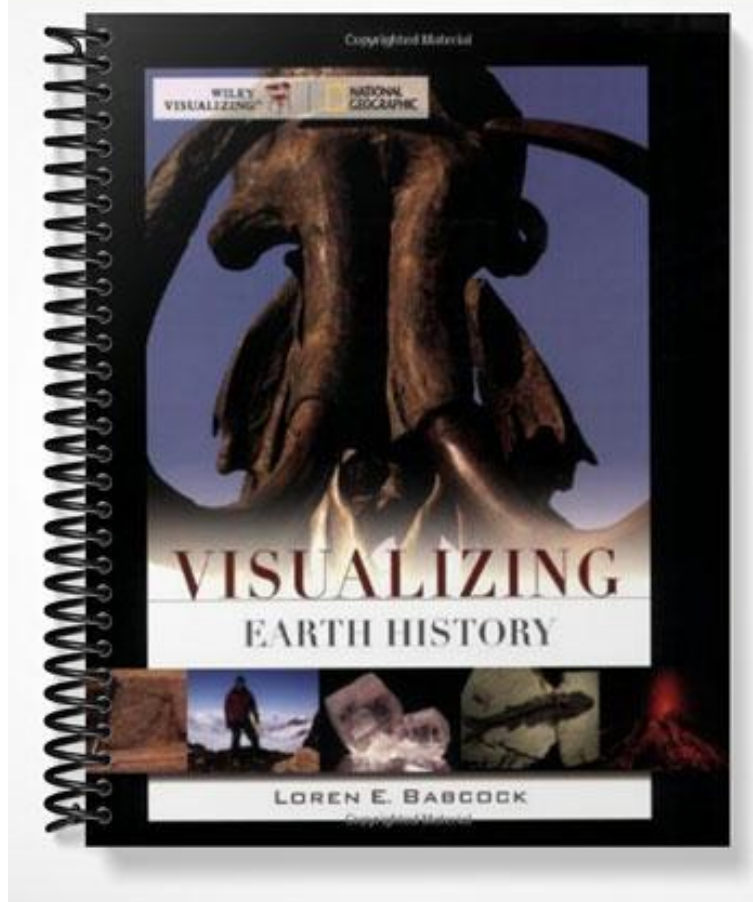


TEST BANK



Import Settings:
Base Settings: Brownstone Default
Information Field: Difficulty
Information Field: Learning Objective
Information Field: Section Ref
Highest Answer Letter: D
Multiple Keywords in Same Paragraph: No

Chapter: Chapter 02: Earth Materials and Features

Multiple Choice

1. Volcanic eruptions create _____ rocks.
- A) Igneous
 - B) Metamorphic
 - C) Sedimentary
 - D) All of the above

Ans: A

Difficulty: Easy

Learning Objective: To understand the nature of Igneous rocks

Section Ref: Earth Materials and Features (Introduction)

2. Minerals _____.



- A) are crystalline
- B) have a fixed chemical composition
- C) solid
- D) All of the above

Ans: D

Difficulty: Easy

Learning Objective: To understand the nature of Minerals

Section Ref: Earth Materials and Features (Introduction)

3. Coal and petroleum are commonly classified as _____.

- A) minerals
- B) mineraloids
- C) mineral resources
- D) rocks

Ans: C

Difficulty: Easy

Learning Objective: To classify fossil fuels as Earth materials

Section Ref: Rocks and minerals

4. Biomineralization does NOT involve the formation of _____.

- A) bones
- B) inorganic compounds
- C) shells

D) teeth

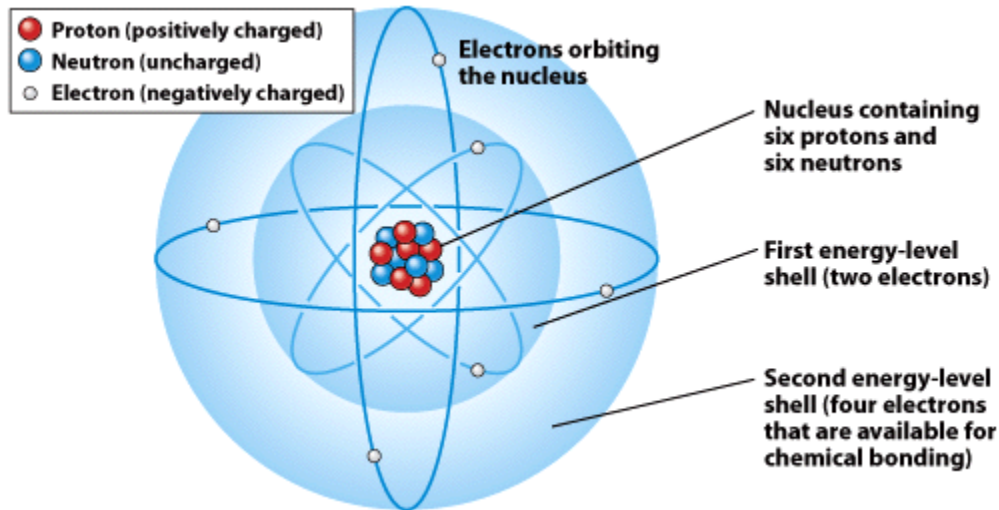
Ans: B

Difficulty: Easy

Learning Objective: To be aware that inorganic chemical reactions are not involved in Biomineralization

Section Ref: Rocks and minerals

5. Atoms of the same element have the same _____.



- A) atomic number
- B) atomic weight
- C) number of neutrons
- D) none of the above

Ans: A

Difficulty: Easy

Learning Objective: To understand basic chemistry

Section Ref: Elements, ions, and atomic bonds

6. At the center of an atom is the nucleus. The atomic nucleus contains _____.

- A) electrons
- B) neutrons only
- C) protons only
- D) Both B and C

Ans: D

Difficulty: Easy

Learning Objective: To understand basic chemistry

Section Ref: Elements, ions, and atomic bonds

7. The atomic number of Uranium (U) is 92. This means that a U atom has 92 _____.

- A) electrons
- B) neutrons
- C) protons
- D) Both B and C

Ans: C

Difficulty: Easy

Learning Objective: To understand basic chemistry

Section Ref: Elements, ions, and atomic bonds

8. _____ orbit the nucleus of an atom.

