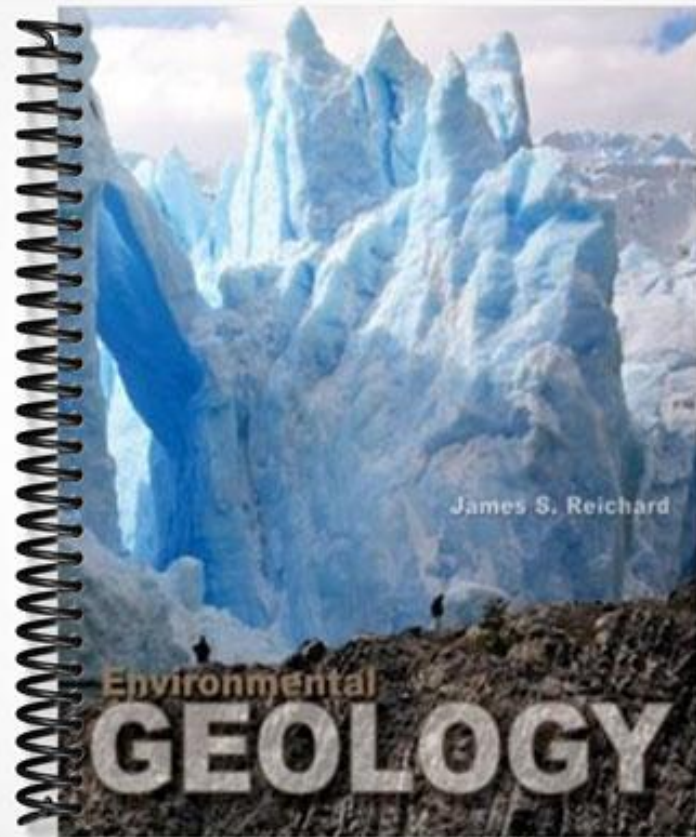


TEST BANK



James S. Reichard

Environmental
GEOLOGY

Chapter 02 Earth from a Larger Perspective

Multiple Choice Questions

1. Uranus is an example of a _____.
- A. gas giant**
 - B. supernova
 - C. terrestrial planet
 - D. coronal body

The four outer planets, including Uranus, are quite large in comparison to the inner planets and are composed primarily of gas. They are collectively referred to as the gas giants.

Bloom's Level: Remember
Section: 2.01
Topic: Geology of the Solar System

2. In addition to Earth, which other planet has relatively few impact craters due to weathering and erosion processes on the surface?
- A. Venus**
 - B. Earth is the only planet where weathering and erosion have occurred, erasing evidence of impacts.
 - C. Mars
 - D. Mercury

Venus and Earth have relatively few impact craters because weathering and erosion on their surfaces erased most of the original impact record.

Bloom's Level: Remember
Section: 2.02
Topic: Geology of the Solar System

3. Which of the following best describes what happened to the dinosaurs about 65 million years ago?

- A. A large asteroid impact occurred, which resulted in environmental change that led to the death of the dinosaurs.**
- B. They began to slowly go extinct.
- C. A massive volcanic eruption resulted in global cooling, which killed the dinosaurs.
- D. The extinction of the dinosaurs 65 million years ago remains a great mystery to scientists.

About 65 million years ago, a large asteroid impact took place. The consequences of this event altered the global environment, triggering a mass extinction in which the dinosaurs--and 75% of all species on the planet, terrestrial and marine--became extinct. The impact crater, called Chicxulub, is 112 miles wide and is located along Mexico's Yucatan peninsula.

Bloom's Level: Remember
Section: 2.05
Topic: Investigating Geologic Questions

4. What is the primary nuclear reaction that takes place within the sun?

- A. Fusion**
- B. Fission
- C. Radiation
- D. Nucleation

Due to the sun's immense gravity, hydrogen atoms within the interior are packed so tightly that they collide and undergo nuclear fusion.

