Essentials of Oceanography, 11e **(Trujillo)**
Chapter 1 Introduction to Planet "Earth"

Match the term or person with the appropriate phrase. You may use each answer once, more than once or not at all.

A) first European explorer to see the Pacific Ocean
B) led voyage that first circumnavigated the globe
C) used ecological approach to solve fisheries problem
D) mapped world with Roman knowledge showing latitude and longitude
E) first determination of Earth's circumference
F) led voyage that first used the marine chronometer
G) made important observations about drift of sea ice
H) mapped the Mediterranean Sea for the Greeks
I) established impermanent settlement in North America and the first Europeans to explore Iceland and Greenland
J) incorrectly concluded that no life exists in deep ocean

1) Balboa
Diff: 1
Skill: Knowledge
Section: 1.2 How Was Early Exploration of the Oceans Achieved?
Essent'l Concept: 1.2 Discuss how early exploration of the oceans was achieved

2) Eratosthenes
Diff: 1
Skill: Knowledge
Section: 1.2 How Was Early Exploration of the Oceans Achieved?
Essent'l Concept: 1.2 Discuss how early exploration of the oceans was achieved

3) Magellan
Diff: 1
Skill: Knowledge
Section: 1.2 How Was Early Exploration of the Oceans Achieved?
Essent'l Concept: 1.2 Discuss how early exploration of the oceans was achieved

4) Ptolemy
Diff: 1
Skill: Knowledge
Section: 1.2 How Was Early Exploration of the Oceans Achieved?
Essent'l Concept: 1.2 Discuss how early exploration of the oceans was achieved

5) Vikings
Diff: 1
Skill: Knowledge
Section: 1.2 How Was Early Exploration of the Oceans Achieved?
Essent'l Concept: 1.2 Discuss how early exploration of the oceans was achieved

Answers: 1) A 2) E 3) B 4) D 5) I

Match the term with the appropriate phrase. You may use each answer once, more than once or not at all.

A) the Sun and the eight major planets revolving around it
B) gaseous and dusty space cloud (pre-cursor to a solar system)
C) Milky Way galaxy
D) outermost portion of the Earth composed largely of the igneous rocks basalt and granite
E) contains minerals rich in iron and magnesium, between the crust and the core, and has the second largest volume according to the chemical classification
F) solar winds
G) composed mostly of iron and nickel with a liquefied metallic outer layer

6) core
Diff: 1
Skill: Knowledge
Section: 1.4 How Were Earth and the Solar System Formed?
Essent'l Concept: 1.4 Explain how Earth and the solar system were formed

7) crust
Diff: 1
Skill: Knowledge
Section: 1.4 How Were Earth and the Solar System Formed?
Essent'l Concept: 1.4 Explain how Earth and the solar system were formed

8) mantle
Diff: 1
Skill: Knowledge
Section: 1.4 How Were Earth and the Solar System Formed?
Essent'l Concept: 1.4 Explain how Earth and the solar system were formed

9) nebula
Diff: 1
Skill: Knowledge
Section: 1.4 How Were Earth and the Solar System Formed?
Essent'l Concept: 1.4 Explain how Earth and the solar system were formed

10) solar system
Diff: 1
Skill: Knowledge
Section: 1.4 How Were Earth and the Solar System Formed?
Essent'l Concept: 1.4 Explain how Earth and the solar system were formed

Answers: 6) G 7) D 8) E 9) B 10) A

Match the term with the appropriate phrase. You may use each answer once, more than once or not at all.

A) plastic (capable of flow) portion of the upper mantle beneath the lithosphere
B) innermost layer of the Earth, a solid
C) lower portion of the mantle that is rigid
D) composed of iron, nickel, and sulfur
E) continental crust
F) oceanic crust
G) crust and the uppermost mantle consisting of a solid rock layer

11) asthenosphere
Diff: 1
Skill: Knowledge
Section: 1.4 How Were Earth and the Solar System Formed?
Essent'l Concept: 1.4 Explain how Earth and the solar system were formed

12) basalt
Diff: 1
Skill: Knowledge
Section: 1.4 How Were Earth and the Solar System Formed?
Essent'l Concept: 1.4 Explain how Earth and the solar system were formed

13) granite
Diff: 1
Skill: Knowledge
Section: 1.4 How Were Earth and the Solar System Formed?
Essent'l Concept: 1.4 Explain how Earth and the solar system were formed

14) lithosphere
Diff: 1
Skill: Knowledge
Section: 1.4 How Were Earth and the Solar System Formed?
Essent'l Concept: 1.4 Explain how Earth and the solar system were formed

15) mesosphere
Diff: 1
Skill: Knowledge
Section: 1.4 How Were Earth and the Solar System Formed?
Essent'l Concept: 1.4 Explain how Earth and the solar system were formed

Answers: 11) A 12) F 13) E 14) G 15) C

16) Early Polynesians only traveled within sight of land.
Answer: FALSE
Diff: 1
Skill: Knowledge
Section: 1.2 How Was Early Exploration of the Oceans Achieved?
Essent'l Concept: 1.2 Discuss how early exploration of the oceans was achieved