- A) Electrons
- B) Ions
- C) Neutrons
- D) Protons

Ans: A

Difficulty: Easy

Learning Objective: To understand basic chemistry

Section Ref: Elements, ions, and atomic bonds

9. Molecules are formed by the bonding together of _____.

- A) atoms
- B) electrons
- C) protons
- D) neutrons

Ans: A

Difficulty: Easy

Learning Objective: To understand basic chemistry

Section Ref: Elements, ions, and atomic bonds

10. Ions are transferred between atoms with _____ bonding.

- A) covalent
- B) ionic
- C) metallic
- D) Van Der Waals

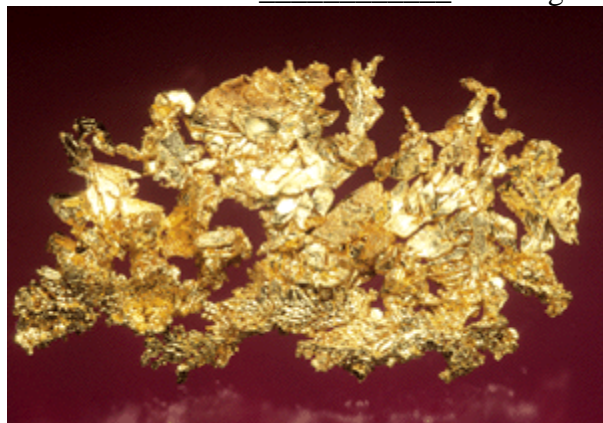
Ans: B

Difficulty: Easy

Learning Objective: To understand basic chemistry

Section Ref: Elements, ions, and atomic bonds

11. Minerals with _____ bonding tend to be good electrical conductors.



- A) covalent
- B) ionic
- C) metallic
- D) Van Der Waals

Ans: C

Difficulty: Easy

Learning Objective: To understand the relationship between mineral properties and chemical bonding

Section Ref: Elements, ions, and atomic bonds

12. Electrons are shared with strong _____ bonding. Minerals with this type of bonding tend to be more resistant to weathering.

- A) covalent
- B) ionic
- C) metallic
- D) Van Der Waals

Ans: A

Difficulty: Easy

Learning Objective: To understand the relationship between chemical bonding and resistance to weathering

Section Ref: Elements, ions, and atomic bonds

13. Isotopes of the same element have different amounts of _____, but must have the same amount of _____.

- A) electrons, protons
- B) neutrons, protons
- C) protons, electrons
- D) protons, neutrons

Ans: B

Difficulty: Medium

Learning Objective: To understand the basic definition of an isotope

Section Ref: Isotopes

14. The element Manganese (Mn) has an atomic weight of 55 and an atomic number of 25. Mn atoms contain _____.

- A) 25 protons, 30 neutrons
- B) 30 protons, 25 neutrons
- C) 25 protons, 55 neutrons
- D) 55 neutrons, 25 protons

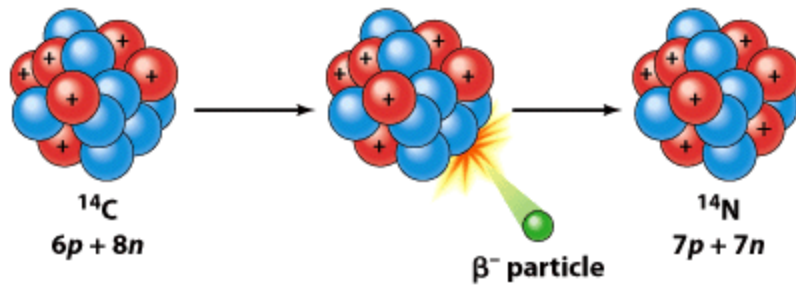
Ans: A

Difficulty: Easy

Learning Objective: To understand the basic definition of an isotope

Section Ref: Isotopes

15. After an organism dies, the amount of Carbon-14 that it contains _____, whereas the amount of its daughter Nitrogen-14 _____.



- A) decreases, decreases
- B) decreases, increases
- C) increases, decreases
- D) increases, increases

Ans: B

Difficulty: Medium

Learning Objective: To understand the basics of Carbon-14 dating

Section Ref: Isotopes

16. The ratio of _____ isotopes in the oceans is commonly used to measure past temperature changes.

- A) Carbon
- B) Oxygen
- C) Thorium
- D) Uranium

Ans: B

Difficulty: Easy

Learning Objective: To understand how to measure climate changes of the past

Section Ref: Isotopes

17. Tectonic plates are driven by both _____ and _____.

- A) stable isotopes, electromagnetic radiation
- B) stable isotopes, heat
- C) radioactive isotope decay, electromagnetic radiation
- D) radioactive isotope decay, heat

Ans: D

Difficulty: Easy

Learning Objective: To understand the driving force of Plate tectonics

Section Ref: Isotopes

18. There are about _____ rock forming minerals that are essential to interpreting Earth history.

- A) 5
- B) 20
- C) 50
- D) 150

Ans: B

Difficulty: Easy

Learning Objective: To emphasize to the student that he/she only needs to know 20 or so minerals to study Earth History at the college undergraduate level

Section Ref: Common rock forming minerals

19. _____ is a common mineral used in the production of wallboard (also called Drywall) for the purposes of building construction.