Bloom's Level: Remember
Section: 2.01
Topic: Geology of the Solar System

5. Which statement best describes the four outer planets in our solar system?

- A. They are large and made of gas.**
- B. They are large and made of rock.
- C. They are Jupiter, Saturn, Neptune, and Pluto.
- D. They are all the same in size, type of atmosphere, and density.

The four outer planets--Jupiter, Saturn, Uranus, and Neptune--are largely composed of hydrogen and helium gas and have surfaces that are marked by clouds of swirling gases. Compared to the terrestrial planets they are quite large. Note that Pluto was removed from the official list of planets in 2006.

Bloom's Level: Evaluate
Section: 2.01
Topic: Geology of the Solar System

6. The four inner planets are collectively referred to as what?

- A. Terrestrial Planets**
- B. Jovian Planets**
- C. Mercurian Planets**
- D. Venetian Planets**

The planets closest to the sun--Mercury, Venus, Earth, and Mars--have outer shells composed of rocky materials and are referred to as the terrestrial planets, which comes from the Latin terra, meaning earth.

Bloom's Level: Remember

Section: 2.01

Topic: Geology of the Solar System

7. What is the name of the hypothesis proposed for the formation of the solar system?

- A. Nebular hypothesis**
- B. Heliocentric hypothesis**
- C. Coronal hypothesis**
- D. Andromeda hypothesis**

The nebular hypothesis explains how the solar system, and all the objects in it, formed from a rotating cloud of dust and gas called a nebula.

Bloom's Level: Remember

Section: 2.02

Topic: Geology of the Solar System

8. Venus is the only planet in the solar system that rotates clockwise, which is opposite the other planets. Why do scientists think this is?

- A. Early in the history of the solar system, there was a large impact that reversed the direction of its spin.**
- B. Venus is more dense than the other planets, which causes it to rotate in an opposing direction.**
- C. Early in the history of the solar system, the proximity of Earth and Venus to each other resulted in a gravitational attraction that caused them to spin in opposing directions.**
- D. Venus lacks a moon, which causes it to behave differently from the other planets.**

Early in the history of the solar system when the planets were accreting, there were many impacts. Scientists believe that Venus experienced a large, glancing impact that reversed the direction of its spin.

Bloom's Level: Remember

Section: 2.02

Topic: Geology of the Solar System

9. Which of the following is most true of the Big Bang Theory?

- A.** About 14 billion years ago, the universe began expanding from a single point.
- B.** About 14 million years ago, the universe began expanding from a single point.
- C.** All of the matter in the universe was created in an instant, known as the Big Bang.
- D.** The Big Bang Theory has been disproved.

All matter in universe had at one time existed as a single point. Then 14 billion years ago, this matter began to expand outward in all directions, and it has been expanding ever since.

Bloom's Level: Understand
Section: 2.03
Topic: Geology of the Solar System

10. _____ refers to the massive and sudden loss of plants and animals relative to the number of new species being added.

- A.** Mass extinction
- B.** Catastrophism
- C.** Population extermination
- D.** Great death

Mass extinctions occur when large numbers of species go extinct in a relatively short period of time. These die-offs are related to significant changes in Earth's environment that are global in nature. Mass extinctions have been known to have occurred in the geologic past.

Bloom's Level: Remember
Section: 2.05
Topic: Nature of Geology

11. In 1994, scientists witnessed a major impact on _____. This event was a sobering reminder that Earth-crossing comets and asteroids pose a serious threat to life on Earth.

- A.** Jupiter
- B.** Saturn
- C.** Mars
- D.** Neptune

In July 1994, scientists around the world watched as a broken-up comet impacted the surface of Jupiter. This comet was discovered by Gene Shoemaker, his wife Carolyn, and colleague David Levy who, in the early 1980's, began searching the solar system for large objects that had the potential to result in major impacts.

Bloom's Level: Remember
Section: 2.05
Topic: Geology of the Solar System

12. Which term is used to describe the relatively small area around a star where surface temperatures would allow for the existence of liquid water?

