestern stromatolites suggest?
66. For how many years were prokaryotes more than likely the only organism on earth?