- A) Aragonite
- B) Feldspar
- C) Gypsum
- D) Quartz

Ans: C

Difficulty: Easy

Learning Objective: To learn about an example of a mineral which is a key raw material of

economic value

Section Ref: Common rock forming minerals

20. Lava forms _____ rocks.



- A) Igneous
- B) Metamorphic
- C) Sedimentary
- D) None of the above

Ans: A

Difficulty: Easy

Learning Objective: To learn about the basic nature of Igneous rocks

Section Ref: The rock cycle

21. Increases in pressure, temperature and/or the presence of chemically active fluids form



- A) Igneous
- B) Metamorphic
- C) Sedimentary
- D) None of the above

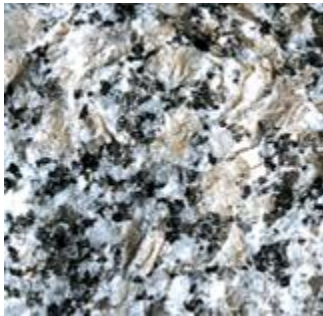
Ans: B

Difficulty: Easy

Learning Objective: To learn about the basic nature of Metamorphic rocks

Section Ref: The rock cycle

22. As a new geologist, you go out in the field and find a Igneous rock with large crystals visible to the naked eye. You know that the rock cooled _____, and _____ ground.



- A) rapidly, above
- B) rapidly, below
- C) slowly, above
- D) slowly, below

Ans: D

Difficulty: Medium

Learning Objective: To learn how to “read” igneous rock textures

Section Ref: Igneous rocks and processes

23. Basalt is a common _____ rock.



Basalt

- A) metamorphic
- B) plutonic
- C) sedimentary
- D) volcanic

Ans: D

Difficulty: Easy

Learning Objective: To become familiar with one of the most common igneous rocks

Section Ref: Igneous rocks and processes

24. Basalt and rhyolite are _____, and _____ texture(s).



Rhyolite



Basalt

- A) extrusive, have different
- B) extrusive, have the same
- C) intrusive, have different
- D) intrusive, have the same

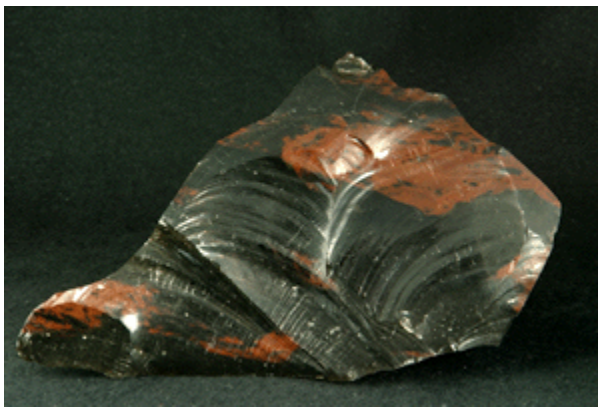
Ans: B

Difficulty: Moderate-Easy

Learning Objective: To become familiar with two common igneous rocks

Section Ref: Igneous rocks and processes

25. The igneous rock obsidian is a _____ solid, which cooled _____.



- A) crystalline, rapidly
- B) crystalline, slowly
- C) non-crystalline, rapidly

D) non-crystalline, slowly

Ans: C

Difficulty: Moderate-Easy

Learning Objective: To become familiar with a common volcanic rock

Section Ref: Igneous rocks and processes

26. Of the following igneous rocks which cooled the slowest?

- A) Andesite
- B) Basalt
- C) Granite
- D) Obsidian

Ans: C

Difficulty: Easy

Learning Objective: To become familiar with one of the most common igneous rocks

Section Ref: Igneous rocks and processes

27. Igneous rocks with a porphyritic texture cooled _____.

- A) first rapidly then slowly
- B) first slow then rapidly
- C) rapidly
- D) slowly

Ans: B

Difficulty: Easy

Learning Objective: To become familiar with igneous rock textures

Section Ref: Igneous rocks and processes

28. _____ is not amongst the common minerals found within igneous rocks.

- A) Calcite
- B) Feldspar
- C) Olivine
- D) Quartz

Ans: A

Difficulty: Easy-Moderate

Learning Objective: To become familiar with the mineralogy of igneous rocks
Section Ref: Igneous rocks and processes

29. Mafic igneous rocks are _____ in iron, and are more likely found within the _____ crust.



- A) poor, continental
- B) poor, oceanic
- C) rich, continental
- D) rich, oceanic

Ans: D

Difficulty: Easy-Moderate

Learning Objective: To become familiar with two important terms, “mafic” and “felsic”

Section Ref: Igneous rocks and processes

30. Of the following igneous rock types which contains the most iron.

- A) Andesite
- B) Basalt
- C) Granite
- D) Peridotite

Ans: D

Difficulty: Easy

Learning Objective: To become familiar with the igneous rock Peridotite

Section Ref: Igneous rocks and processes

31. Quartz is a common mineral in _____ igneous rocks.



- A) felsic
- B) limestone
- C) mafic
- D) ultramafic

Ans: A

Difficulty: Easy

Learning Objective: To become familiar with the mineralogy of igneous rocks

Section Ref: Igneous rocks and processes

32. This black volcanic rock from the island of Hawaii is called _____.



- A) andesite
- B) basalt
- C) diorite
- D) granite

Ans: B

Difficulty: Easy

Learning Objective: To become familiar with the most common rock type of the Pacific islands

Section Ref: Igneous rocks and processes

33. The valuable mineral “Diamond” is formed within the _____ rock “Kimberlite”.



- A) glassy
- B) igneous
- C) metamorphic
- D) sedimentary

Ans: B

Difficulty: Easy

Learning Objective: To become familiar with the source of diamonds

Section Ref: Amazing places: The source of diamonds

34. Of the following igneous rock types this one has the largest crystals.



- A) Basalt
- B) Obsidian
- C) Pegmatite
- D) Tuff

Ans: C

Difficulty: Easy

Learning Objective: To be able to differentiate between different igneous rock types