- A. Habitable Zone
- B. Biosphere
- C. Terrestrial Region
- D. Potential Biotic Area

The term habitable zone has been applied to the narrow zone around a star where the surface temperature would be such that liquid water could exist.

Bloom's Level: Remember
Section: 2.04
Topic: Geology of the Solar System

13. Which of the following statements is most true of the first life-forms on Earth, which existed about 3.6 billion years ago?

- A. Microbial life began at a time when the planet's atmosphere and climate were very different from today.
- B. Microbial life began simultaneously with the solidification of Earth.
- C. Microbial life evolved rapidly--within several hundred million years--to more complicated life forms.
- D. The first life was found on Pangaea.

While studying some of Earth's oldest surviving rocks, scientists discovered evidence of bacteria in rocks as old as 3.6 billion years. At this time in the Earth's history, the planet's atmosphere and climate would have been very different from today, inhospitable for most of today's life-forms.

Bloom's Level: Evaluate
Section: 2.04
Topic: Geologic Time

14. Which of the following statements is true?

- A. The moon has reduced the wobble in Earth's axis, thereby helping to stabilize Earth's climate.
- B. Pluto is the smallest and most distant planet from the sun.
- C. Jupiter is the largest, densest, most massive planet in the solar system.
- D. Saturn rotates on its side rather than in an upright position.

The moon's gravity acts to minimize the amount of movement (wobble) in Earth's axis as our planet rotates. Minimizing this wobble in the axis has helped to reduce the seasonal extremes between summer and winter, which has produced a more stable climate. Pluto is no longer considered a planet. While Jupiter is the largest planet, it is a gas giant and is, consequently, not the densest. Uranus, not Saturn, rotates on its side rather than in an upright position.

Bloom's Level: Evaluate
Section: 2.01
Topic: Geology of the Solar System

15. Which of the following statements is NOT true of the ozone layer?

- A. The ozone layer is responsible for the greenhouse effect.
- B. The ozone layer is a thin layer of oxygen molecules, called ozone, found in the Earth's upper atmosphere.
- C. The ozone layer naturally absorbs much of the incoming ultraviolet radiation from the sun.
- D. The ozone layer has been damaged by the use of CFCs (chlorofluorocarbons).

The ozone layer is a thin layer of oxygen molecules (O_3), called ozone, found in the Earth's upper atmosphere. This layer naturally absorbs much of the incoming ultraviolet radiation from the sun, protecting surface life from these damaging rays. The combination of CFCs and UV radiation causes ozone molecules to break down into free oxygen (O_2) thus depleting the ozone layer. The greenhouse effect is caused by other gasses (including CO_2 , CH_4 , H_2O , and SO_2) that occur naturally and anthropogenically in the Earth's atmosphere.

Bloom's Level: Understand
Section: 2.05
Topic: Nature of Geology

Check All That Apply Questions

16. Why do Earth scientists care about the rest of the solar system?

- The sun generates energy.
- The moon's gravity influences tides.
- Other planets occasionally influence Earth's system by altering asteroid and comet trajectories through gravitational attraction.
- Other life within our solar system is a threat to human existence.

Earth scientists care about the rest of the solar system because our planet operates within an astronomical environment that has a major influence on the Earth system and the environment in which we live. The sun generates energy that warms our planet and drives many Earth systems; the Moon's gravitational field is the dominant force responsible for creating tides, and the other planets in the solar system occasionally alter the trajectories of comets and asteroids. While Earth scientists are interested to know if life has or does exist in other parts of our solar system, this potential is not considered a threat to human existence.

Bloom's Level: Understand
Section: 2.01
Topic: Geology of the Solar System

17. Evidence for the nebular hypothesis includes which of the following?

The heavily cratered surfaces we see on some planets and moons, which indicates a period of intense bombardment associated with accretion.

Radiometric dating has shown that the Earth, Moon, and asteroids all solidified at approximately the same time.