17) Vikings led by Thor Heyerdahl established temporary colonies in North America.
Answer: FALSE
Diff: 1
Skill: Knowledge
Section: 1.2 How Was Early Exploration of the Oceans Achieved?
Essent'l Concept: 1.2 Discuss how early exploration of the oceans was achieved

18) In Europe, significant oceanographic knowledge was acquired during the Middle Ages.
Answer: FALSE
Diff: 1
Skill: Knowledge
Section: 1.2 How Was Early Exploration of the Oceans Achieved?
Essent'l Concept: 1.2 Discuss how early exploration of the oceans was achieved

19) Christopher Columbus established trade routes from Europe around Africa to India.
Answer: FALSE
Diff: 1
Skill: Knowledge
Section: 1.2 How Was Early Exploration of the Oceans Achieved?
Essent'l Concept: 1.2 Discuss how early exploration of the oceans was achieved

20) The Earth's crust solidified around 4.5 billion years ago.
Answer: TRUE
Diff: 1
Skill: Knowledge
Section: 1.4 How Were Earth and the Solar System Formed?
Essent'l Concept: 1.4 Explain how Earth and the solar system were formed

21) Layers of the earth separated based on density differences.
Answer: TRUE
Diff: 1
Skill: Knowledge
Section: 1.4 How Were Earth and the Solar System Formed?
Essent'l Concept: 1.4 Explain how Earth and the solar system were formed

22) Oceanic crust is less dense than continental crust because it is made of silica and manganese.
Answer: FALSE
Diff: 1
Skill: Knowledge
Section: 1.4 How Were Earth and the Solar System Formed?
Essent'l Concept: 1.4 Explain how Earth and the solar system were formed

23) Earth developed the first ocean by about 4 billion years ago.
Answer: TRUE
Diff: 1
Skill: Knowledge
Section: 1.5 How Were Earth's Atmosphere and Oceans Formed?
Essent'l Concept: 1.5 Explain how Earth's atmosphere and ocean were formed

24) In general, the salinity content of ocean water has remained constant throughout the majority of Earth's history.
Answer: TRUE
Diff: 1
Skill: Knowledge
Section: 1.5 How Were Earth's Atmosphere and Oceans Formed?
Essent'l Concept: 1.5 Explain how Earth's atmosphere and ocean were formed

25) The salinity of the oceans has been steadily increasing.
Answer: FALSE
Diff: 1
Skill: Knowledge
Section: 1.5 How Were Earth's Atmosphere and Oceans Formed?
Essent'l Concept: 1.5 Explain how Earth's atmosphere and ocean were formed

26) Free oxygen was present in the Earth's primordial atmosphere.
Answer: FALSE
Diff: 1
Skill: Knowledge
Section: 1.6 Did Life Begin in the Oceans?
Essent'l Concept: 1.6 Discuss why life is thought to have originated in the oceans

27) Heterotrophic organisms can make their own food from inorganic carbon sources.
Answer: FALSE
Diff: 1
Skill: Knowledge
Section: 1.6 Did Life Begin in the Oceans?
Essent'l Concept: 1.6 Discuss why life is thought to have originated in the oceans

28) Anaerobic organisms require oxygen to survive.
Answer: FALSE
Diff: 1
Skill: Knowledge
Section: 1.6 Did Life Begin in the Oceans?
Essent'l Concept: 1.6 Discuss why life is thought to have originated in the oceans

29) The Earth formed around 4.6 billion years ago.
Answer: TRUE
Diff: 1
Skill: Knowledge
Section: 1.7 How Old Is Earth?
Essent'l Concept: 1.7 Demonstrate an understanding of how old Earth is

30) Radiometric dating is used to determine the ages of rocks.
Answer: TRUE
Diff: 1
Skill: Knowledge
Section: 1.7 How Old Is Earth?
Essent'l Concept: 1.7 Demonstrate an understanding of how old Earth is

31) The four principal ocean basins (plus an additional ocean) on Earth are the:
A) Atlantic, Arctic, Mediterranean, Southern, and Pacific Oceans.
B) Atlantic, Pacific, Indian, Southern, and Arctic Oceans.
C) Atlantic, Antarctic, Southern, Mediterranean, and Pacific Oceans.
D) Antarctic, Caspian, Southern, Indian, and Pacific Oceans.
E) Antarctic, Arctic, Indian, Pacific, and Southern Oceans.
Answer: B
Diff: 1
Skill: Knowledge
Section: 1.1 How Many Oceans Exist on Earth?
Essent'l Concept: 1.1 Compare the characteristics of Earth's oceans

32) The largest of the ocean basins, which currently covers more than half of the ocean surface, is the:
A) Arctic Ocean.
B) Atlantic Ocean.
C) Indian Ocean.
D) Pacific Ocean.
E) Southern Ocean.
Answer: D
Diff: 1
Skill: Knowledge
Section: 1.1 How Many Oceans Exist on Earth?
Essent'l Concept: 1.1 Compare the characteristics of Earth's oceans