Section Ref: Igneous rocks and processes

35. Pegmatites typically crystallize _____ from an igneous melt, and commonly _____ contain rare elements.



- A) first, do
- B) first, do not
- C) last, do
- D) last, do not

Ans: C

Difficulty: Easy

Learning Objective: To understand the basic nature of Pegmatites

Section Ref: Igneous rocks and processes

36. Melting will produce _____ rocks, whereas weathering produces _____ ones.

- A) igneous, sedimentary
- B) sedimentary, igneous
- C) metamorphic, sedimentary
- D) sedimentary, metamorphic

Ans: A

Difficulty: Easy

Learning Objective: To be able to differentiate between the three major rock types

Section Ref: Sedimentary rocks and processes

37. Sedimentary rocks are NOT derived from _____.

- A) precipitation from water

- B) skeletal debris
- C) substantial increases in pressure and/or temperature
- D) weathering and erosion

Ans: C

Difficulty: Easy

Learning Objective: To be able to differentiate between the three major rock types

Section Ref: Sedimentary rocks and processes

38. The finest sediments are classified as _____.

- A) clay
- B) gravel
- C) sand
- D) silt

Ans: A

Difficulty: Easy

Learning Objective: To differentiate between the different sediment size types

Section Ref: Sedimentary rocks and processes

39. “Coccoliths” are a common type of _____ organism found in _____.



- A) land, limestone
- B) land, shale
- C) marine, limestone

D) marine, shale

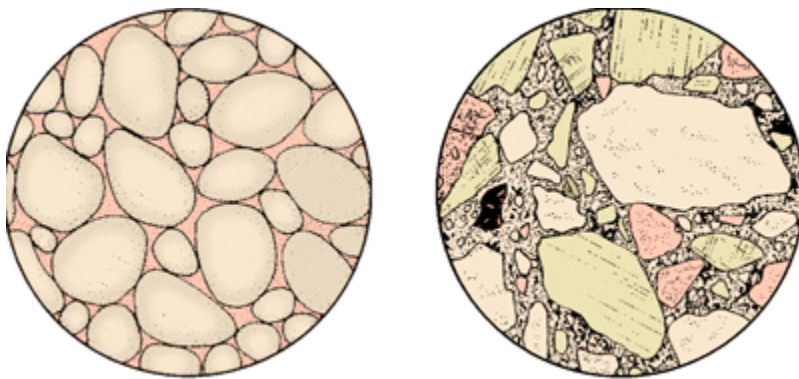
Ans: C

Difficulty: Medium

Learning Objective: To learn the characteristics of common sedimentary rocks

Section Ref: Sedimentary rocks and processes

40. _____ is/are commonly used to describe siliclastic sediments/rocks.



- A) grain-size
- B) grain-shape
- C) grain-sorting
- D) A, B and C

Ans: D

Difficulty: Easy

Learning Objective: To learn about how to describe siliclastic sediments/rocks

Section Ref: Sedimentary rocks and processes

41. _____ is/are not a common constituent of carbonate sedimentary rocks.



- A) Calcite
- B) Dolomite
- C) Ooids
- D) Quartz

Ans: D

Difficulty: Easy

Learning Objective: To learn about the common constituents of carbonate sedimentary rocks

Section Ref: Sedimentary rocks and processes

42. Which of the following minerals is NOT commonly found within sedimentary rocks that are formed from evaporite minerals.

- A) Anhydrite
- B) Gypsum
- C) Halite
- D) Olivine

Ans: D

Difficulty: Easy

Learning Objective: To learn about the most common minerals found within evaporites

Section Ref: Sedimentary rocks and processes

43. The cementation of rocks occurs for sedimentary rocks during _____.

- A) deposition
- B) diagenesis
- C) erosion
- D) weathering

Ans: B

Difficulty: Easy

Learning Objective: To become familiar with the terminology used in studying sedimentary rocks

Section Ref: Sedimentary rocks and processes

44. Metamorphic rocks can be formed from _____ rocks.

- A) igneous
- B) metamorphic
- C) sedimentary
- D) all of the above

Ans: D

Difficulty: Easy

Learning Objective: To become familiar with the basics of how metamorphic rocks are formed

Section Ref: Metamorphic rocks and processes

45. Bedding is a characteristic commonly found in _____ rocks.

- A) Igneous
- B) Metamorphic
- C) Sedimentary
- D) All of the above

Ans: C

Difficulty: Easy

Learning Objective: To become familiar with the features associated with the three basic types of rocks.

Section Ref: Types of rocks

46. Of the following metamorphic rock types, which is of the highest grade?

- A) Gneiss

- B) Phyllite
- C) Schist
- D) Slate

Ans: A

Difficulty: Easy

Learning Objective: To be able to differentiate between metamorphic rocks of different grade

Section Ref: Metamorphic rocks and processes

47. Metamorphic rocks with schistosity are _____ crystalline, and are _____.

- A) coarsely, foliated
- B) coarsely, non-foliated
- C) finely, foliated
- D) finely, non-foliated

Ans: A

Difficulty: Easy

Learning Objective: To understand the term “Schistosity”

