

CHAPTER REVIEW

Ch 17

CONTENT REVIEW

Multiple Choice

Choose the letter of the answer that best completes each statement.

- The hypothesis that mice can arise from spoiled grain is called
 - evolution.
 - microfossil.
 - spontaneous generation.
 - metabolism.
- One scientist who believed in spontaneous generation was
 - Redi.
 - Needham.
 - Pasteur.
 - Spallanzani.
- Earth's early atmosphere did not contain free
 - nitrogen.
 - oxygen.
 - carbon dioxide.
 - hydrogen cyanide.
- Microfossils indicate that the first living cells were not
 - prokaryotes.
 - heterotrophic.
 - eukaryotes.
 - anaerobes.
- Modern photosynthetic organisms have replaced H_2S with
 - HCN.
 - CO_2 .
 - H_2O .
 - O_2 .
- In the atmosphere, oxygen forms a layer of O_3 , or ozone, that protects organisms from
 - sunlight.
 - infrared radiation.
 - ultraviolet radiation.
 - hydrogen cyanide.
- Cells with membrane-bound organelles are called
 - prokaryotes.
 - mitochondria.
 - chloroplasts.
 - eukaryotes.
- Sexual reproduction can speed up evolution because it provides more
 - chromosomes.
 - genetic variation.
 - identical cells.
 - organelles.

True or False

Determine whether each statement is true or false. If it is true, write "true." If it is false, change the underlined word or words to make the statement true.

- The hypothesis that nonlife arises from life is called spontaneous generation.
- Redi showed that the flies that developed on raw meat did not arise spontaneously.
- Earth formed around 4.6 billion years ago.
- In the presence of oxygen, amino acids spontaneously link to form short chains.
- The first true cells were prokaryotes.
- The first heterotrophs were similar to modern-day stromatolites.
- The ozone layer protects living things from ultraviolet radiation from the sun.
- Genetic variation increases when organisms reproduce asexually.

Word Relationships

A. In each of the following sets of terms, three of the terms are related. One term does not belong. Determine the characteristic common to the three terms and then identify the term that does not belong.

- early atmosphere, hydrogen sulfide, oxygen, nitrogen
- organelle, amino acid, lipid, carbohydrate
- RNA, DNA, amino acid, nucleic acid
- aerobic, first true cells, heterotrophic, anaerobic
- eukaryote, asexual, prokaryote, single-celled

- B. Replace the underlined definition with the correct vocabulary word.
6. Pasteur helped disprove the life arises from nonlife hypothesis.
 7. Microscopic fossils provide outlines of ancient cells in rocks.
 8. The first true cells were organisms that can live without oxygen.

CONCEPT MASTERY

Use your understanding of the concepts developed in the chapter to answer each of the following in a brief paragraph.

1. Explain why scientists believe the first true cells were anaerobic heterotrophic prokaryotes.
2. Discuss the experiments of Redi, Needham, Spallanzani, and Pasteur as they relate to spontaneous generation.
3. Which is more likely to result in increased variety among organisms, sexual reproduction or asexual reproduction? Why?
4. In one early experiment, Pasteur used flasks that had curved necks. He tipped some of the flasks so that the nutrient broth ran into the neck and then back into the body. Pasteur later observed microorganisms in these flasks. Explain this observation.
5. Discuss how scientists believe the Earth's early atmosphere and oceans formed.
6. Describe the symbiosis theory of eukaryotic development.

CRITICAL AND CREATIVE THINKING

Discuss each of the following in a brief paragraph.

1. **Sequencing events** Draw a time line that begins with the formation of the Earth and ends with the development of multicellular life. Make sure every significant event discussed in the chapter is included.
2. **Applying facts** Describe the ways in which the evolution of photosynthesis changed not only living things but the environment of Earth as well.
3. **Making predictions** Predict how modern life on Earth would have evolved if organisms did not begin using H_2O instead of H_2S in photosynthesis.
4. **Relating cause and effect** When people believed in spontaneous generation, a scientist developed this recipe for producing mice: Place a few wheat grains and a dirty shirt in an open pot; wait 3 weeks. Suggest a reason why this recipe may have worked. How could you prove that the mice were not due to spontaneous generation?
5. **Drawing conclusions** Although scientists have re-created some of the events that led to the formation of complex organic compounds, they do not believe that similar events could occur in the natural world today. Explain why not.
6. **Making inferences** Suppose autotrophic organisms had not evolved. What would life on Earth be like today?
7. **Using the writing process** You are asked to develop a television program for young children that explains the origin of life on Earth. Write a script for this show. You might like to videotape your presentation.
8. **Using the writing process** Did you ever wonder what it would have been like to be the first cell on Earth? Pretend you are that first cell. Keep a written diary of your first week on Earth.