33) All of the following are characteristics of seas ***except***:
A) seas are smaller and shallower.
B) seas are usually somewhat enclosed by land.
C) seas are composed of salt water.
D) seas are directly connected to the world ocean.
E) all of the above are correct.
Answer: E
Diff: 1
Skill: Knowledge
Section: 1.1 How Many Oceans Exist on Earth?
Essent'l Concept: 1.1 Compare the characteristics of Earth's oceans

34) The average depth of the world's oceans is approximately:
A) 11,022 meters (36,161 feet).
B) 840 meters (2,756 feet).
C) 3,682 meters (12,080 feet).
D) 2,172 meters (7,126 feet).
E) none of the above.
Answer: C
Diff: 1
Skill: Knowledge
Section: 1.1 How Many Oceans Exist on Earth?
Essent'l Concept: 1.1 Compare the characteristics of Earth's oceans

35) All of the following are **TRUE** concerning the deepest part of the ocean ***except***:
A) the bottom of this trench was visited by Piccard and Walsh in the *Trieste* in 1960.
B) the deepest part of the ocean is located in a trench off the coast of Japan.
C) the depth of this trench exceeds the height of Mount Everest.
D) the depth of this trench is estimated at 11,022 meters (~36,161 feet).
E) this trench is called the Mariana Trench.
Answer: B
Diff: 1
Skill: Knowledge
Section: 1.1 How Many Oceans Exist on Earth?
Essent'l Concept: 1.1 Compare the characteristics of Earth's oceans

36) The first humans from Western Hemisphere known to have developed the art of navigation were the:
A) Polynesians.
B) Greeks.
C) Vikings.
D) Phoenicians.
E) New Zealanders.
Answer: D
Diff: 1
Skill: Knowledge
Section: 1.2 How Was Early Exploration of the Oceans Achieved?
Essent'l Concept: 1.2 Discuss how early exploration of the oceans was achieved

37) The method of determining latitude in the Northern Hemisphere by measuring the angle between an observer's line of site to the North Star and line of site to the northern horizon was developed by:
A) Pytheas.
B) Eratosthenes.
C) Herodotus.
D) Seneca.
E) Ptolemy.
Answer: A
Diff: 1
Skill: Knowledge
Section: 1.2 How Was Early Exploration of the Oceans Achieved?
Essent'l Concept: 1.2 Discuss how early exploration of the oceans was achieved

38) The first person we are aware of who determined the circumference of the Earth using trigonometry and the angle of sunlight at Alexandria, Egypt, was:
A) Pytheas.
B) Eratosthenes.
C) Herodotus.
D) Seneca.
E) Ptolemy.
Answer: B
Diff: 1
Skill: Knowledge
Section: 1.2 How Was Early Exploration of the Oceans Achieved?
Essent'l Concept: 1.2 Discuss how early exploration of the oceans was achieved

39) Most of the explorations by northern and western Europeans during the Middle (Dark) Ages were undertaken by:
A) Italy.
B) Portugal.
C) Vikings of Scandinavia.
D) France.
E) Spain.
Answer: C
Diff: 1
Skill: Knowledge
Section: 1.2 How Was Early Exploration of the Oceans Achieved?
Essent'l Concept: 1.2 Discuss how early exploration of the oceans was achieved

40) The European "Age of Discovery" began with:
A) Christopher Columbus' discovery of the "New World."
B) Ferdinand Magellan's circumnavigation of the globe.
C) Phoenician exploration of the Mediterranean.
D) Polynesian colonization of Pacific Islands.
E) Viking voyages to North America.
Answer: A
Diff: 1
Skill: Knowledge
Section: 1.2 How Was Early Exploration of the Oceans Achieved?
Essent'l Concept: 1.2 Discuss how early exploration of the oceans was achieved

41) The European "Age of Discovery" ended with:
A) Christopher Columbus' discovery of the "New World."
B) Ferdinand Magellan's circumnavigation of the globe.
C) Phoenician exploration of the Mediterranean.
D) Polynesian colonization of Pacific Islands.
E) Viking voyages to North America.
Answer: B
Diff: 1
Skill: Knowledge
Section: 1.2 How Was Early Exploration of the Oceans Achieved?
Essent'l Concept: 1.2 Discuss how early exploration of the oceans was achieved

42) All of the following were accomplishments of Captain James Cook ***except***:
A) exploring the Southern Ocean near Antarctica.
B) mapping of unknown islands, including Hawaii, in the Pacific.
C) determining the outline of the Pacific Ocean.
D) measuring environmental characteristics such as water temperature.
E) all of the above are correct.
Answer: E
Diff: 2
Skill: Comprehension
Section: 1.2 How Was Early Exploration of the Oceans Achieved?
Essent'l Concept: 1.2 Discuss how early exploration of the oceans was achieved

43) The scientific method includes all of the following ***except***:
A) data collection.
B) evaluation of data.
C) hypothesis formation.
D) hypothesis testing.
E) validation of a theory.
Answer: E
Diff: 2
Skill: Comprehension
Section: 1.3 What Is the Nature of Scientific Inquiry?
Essent'l Concept: 1.3 Describe the nature of scientific inquiry