Section Ref: Metamorphic rocks and processes

48. Which of the following metamorphic rocks is non-foliated?

- A) Gneiss
- B) Marble
- C) Schist
- D) Slate

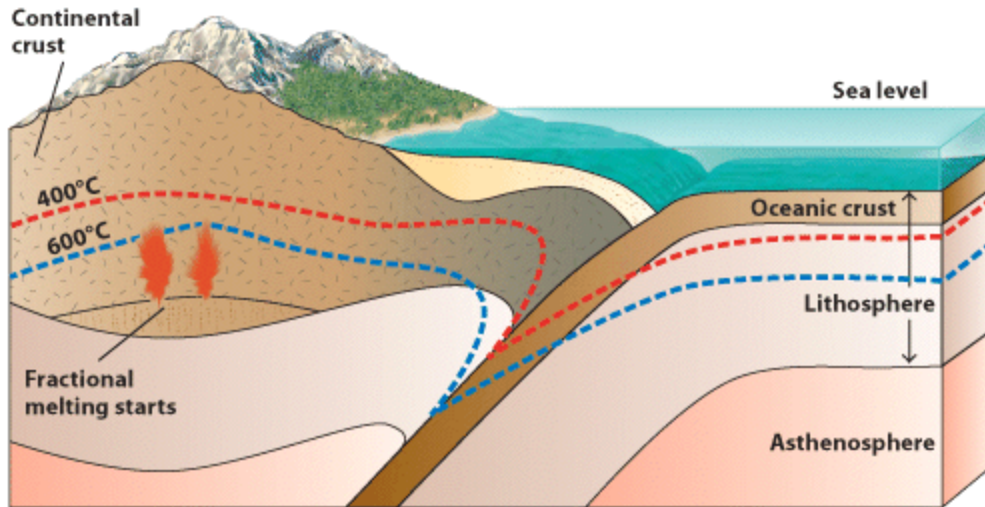
Ans: B

Difficulty: Easy

Learning Objective: To be able to differentiate between foliated and non-foliated rocks

Section Ref: Metamorphic rocks and processes

49. Regional metamorphism usually occurs in or near _____.



- A) glaciers
- B) the middle of plates
- C) mid-ocean ridges
- D) subduction zones

Ans: D

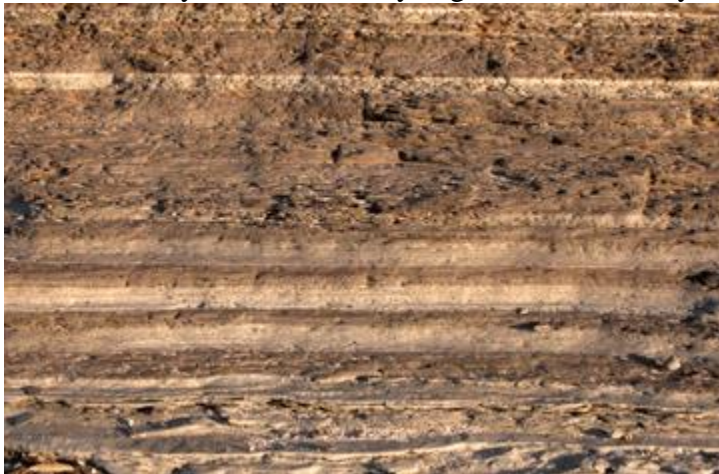
Difficulty: Easy

Learning Objective: To understand where regional metamorphism occurs

Section Ref: Metamorphic rocks and processes

True/False

50. The study of Earth History begins with the study of rocks.



Ans: True

Difficulty: Easy

Learning Objective: To understand that studying rocks is the first step in studying Earth history.

Section Ref: Earth Materials and Features (Introduction)

51. Diamonds produced in the lab are not normally classified as minerals.

Ans: False

Difficulty: Easy

Learning Objective: To be able to recognize what is and what is not a mineral

Section Ref: Rocks and Minerals

52. Mineraloids are crystalline.



Ans: False

Difficulty: Easy

Learning Objective: To familiarize the student with the term “Mineraloid”

Section Ref: Rocks and Minerals

53. Organisms can secrete minerals.



Ans: True

Difficulty: Easy

Learning Objective: To be aware that organisms can produce minerals

Section Ref: Rocks and Minerals

54. Quartz sandstones are produced by inorganic processes.



Ans: True

Difficulty: Easy

Learning Objective: To understand the basics of sandstone formation

Section Ref: Rocks and Minerals

55. Rocks usually contain more than one mineral.

Ans: True

Difficulty: Easy

Learning Objective: To understand that rocks are aggregates of minerals

Section Ref: Rocks and Minerals

56. Atoms are the basic building blocks of minerals.

Ans: True

Difficulty: Easy

Learning Objective: To understand basic chemistry

Section Ref: Elements, ions, and atomic bonds

57. Ions have an equal number of protons and electrons for each atom.

Ans: False

Difficulty: Easy

Learning Objective: To understand basic chemistry

Section Ref: Elements, ions, and atomic bonds

58. Minerals which have ionic bonds are usually difficult to dissolve in water.

Ans: False

Difficulty: Easy

Learning Objective: To understand basic chemistry

Section Ref: Elements, ions, and atomic bonds

59. Carbon has three isotopes, Carbon-12, Carbon-13 and Carbon-14. Carbon-12 is the heaviest of the three.

Ans: False

Difficulty: Easy

Learning Objective: To understand basic chemistry

Section Ref: Isotopes

60. If the half life of Carbon-14 is 5730 years, this means that a rock will contain 50 percent Carbon-14 after 2865 years.

Ans: False

Difficulty: Easy

Learning Objective: To understand the concept of half-life

Section Ref: Isotopes

61. Oxygen has two isotopes, Oxygen-16 and Oxygen-18. Both isotopes have the same atomic number.

Ans: True

Difficulty: Easy

Learning Objective: To understand the definition of an isotope

Section Ref: Isotopes

62. After an organism dies the amount of Nitrogen-14 (the daughter product of radioactive Carbon-14) within it decreases.

