Answer Key

Directed Reading A

SECTION: OUR SOLAR SYSTEM

1. B
2. C
3. D
4. C
5. solar system
6. The Saturn system is made up of the planet Saturn and the moons that orbit it.
7. B
8. D
9. 1 second
10. light minute
11. There are 8.3 light minutes in one astronomical unit.
12. D
13. B
14. the sun, Mercury, Venus, Earth, Mars, Jupiter, Saturn, and the moon
15. C
16. B
17. the inner solar system
18. terrestrial planets
19. Mercury, Mars, Earth, Venus
20. Jupiter, Saturn, Uranus, Neptune
21. They are large planets that are composed mostly of gases.
22. They are made of different materials.

SECTION: THE INNER PLANETS

1. B
2. The inner planets are smaller, denser, and rockier than the outer planets.
3. C
4. period of rotation
5. because its period of rotation is so slow
6. C
7. D
8. A
9. B
10. A
11. D
12. B
13. C
14. C
15. D
16. because Venus is only slightly smaller, less massive, and less dense than Earth
17. prograde
18. retrograde
19. Earth is located at just the right distance from the sun to keep its water from freezing and cool enough to keep its water from boiling away.
20. Answers may vary. Sample answer: the atmosphere, land, ice, the oceans, and life
21. C
22. B
23. C
24. Mars is a cold planet because it has a thin atmosphere that cannot trap heat, and it is located much farther out from the sun.
25. Olympus Mons
26. The difference in the chemical composition of Mars has kept the Martian crust from shifting like Earth's so the Martian volcanic system keeps building up in the same spots.
27. The Twin Rovers mission was designed to help determine whether life ever existed on Mars and to help prepare for human exploration missions to Mars.

SECTION: THE OUTER PLANETS

1. gas giant
2. A
3. B
4. C
5. B
6. C
7. As depth and pressure increase, hydrogen gas turns into liquid form. Deeper still, the liquid hydrogen changes into a liquid, metallic state.
8. C
9. Saturn's rings, moons, and atmosphere
10. C
11. B
12. B
13. Early in its history, Uranus may have been struck by a massive object that tipped it over on its side.
14. D

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15. Great Dark Spot
16. A release of thermal energy causes the warm gases to rise and the cool gases to sink and produces wind patterns that create the belts of clouds.
17. B
18. D
19. C
20. Pluto is covered by frozen nitrogen. Charon is covered by frozen water.
21. Charon is more than half the size of Pluto.
22. Before 2006, Pluto was classified as a planet. Since 2006, it has been classified as a dwarf planet.

SECTION: MOONS

1. satellites
2. moons
3. A moon is always natural, but a satellite can be artificial.
4. C
5. Since the rocks seem to be unchanged since they were formed, the solar system must be about the same age.
6. Without an atmosphere, they are preserved unchanged.
7. One explanation is that the moon was a separate body captured by Earth's gravity. A second explanation is that the moon formed at the same time and from the same materials as the Earth. The third explanation is that the newly formed Earth was spinning so fast that a piece flew off and became the moon.
8. The current theory is that a large Mars-sized object collided with Earth. Part of the Earth's mantle was blasted into orbit around the Earth to form the moon.
9. The composition of the moon rocks is very similar to the Earth's mantle.
10. The moon changes from a dark unlit face to a thin crescent, to a half circle to a fully lit circle, down to a thin crescent, and back to the dark face again.
11. phases
12. These are caused by the changing positions of the moon relative to the sun and the Earth. As the moon revolves around Earth, the amount of the sunlit portion of the moon visible from Earth changes.
13. Because the moon's period of rotation is the same as its period of revolution.
14. waxing; waning
15. B
16. C
17. A
18. E
19. D
20. The moon's orbit around Earth is tilted with respect to Earth's orbit around the sun. Thus, the moon usually passes above or below Earth's shadow.
21. D
22. C
23. B
24. Io is constantly being tugged at by the gravitational tug of war between the planet Jupiter and its nearest neighbor, Europa. This causes Io to heat up, resulting in eruptions.
25. Recent pictures show that Europa appears to have oceans of liquid water beneath its frozen surface. It is possible that life may have evolved in these subterranean oceans.
26. Titan's atmosphere is thought to be similar in composition to the early Earth, when life first evolved here.
27. Scientists think that Miranda may have been hit and broken apart in the past. Gravity pulled the pieces together again, leaving a patchwork surface.
28. retrograde
29. about 6.4 days

SECTION: SMALL BODIES IN THE SOLAR SYSTEM

1. Answers may vary but should include comets, asteroids, or meteoroids.
2. B
3. because of their composition: rock, ice, and cosmic dust
4. These bodies are leftovers from the time the planets formed. Each one is a sample of that early solar system. Their composition can provide information on the history of our solar system.
5. The comet gives off gas and dust in the form of a long tail.
6. nucleus
7. The dust tail follows the orbit around the sun; the ion tail points away from the sun.

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