44) A tentative, testable statement about the general nature of a phenomenon is called a/an:
A) guess.
B) law.
C) observation.
D) hypothesis.
E) theory.
Answer: D
Diff: 1
Skill: Knowledge
Section: 1.3 What Is the Nature of Scientific Inquiry?
Essent'l Concept: 1.3 Describe the nature of scientific inquiry

45) Plate tectonics and evolution, which are held with a high degree of confidence because of rigorous testing and verification, are examples of:
A) guesses.
B) laws.
C) observations.
D) hypotheses.
E) theories.
Answer: E
Diff: 2
Skill: Comprehension
Section: 1.3 What Is the Nature of Scientific Inquiry?
Essent'l Concept: 1.3 Describe the nature of scientific inquiry

46) The Sun and the rest of the solar system formed about 5 billion years ago from a huge cloud of dust and gas called a:
A) nebula.
B) solar system.
C) protoplanet.
D) quasar.
E) supernova.
Answer: A
Diff: 1
Skill: Knowledge
Section: 1.4 How Were Earth and the Solar System Formed?
Essent'l Concept: 1.4 Explain how Earth and the solar system were formed

47) The **nebular hypothesis** suggests that:
A) all bodies in the solar system formed from an enormous gas cloud.
B) Earth's moon is an asteroid captured by the Earth's gravity.
C) galaxies such as the Milky Way form independent of one another.
D) the Earth was formed by a cosmic explosion, a "big bang."
E) the moon is derived from a protoplanet.
Answer: A
Diff: 1
Skill: Knowledge
Section: 1.4 How Were Earth and the Solar System Formed?
Essent'l Concept: 1.4 Explain how Earth and the solar system were formed

48) The separation of the Earth into layers while it was molten was the result of the:
A) decrease in temperature downward toward the core.
B) differing densities of the elements that make up the Earth.
C) gravitational force created by the rotating Earth.
D) initial collection of materials and their position in Earth.
E) presence of water at Earth's surface.
Answer: B
Diff: 1
Skill: Knowledge
Section: 1.4 How Were Earth and the Solar System Formed?
Essent'l Concept: 1.4 Explain how Earth and the solar system were formed

49) Oceanic crust is primarily:
A) basalt.
B) carbonate sedimentary rocks.
C) clay minerals.
D) granite.
E) siltstone.
Answer: A
Diff: 1
Skill: Knowledge
Section: 1.4 How Were Earth and the Solar System Formed?
Essent'l Concept: 1.4 Explain how Earth and the solar system were formed

50) Which of the following statements regarding continental and oceanic crust is **TRUE**?
A) Continental crust and oceanic crust have equivalent densities.
B) Continental crust is thicker and denser than oceanic crust.
C) Continental crust is thinner and denser than oceanic crust.
D) Continental crust is thicker and less dense than oceanic crust.
E) Continental crust is thinner and less dense than oceanic crust.
Answer: D
Diff: 2
Skill: Comprehension
Section: 1.4 How Were Earth and the Solar System Formed?
Essent'l Concept: 1.4 Explain how Earth and the solar system were formed

51) Earth's primordial atmosphere most likely included:
A) ammonia, oxygen, carbon dioxide, and water vapor.
B) carbon dioxide, water vapor, sulfur dioxide, and methane.
C) hydrogen, helium, and oxygen.
D) nitrogen, ozone, and sulfur dioxide.
E) all of the above.
Answer: B
Diff: 1
Skill: Knowledge
Section: 1.5 How Were Earth's Atmosphere and Oceans Formed?
Essent'l Concept: 1.5 Explain how Earth's atmosphere and ocean were formed

52) Current scientific knowledge indicates that the most likely origin of most of Earth's oceans was due to:
A) comets from outer space.
B) release of liquid water from the core.
C) water vapor released from volcanic outgassing.
D) all of the above.
E) none of the above.
Answer: C
Diff: 2
Skill: Comprehension
Section: 1.5 How Were Earth's Atmosphere and Oceans Formed?
Essent'l Concept: 1.5 Explain how Earth's atmosphere and ocean were formed

53) The mechanism by which populations evolve and new species develop is called:
A) adaptation.
B) evolution.
C) descent with modification.
D) intelligent design.
E) natural selection.
Answer: E
Diff: 1
Skill: Knowledge
Section: 1.6 Did Life Begin in the Oceans?
Essent'l Concept: 1.6 Discuss why life is thought to have originated in the oceans

54) One of the reasons that free oxygen in our atmosphere is important to the development and maintenance of life on Earth is because oxygen:
A) combines with iron in volcanic rocks.
B) can form ozone and block some UV radiation.
C) is necessary for photosynthesis to occur.
D) reduces atmospheric temperature.
E) was very abundant in Earth's early atmosphere.
Answer: B
Diff: 2
Skill: Comprehension
Section: 1.6 Did Life Begin in the Oceans?
Essent'l Concept: 1.6 Discuss why life is thought to have originated in the oceans

55) Radioactive materials can sometimes be used to determine the:
A) origin of rocks.
B) chemical composition of rocks.
C) formation method.
D) metamorphism.
E) ages of rocks.
Answer: E
Diff: 2
Skill: Comprehension
Section: 1.7 How Old Is Earth?
Essent'l Concept: 1.7 Demonstrate an understanding of how old Earth is

56) Earth is about:
A) 6,000 years old.
B) 4.6 billion years old.
C) 4.6 million years old.
D) 40 billion years old.
E) 400,000 years old.
Answer: B
Diff: 1
Skill: Knowledge
Section: 1.7 How Old Is Earth?
Essent'l Concept: 1.7 Demonstrate an understanding of how old Earth is

Examine the five words and/or phrases and determine the relationship among the majority of words/phrases. Choose the one option that does not fit the pattern.