Ans: False

Difficulty: Easy

Learning Objective: To understand the basics of radioactive decay

Section Ref: Isotopes

63. Quartz and feldspar contain silica (SiO_4) tetrahedra.



Quartz



Feldspar

Ans: True

Difficulty: Easy

Learning Objective: To understand the basic chemistry of two of the most common rock forming minerals

Section Ref: Rock forming minerals

64. Calcite and dolomite are oxide minerals, meaning they consist of metallic ions bonded to oxygen.



Calcite



Dolomite

Ans: False

Difficulty: Easy

Learning Objective: To understand the basic chemistry of two of the most common rock forming minerals

Section Ref: Rock forming minerals

65. Granite is a volcanic rock.



Granite

Ans: False

Difficulty: Easy

Learning Objective: To learn about the most common of igneous rocks

Section Ref: Igneous rocks and processes

66. Smaller crystals in igneous rocks indicate more rapid cooling (when compared to large crystals).



Ans: True

Difficulty: Easy

Learning Objective: To learn how to “read” igneous rock textures

Section Ref: Igneous rocks and processes

67. Igneous rocks that have large crystals probably cooled underground.

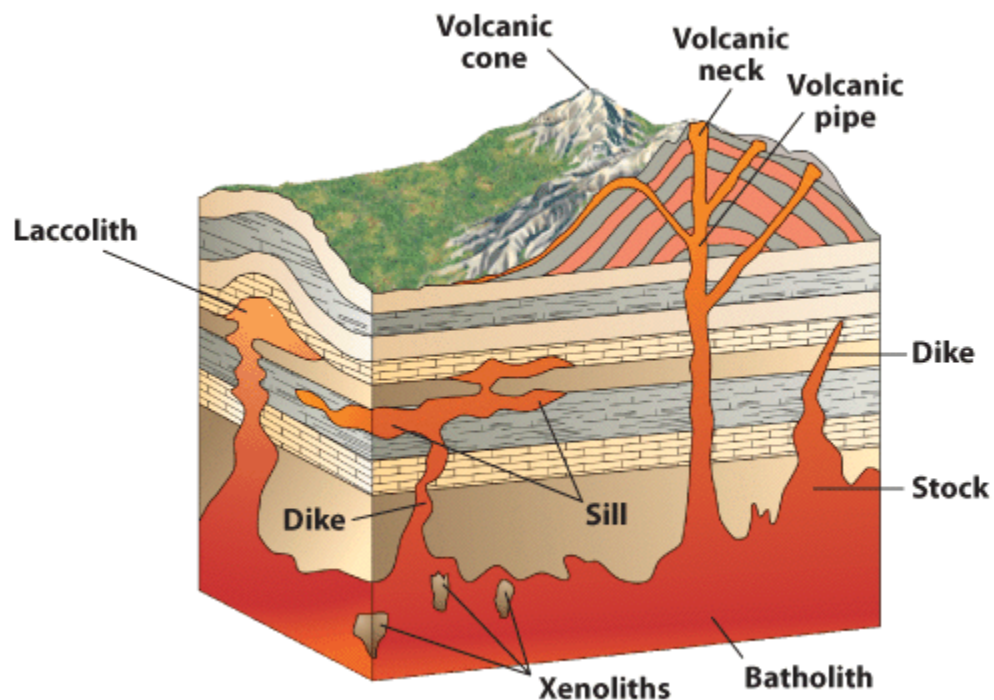
Ans: True

Difficulty: Easy

Learning Objective: To learn how to “read” igneous rock textures

Section Ref: Igneous rocks and processes

68. Dikes, Sills, Laccoliths, and Batholiths are plutonic features.



Ans: True

Difficulty: Easy

Learning Objective: To learn how to about some basic underground igneous bodies

Section Ref: Igneous rocks and processes

69. Tuffs are igneous rocks that are comprised of large intertwined crystals.

Ans: False

Difficulty: Easy

Learning Objective: To become familiar with a common igneous rock type

Section Ref: Igneous rocks and processes

70. Igneous rocks that have a “Porphyritic” texture contain both “phenocrysts” surrounded by fine crystalline “groundmass”.

Ans: True

Difficulty: Easy

Learning Objective: To become familiar with igneous rock textures

Section Ref: Igneous rocks and processes

71. Olivine is a common mineral within the igneous rock Granite.

Ans: False

Difficulty: Easy

Learning Objective: To become familiar with the mineralogy of Granite

Section Ref: Igneous rocks and processes

72. The intermediate igneous rocks “Diorite” and “Andesite” are primarily found within the oceanic crust.

Ans: False

Difficulty: Easy

Learning Objective: To become familiar with the composition of Earth's crustal rocks

Section Ref: Igneous rocks and processes

73. Volcanic rock bodies are commonly called “Plutons”.

Ans: False

Difficulty: Easy

Learning Objective: To become familiar with igneous rock terminology
Section Ref: Igneous rocks and processes