Visual evidence from Hubble shows accretion and planetary development occurring in other parts of the universe.

Visual evidence from Hubble shows star birth occurring in other parts of the universe.

All of the above are lines of evidence used to support the nebular hypothesis which states that all objects in the solar system formed when an exploding star disturbed a cloud of dust and gas; this disturbance caused the nebula to begin collapsing in on itself due to gravitational attraction. Consequently, we would expect that planetary bodies solidified at approximately the same time. We would also expect to see evidence of bombardment, like the cratered surfaces of some planets and moons. Visual evidence from Hubble provided strong evidence for the nebular hypothesis as we can now see this process taking place in other parts of the universe.

Bloom's Level: Evaluate

Section: 2.02

Topic: Geology of the Solar System

18. Which of the following assumptions are inherent in the concept of habitable zones?

All life-forms require liquid water.

Water is present, in some form, on all planets.

The size and energy output of stars with habitable zones will remain constant.

Life is present throughout the universe.

The concept of a habitable zone is based on the assumption that all life-forms require liquid water as a solvent necessary for survival. The zone delineated around a star as habitable is defined by an area in which liquid water could exist: too close and water would vaporize; too far and water would freeze. Depending on the size and energy output of a star, the habitable zone would shift accordingly to accommodate liquid water. This does not imply or assume that water is present but describes conditions in which the liquid phase could be present. This habitable zone concept defines where it would be possible for life to exist; it is not predicated on the existence of life.

Bloom's Level: Evaluate

Section: 2.04

Topic: Geology of the Solar System

19. Extremophile bacteria have been found living in which of the following locations?

- Antarctic ice
- Super-hot vents on the sea floor
- Rocks deep underground
- On the surfaces of other planets

Extremophile bacteria are found thriving in conditions that would be lethal to nearly all other life-forms, including Antarctic ice, super hot vents on the sea floor, and rocks located deep underground. While scientists are very interested to see if life, perhaps in the form of extremophile bacteria exists elsewhere, it is not yet been discovered.

Bloom's Level: Remember
Section: 2.04
Topic: Nature of Geology

True / False Questions

20. The outer planets are more massive and more dense than the inner planets.

FALSE

The outer planets are the gas giants. They are more massive than the inner, terrestrial planets, but they are less dense as they are composed primarily of gas.

Bloom's Level: Understand
Section: 2.01
Topic: Geology of the Solar System

21. Nuclear reactions within the sun release electromagnetic radiation.

TRUE

In addition to heat, nuclear reactions within the Sun release electromagnetic radiation, which is a type of energy that travels in the form of waves.

Bloom's Level: Remember
Section: 2.01
Topic: Geology of the Solar System

22. Comets are composed primarily of rocky and metallic materials.

FALSE

Comets are composed of small rocky fragments embedded in a mass of ice and frozen gases. Asteroids are composed primarily of rocky and metallic materials.

Bloom's Level: Remember

Section: 2.01

Topic: Geology of the Solar System

23. Meteoroid is the term used to describe an asteroid or comet that passes through the Earth's atmosphere and hits the surface.

FALSE

The term meteoroid is used to describe a body of rock and metal that is smaller than an asteroid. Meteorite describes a meteoroid that passes through the Earth's atmosphere and strikes the ground.

Bloom's Level: Remember

Section: 2.01

Topic: Geology of the Solar System

24. When scientists radiometrically date meteorites, they find that they are all about 4.6 billion years old, which is the age of the Earth.

TRUE

When scientists date meteorites using radiometric dating, they find that all meteorites fall between 4.5 and 4.7 billion years old. The 4.6-billion-year age of the Earth was determined using the radiometric dates of both asteroids and the oldest surviving rocks on our planet. Scientists now believe that all the planets within the solar system formed during this same 4.5 to 4.7 billion year time frame.

Bloom's Level: Understand

Section: 2.02

Topic: Geology of the Solar System