57)
A. Mediterranean
B. Arctic
C. Atlantic
D. Indian
E. Pacific
Answer: A
Diff: 4
Skill: Analysis
Section: 1.1 How Many Oceans Exist on Earth?
Essent'l Concept: 1.1 Compare the characteristics of Earth's oceans

58)
A. Adriatic
B. Black
C. Caspian
D. Indian
E. Mediterranean
Answer: D
Diff: 4
Skill: Analysis
Section: 1.1 How Many Oceans Exist on Earth?
Essent'l Concept: 1.1 Compare the characteristics of Earth's oceans

59)
A. Eratosthenes
B. Herodotus
C. Ptolemy
D. Pytheas
E. Magellan
Answer: E
Diff: 4
Skill: Analysis
Section: 1.2 How Was Early Exploration of the Oceans Achieved?
Essent'l Concept: 1.2 Discuss how early exploration of the oceans was achieved

60)
A. Vasco de Gama
B. Ptolemy
C. Christopher Columbus
D. John Cabot
E. Ferdinand Magellan
Answer: B
Diff: 4
Skill: Analysis
Section: 1.2 How Was Early Exploration of the Oceans Achieved?
Essent'l Concept: 1.2 Discuss how early exploration of the oceans was achieved

61)
A. observation
B. hypothesis
C. belief
D. theory
E. testing
Answer: C
Diff: 4
Skill: Analysis
Section: 1.3 What Is the Nature of Scientific Inquiry?
Essent'l Concept: 1.3 Describe the nature of scientific inquiry

62)
A. atmosphere
B. lithosphere
C. asthenosphere
D. mesosphere
E. core
Answer: A
Diff: 4
Skill: Analysis
Section: 1.4 How Were Earth and the Solar System Formed?
Essent'l Concept: 1.4 Explain how Earth and the solar system were formed

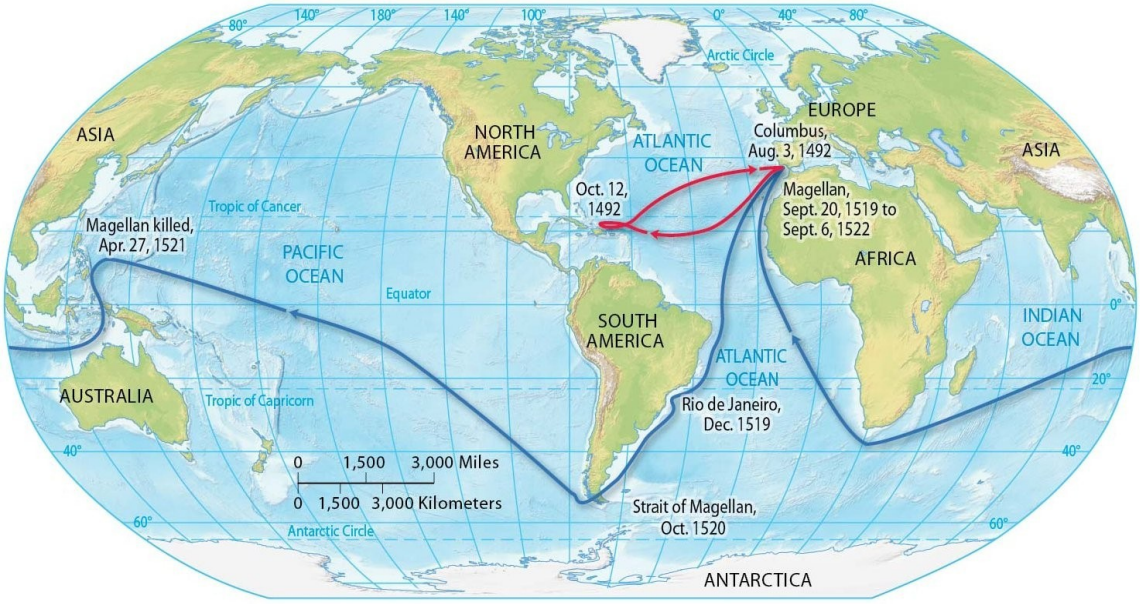
63)
A. granite
B. asthenosphere
C. continental crust
D. basalt
E. oceanic crust
Answer: B
Diff: 4
Skill: Analysis
Section: 1.4 How Were Earth and the Solar System Formed?
Essent'l Concept: 1.4 Explain how Earth and the solar system were formed