74. Diamonds are formed in rivers.



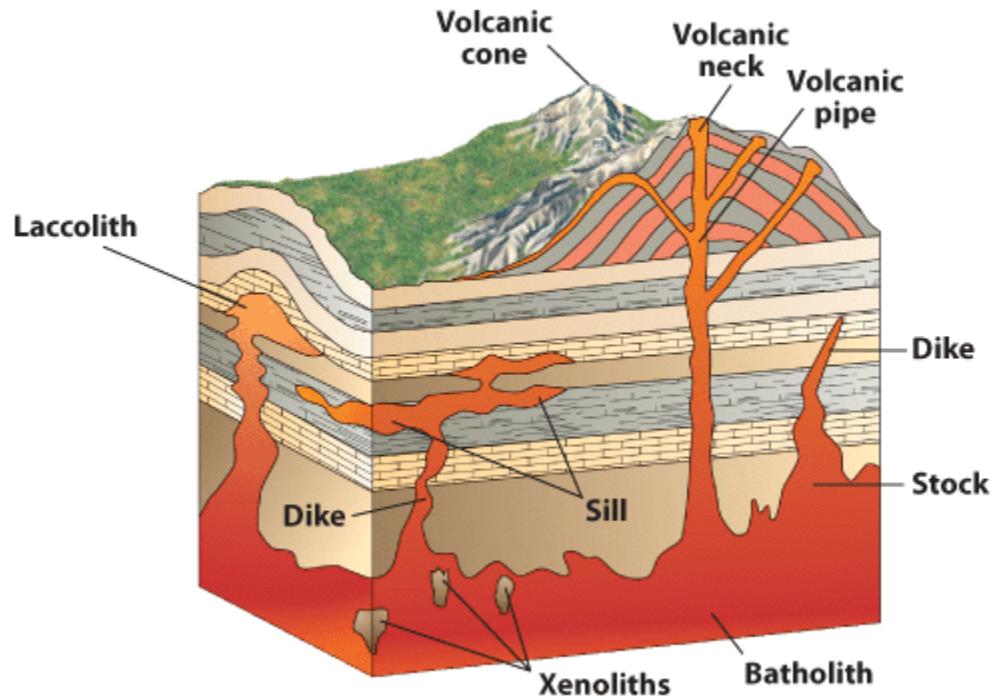
Ans: False

Difficulty: Easy

Learning Objective: To learn about the origin of diamonds

Section Ref: Amazing places: The source of diamonds

75. The largest of the igneous plutons are known as “Batholiths”.



Ans: True

Difficulty: Easy

Learning Objective: To become familiar with the classification of igneous plutons

Section Ref: Igneous rocks and processes

76. Diamonds are much younger than the stream gravel that they are commonly formed in.



Ans: False

Difficulty: Easy

Learning Objective: To gain an understanding of the origin of diamonds

Section Ref: Amazing places: The source of diamonds

77. Volcanic necks are formed in regions of active volcanic activity.

Ans: False

Difficulty: Easy

Learning Objective: To understand the nature of a common igneous feature

Section Ref: Igneous rocks and processes

78. “Lithification” is a term that is usually associated with “Sedimentary Rocks”

Ans: True

Difficulty: Easy

Learning Objective: To become familiar with basic terminology for rocks

Section Ref: Sedimentary rocks and processes

79. Siliclastic sediments are usually masses of tightly intergrown calcite crystals.

Ans: False

Difficulty: Easy

Learning Objective: To understand how silica sediments are formed

Section Ref: Sedimentary rocks and processes

80. More mature sediments are usually clay rich.

Ans: True

Difficulty: Easy

Learning Objective: To understand the term sediment maturity

Section Ref: Sedimentary rocks and processes

81. Chalk is a common siliclastic rock.

Ans: False

Difficulty: Easy

Learning Objective: To classify the main sedimentary rock types

Section Ref: Sedimentary rocks and processes

82. Sedimentary rocks with a phaneritic texture are common.

Ans: False

Difficulty: Easy

Learning Objective: To be able to recognize sedimentary textures

Section Ref: Sedimentary rocks and processes

83. Both compaction and cementation can be involved in “diagenesis” process.

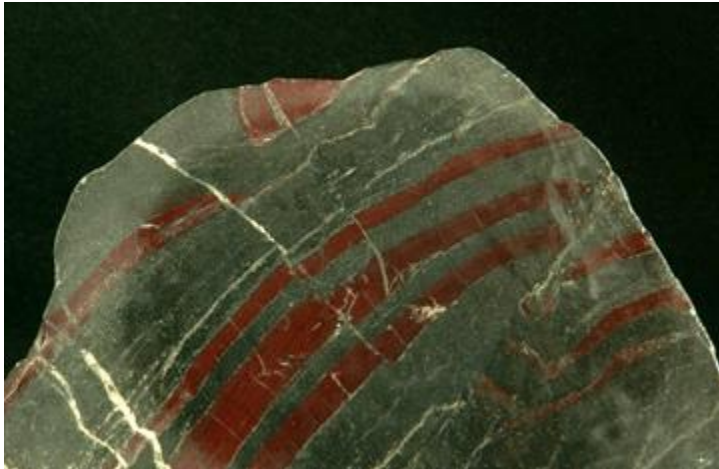
Ans: True

Difficulty: Easy

Learning Objective: To understand how “diagenesis” occurs

Section Ref: Sedimentary rocks and processes

84. Banded iron formations consist of shale and chert.



Ans: True

Difficulty: Easy

Learning Objective: To become aware of the composition of banded iron formations

Section Ref: Sedimentary rocks and processes

85. High grade metamorphic rocks are formed when rocks are exposed to higher pressures and temperatures, but do not melt.

Ans: True

Difficulty: Easy

Learning Objective: To understand the concept of metamorphic grade

Section Ref: Metamorphic rocks and processes

86. Higher grade metamorphic rocks tend to have finer crystal sizes.

Ans: False

Difficulty: Easy

Learning Objective: To understand the relationship between metamorphic grade and crystal sizes.

Section Ref: Metamorphic rocks and processes

87. Regional metamorphism occurs over a wide area, and results from increases in both pressure and temperature.

Ans: True

Difficulty: Easy

Learning Objective: To understand the concept of “Regional Metamorphism”

Section Ref: Metamorphic rocks and processes

88. Non-foliated rocks usually only consist on one mineral.

Ans: True

Difficulty: Easy

Learning Objective: To gain knowledge as to the characteristics of non-foliated rocks

Section Ref: Metamorphic rocks and processes

89. Marble is composed of the mineral calcite.



Ans: True

Difficulty: Easy

Learning Objective: To learn about the composition of one of the most common metamorphic rocks.

