

Directed Reading

30.4 (EVEN)

Section: The Big Bang Theory

- _____ 1. What is cosmology?
 - a. the study of the distance, mass, and time of the universe
 - b. the study of the origin, structure, and future of the universe
 - c. the study of the stars, planets, and people of the universe
 - d. the study of how the stars affect Earth and the universe

- _____ 2. Like all scientific theories, the theories about the origin and evolution of the universe
 - a. are well established.
 - b. must constantly be tested against new observations and experiments.
 - c. are occasionally tested against old observations and experiments.
 - d. are considered to be true.

- _____ 3. Many current theories of the universe began with observations made
 - a. more than 300 years ago.
 - b. more than 100 years ago.
 - c. less than 100 years ago.
 - d. less than 10 years ago.

HUBBLE'S OBSERVATIONS

4. What did Hubble discover near the end of the 1920s?

5. What did Hubble find out about the most distant galaxies?

6. What do the spectra of distant galaxies collected today say about Hubble's original findings?

A THEORY EMERGES

7. Define the *big bang theory*.

Directed Reading *continued*

8. If you trace the expanding universe back in time, what would you find?

9. In terms of expansion, what is true of the universe today?

10. What is cosmic background radiation?

11. When do astronomers think cosmic background radiation formed?

12. What would the universe have been like soon after the big bang compared with now?

13. What is the temperature of the energy of the background radiation from the big bang?

14. What are the ripples in the cosmic background radiation, and what caused them?

Directed Reading *continued*

15. What may the ripples in the cosmic background radiation indicate about the early universe?

A UNIVERSE OF SURPRISES

_____ 16. Analyzing the ripples in cosmic background radiation suggests that the kinds of matter that humans, the planets, the stars, and matter between stars are made of

- a. make up only 73% of the universe.
- b. make up only 23% of the universe.
- c. make up only 4% of the universe.
- d. make up only 32% of the universe.

_____ 17. What is the type of matter called that does not give off light?

- a. dark energy
- b. darkness
- c. dark matter
- d. dark elements

_____ 18. What is dark energy?

- a. Scientists think that dark energy acts as a force that opposes gravity.
- b. Scientists think that dark energy is matter that does not give off any light.
- c. Scientists think that dark energy acts as a dark force that opposes reality.
- d. Scientists think that dark energy acts as a force that opposes magnetism.

_____ 19. Recent evidence suggests that distant galaxies are

- a. closer to Earth than current theory would indicate.
- b. moving faster than current theory would indicate.
- c. farther from Earth than any theory is able to describe.
- d. farther from Earth than current theory would indicate.

_____ 20. Because of dark energy, the universe's rate of expansion

- a. seems to be slowing.
- b. seems to be undetectable.
- c. seems to have stopped.
- d. seems to be accelerating.