64)
A. oxygen
B. water vapor
C. carbon dioxide
D. methane
E. ammonia
Answer: A
Diff: 4
Skill: Analysis
Section: 1.6 Did Life Begin in the Oceans?
Essent'l Concept: 1.6 Discuss why life is thought to have originated in the oceans

65)
A. autotrophs
B. chemosynthesis
C. photosynthesis
D. heterotrophs
E. plants
Answer: D
Diff: 4
Skill: Analysis
Section: 1.6 Did Life Begin in the Oceans?
Essent'l Concept: 1.6 Discuss why life is thought to have originated in the oceans

66)
A. Devonian
B. Jurassic
C. Ordovician
D. Permian
E. Silurian
Answer: B
Diff: 4
Skill: Analysis
Section: 1.7 How Old Is Earth?
Essent'l Concept: 1.7 Demonstrate an understanding of how old Earth is

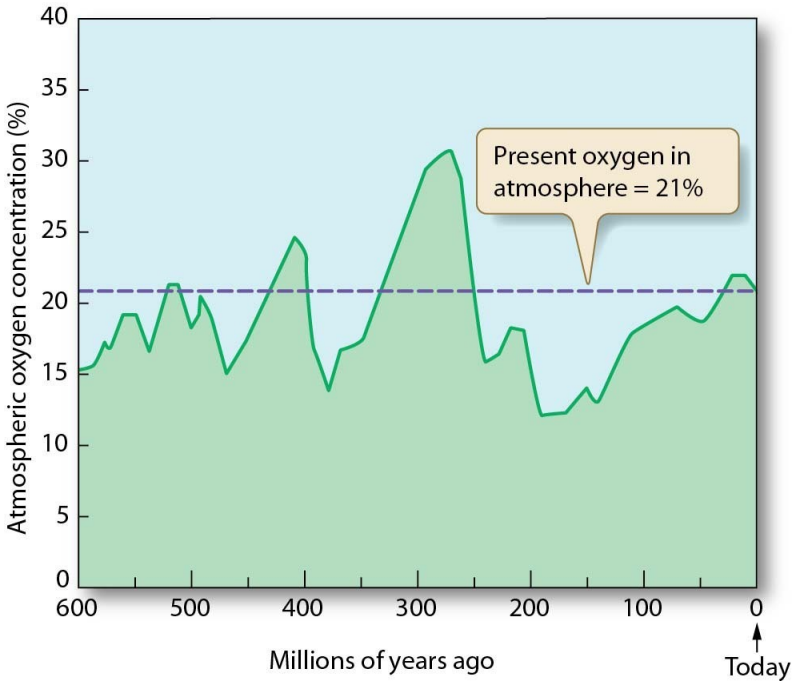
67) Distinguish between an **ocean** and a **sea**.
Answer: The world ocean is the large body of salt water that covers the majority of the earth's surface (roughly 71%). The world ocean is customarily divided into smaller ocean basins that are bordered by continents or latitude lines. One example is the Atlantic Ocean, which is bordered on the west by North and South America, to the east by Europe and Africa, to the north by the Arctic Circle (60°N), and to the south by the Antarctic Circle (60°S). In contrast, a sea is a smaller subdivision of the ocean surrounded by land such as the Black Sea in Eastern Europe.
Diff: 2
Skill: Comprehension
Section: 1.1 How Many Oceans Exist on Earth?
Essent'l Concept: 1.1 Compare the characteristics of Earth's oceans



68) List some of the major achievements of Captain James Cook.
Answer: Captain James Cook (1728-1779) was a British navigator and explorer who undertook three voyages of scientific discovery from 1768-1779. Cook explored the Southern Ocean around Antarctica in an attempt to find the continent. He also extensively explored the Pacific Ocean and mapped previously unknown island groups, including Hawaii. Cook initiated systematic sampling of subsurface water temperatures, measured winds and currents, and took soundings or bottom depths. Cook also used John Harrison's chronometer as a means of determining longitude at sea.
Diff: 2
Skill: Comprehension
Section: 1.2 How Was Early Exploration of the Oceans Achieved?
Essent'l Concept: 1.2 Discuss how early exploration of the oceans was achieved