Section Ref: Metamorphic rocks and processes

Essay

90. Geologists often say that rocks are like book? Discuss what they mean by that.



Ans: Geologists say that rocks are like books because once a person becomes familiar with the principles of this applied science, he will be able to look at a rock and read the history that is recorded in it. Rocks tell us about the conditions that used to exist on the Earth. They also tell us about life on the Earth during the past.

Difficulty: Moderate

Learning Objective: For the student to understand one of the reasons why Geologists study rocks

Section Ref: Earth Materials and Features (Introduction)

91. What is the difference between a rock and a mineral?



**Common Rock-
Forming Minerals**



The Rock Cycle

Ans: A mineral is a naturally occurring crystalline solid with a fixed chemical composition. However, substances grown in a lab are also considered minerals. Rocks are usually made up of

more than one mineral, though some only contain one mineral.

Difficulty: Moderate

Learning Objective: For the student to differentiate between rocks and minerals

Section Ref: Earth Materials and Features (Introduction)

92. What is the difference between the terms “Atomic Number” and “Atomic Weight”.

Ans: Atomic number refers to the number of protons in an atom. Each element has a different atomic number. The atomic weight refers to the sum of the number of protons and neutrons in an atom.

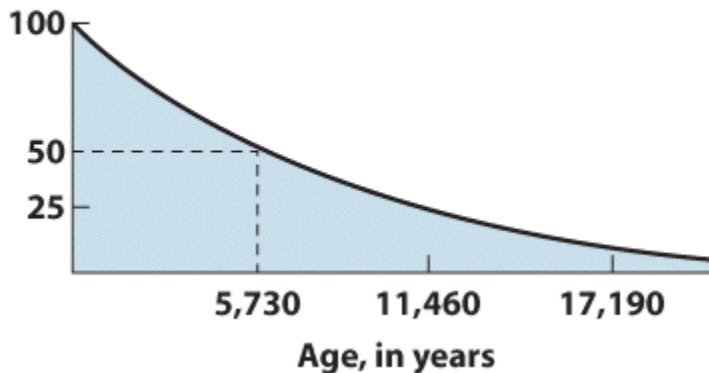
Difficulty: Medium

Learning Objective: To understand basic chemistry

Section Ref: Elements, ions, and atomic bonds

93. Why don't scientist use Carbon-14 dating to age date rocks millions of years old in age?

Percentage of ^{14}C



Ans: Carbon-14 dating is not useful in dating materials older than 50,000 years. Carbon-14 decays to form its daughter product Nitrogen-14. The half life of Carbon-14 is 5730 years, so that every 5730 years, half of the available Carbon-14 atoms will change into its daughter Nitrogen-14. So that for old rocks, millions of years old, the amount of Carbon-14 remaining would be too low to accurately measure.

Difficulty: High

Learning Objective: To understand why Carbon-14 is only useful in dating material younger than 50,000 years.

Section Ref: Isotopes

94. In 3-4 sentences, describe how descriptive and genetic rock classification schemes are different, which provides more information about how the rock formed.

Ans: Descriptive rock classification is based on the physical attributes of the rock, for example "Fine-grained quartz sandstone". Genetic rock classification is based on how the rock originated. For example, Igneous rocks formed from molten lava or magma. So, the genetic classification tells us more about how the rock formed.

Difficulty: Medium

Learning Objective: To understand how rock rocks are classified

Section Ref: Types of rocks

95. When examining hand sample of igneous rocks what generalization can geologists make when looking at the color, crystal size, and cooling rate of these rocks.

Ans: The darker the igneous rock, the more mafic it is, the more likely it is to be found in oceanic rocks, and the more iron it contains. In contrast, lighter igneous rocks are felsic, contain less iron, and are found in continental crust. The larger the crystals, the slower the igneous rock rate of cooling, and the more likely that the rock will be plutonic in origin.

Difficulty: Medium

Learning Objective: To make the student aware of the implication of color and crystal size in determining the origin of igneous rocks

Section Ref: Igneous rocks and processes

96. Describe in 3-4 sentence how diamonds are formed, and how they end up in stream deposits.



Ans: Deep in the mantle diamonds are formed as Carbon is exposed to high pressures in a rock called “Kimberlite”. Kimberlite pipes intrude to or near the surface. Erosion removes the diamonds from the Kimberlite and transports them within stream sediments.

Difficulty: Medium

Learning Objective: To study the origin of stream deposit diamonds

Section Ref: Amazing places: The source of diamonds

97. In 3 or less sentences describe the difference between the origin of sedimentary rocks versus igneous rocks.

Ans: Igneous rocks are formed by melting either on the earth surface (volcanic) or beneath the Earth's surface (plutonic). Sedimentary rocks are formed by weathering and erosion, precipitation from water, or from the remains of organisms. Sedimentary rocks can contain fossils, igneous rocks will not have fossils.

Difficulty: Easy

Learning Objective: To differentiate between the three major rock types

Section Ref: Sedimentary rocks and processes

98. Describe how weathering and erosion of a granite mountain, diagenesis, deposition, and sediment transport can result in the formation of a beach, and then finally quartz sandstone.



Ans: A granitic mountain exposed to the elements will weather and erode, the sediment could then be transported by a river downstream. The sand would then be deposited onto a beach. The sand could then be cemented together in a process called diagenesis to form a quartz sandstone.

Difficulty: Medium

Learning Objective: To become familiar with the processes that produce sediments and sedimentary rocks

Section Ref: Sedimentary rocks and processes

99. Why are increases in pressure NOT important for contact metamorphism?

Ans: Contact metamorphism result from igneous intrusions. When igneous intrusions penetrate into the surrounding country rock, this country rock is baked. The country rock is metamorphosed by the heat, and not by pressure (to any significant extent).

Difficulty: Medium

Learning Objective: To become familiar with conditions that produce contact metamorphism

Section Ref: Metamorphic rocks and processes