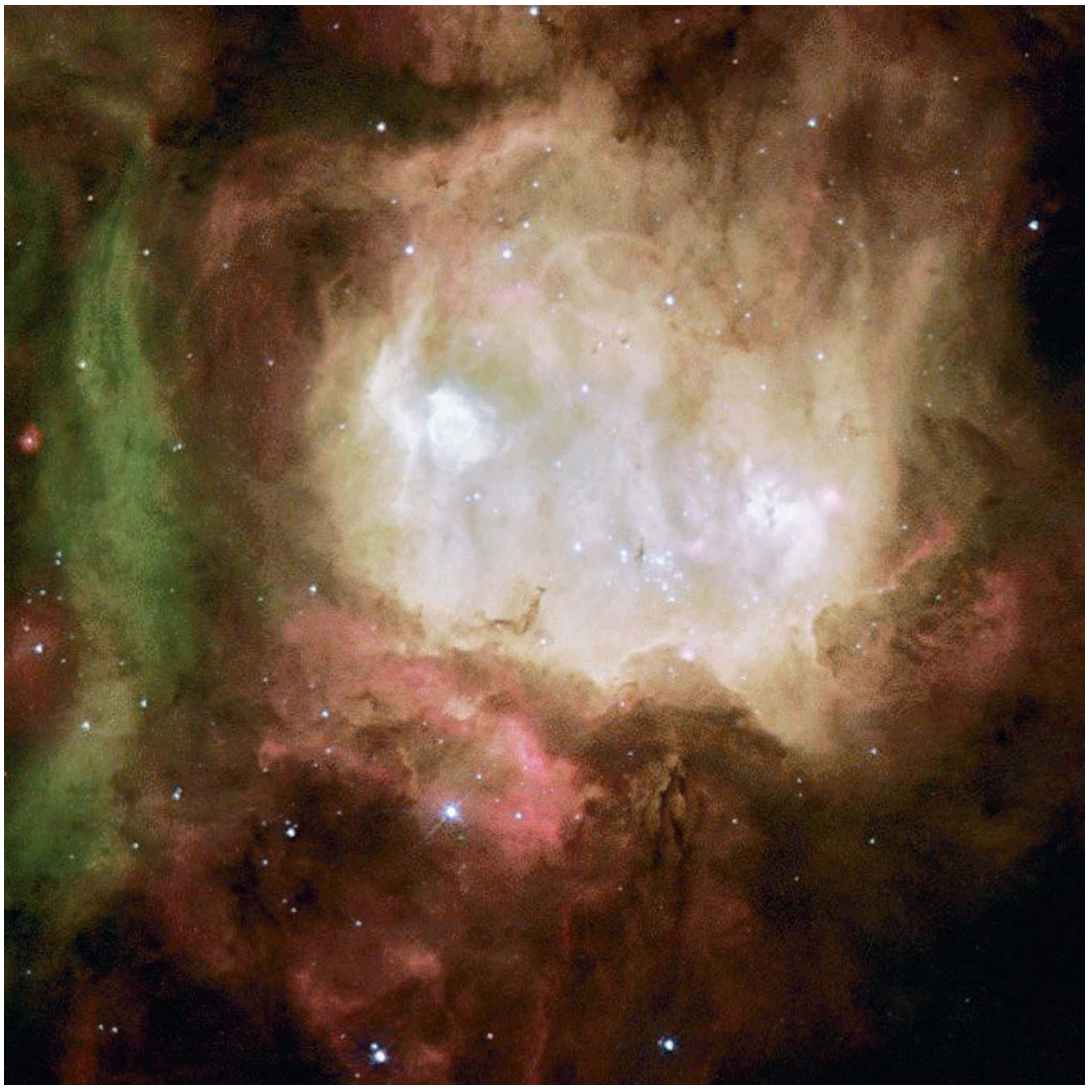
69) Differentiate between a **hypothesis** and a **theory**.
Answer: A hypothesis is a stated relationship between observed phenomena that can be tested; in other words, it is a tentative explanation. A theory is a relationship between observed phenomena (variables) that has withstood repeated independent testing over time and has broad explanatory power for an observed pattern or process.
Diff: 2
Skill: Comprehension
Section: 1.3 What Is the Nature of Scientific Inquiry?
Essent'l Concept: 1.3 Describe the nature of scientific inquiry

70) Contrast oceanic and continental crust.
Answer: Oceanic crust is thinner, denser, and darker in color than continental crust and is composed of the igneous rock, basalt. Continental crust is thicker, less dense, and lighter in color than continental crust and its average composition is the igneous rock granite.
Diff: 2
Skill: Comprehension
Section: 1.4 How Were Earth and the Solar System Formed?
Essent'l Concept: 1.4 Explain how Earth and the solar system were formed

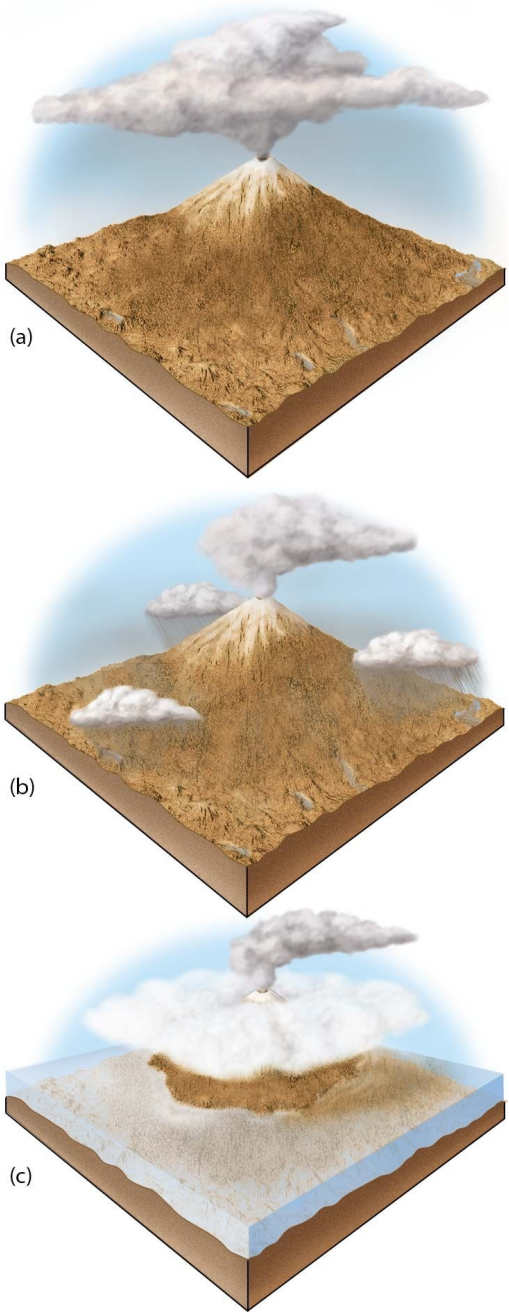


71) Describe how the half-live of radioactive elements can be used to determine the age of rock through radiometric dating.
Answer: Most rocks on Earth contain small amounts of radioactive materials such as potassium, thorium, and uranium. Radioactive materials spontaneously decay into atoms of other elements. Each radioactive material has a characteristic half-life, which is the time required for one-half of the atoms in a sample to decay to atoms of other elements. The older a rock sample is the more radioactive material will have been converted to decay product(s). Instruments can accurately measure the amount of radioactive material and the amount of resulting decay product in a rock sample. By comparing the ratio of these two quantities, the age of a rock sample can be determined, which is referred to as radiometric age dating.
Diff: 2
Skill: Comprehension
Section: 1.6 Did Life Begin in the Oceans?
Essent'l Concept: 1.6 Discuss why life is thought to have originated in the oceans

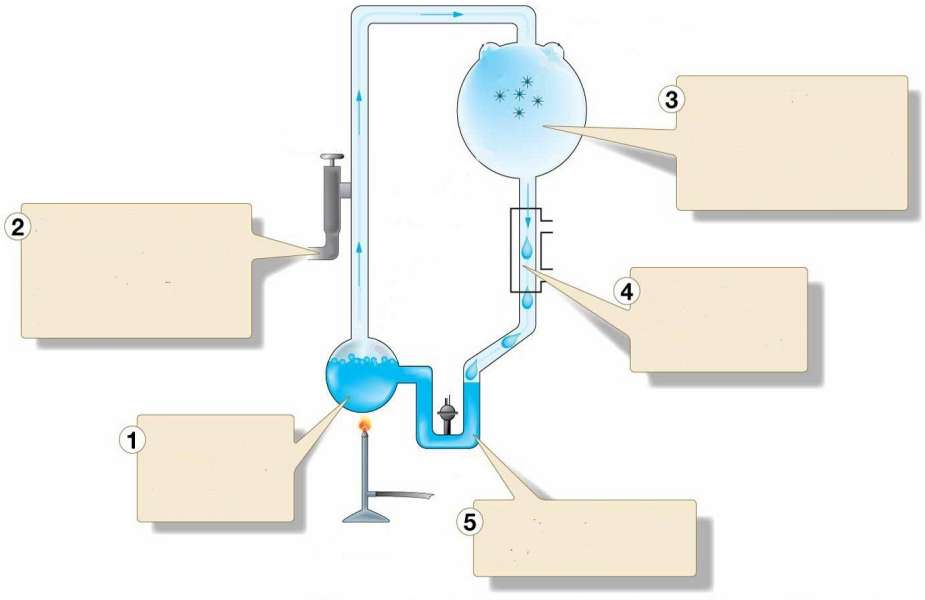
72) Discuss advances in oceanographic navigation occurring over the course of human history.
Diff: 2
Skill: Comprehension
Section: 1.2 How Was Early Exploration of the Oceans Achieved?
Essent'l Concept: 1.2 Discuss how early exploration of the oceans was achieved



73) Discuss the origin of the Solar System using the nebular hypothesis.
Diff: 2
Skill: Comprehension
Section: 1.4 How Were Earth and the Solar System Formed?
Essent'l Concept: 1.4 Explain how Earth and the solar system were formed



74) Discuss the origin of Earth's oceans and how is it related to the origin of our atmosphere.
Diff: 2
Skill: Comprehension
Section: 1.5 How Were Earth's Atmosphere and Oceans Formed?
Essent'l Concept: 1.5 Explain how Earth's atmosphere and ocean were formed



75) Describe Stanley Miller's landmark experiment. How did the results of this experiment change hypothesis regarding the evolution of life on Earth?
Diff: 3
Skill: Application
Section: 1.6 Did Life Begin in the Oceans?
Essent'l Concept: 1.6 Discuss why life is thought to have originated in the oceans

76) Explain why the presence of free oxygen in our atmosphere marks an important step in the evolution of life on Earth.
Diff: 2
Skill: Comprehension
Section: 1.6 Did Life Begin in the Oceans?
Essent'l Concept: 1.6 Discuss why life is thought to have originated in the oceans