Chapter 02 - MINERALS AND ROCKS

True / False

1. Minerals are made of rocks.
   a. True
   b. False

ANSWER: False
REFERENCES: Introduction
LEARNING OBJECTIVES: HGEO.WICA.16.2.2 - Of the 3.800 or so minerals known, only a few, perhaps two dozen, are common in rocks, but many others are found in small quantities in rocks, and some of these are natural resources.
OTHER: Bloom's: Remember

2. An electron is the smallest unit of matter that retains the characteristics of an element.
   a. True
   b. False

ANSWER: False
REFERENCES: Matter - What Is It?
LEARNING OBJECTIVES: HGEO.WICA.16.2.1 - Chemical elements are composed of atoms, all of the same kind, whereas compounds form when different atoms bond together. Most minerals are compounds, which are naturally occurring, inorganic, crystalline solids.
OTHER: Bloom's: Remember

3. A proton is a positively charged particle in the nucleus of an atom.
   a. True
   b. False

ANSWER: True
REFERENCES: Matter - What Is It?
LEARNING OBJECTIVES: HGEO.WICA.16.2.1 - Chemical elements are composed of atoms, all of the same kind, whereas compounds form when different atoms bond together. Most minerals are compounds, which are naturally occurring, inorganic, crystalline solids.
OTHER: Bloom's: Remember

4. Matter is anything that has mass and occupies space.
   a. True
   b. False

ANSWER: True
REFERENCES: Matter - What Is It?
LEARNING OBJECTIVES: HGEO.WICA.16.2.1 - Chemical elements are composed of atoms, all of the same kind, whereas compounds form when different atoms bond together. Most minerals are compounds, which are naturally occurring, inorganic, crystalline solids.
OTHER: Bloom's: Remember

5. Carbon has six protons; therefore, its mass number is six.
   a. True
   b. False

ANSWER: False

REFERENCES: Matter - What Is It?

LEARNING OBJECTIVES: HGEO.WICA.16.2.1 - Chemical elements are composed of atoms, all of the same kind, whereas compounds form when different atoms bond together. Most minerals are compounds, which are naturally occurring, inorganic, crystalline solids.

OTHER: Bloom's: Understand

6. Gemstones are precious minerals used for decorative purposes.
   a. True
   b. False

ANSWER: True

REFERENCES: Introduction

LEARNING OBJECTIVES: HGEO.WICA.16.2.2 - Of the 3.800 or so minerals known, only a few, perhaps two dozen, are common in rocks, but many others are found in small quantities in rocks, and some of these are natural resources.

OTHER: Bloom's: Remember

7. Lava is molten rock below Earth’s surface.
   a. True
   b. False

ANSWER: False

REFERENCES: Igneous Rocks

LEARNING OBJECTIVES: HGEO.WICA.16.2.3 - Cooling and crystallization of magma and lava and the consolidation of pyroclastic materials such as volcanic ash account for the origin of igneous rocks.

OTHER: Bloom's: Remember

8. Quartz is made of the elements silicon and oxygen; therefore, it is a compound.
   a. True
   b. False

ANSWER: True

REFERENCES: Matter - What Is It?

LEARNING OBJECTIVES: HGEO.WICA.16.2.1 - Chemical elements are composed of atoms, all of the same kind, whereas compounds form when different atoms bond together. Most minerals are compounds, which are naturally occurring, inorganic, crystalline solids.

OTHER: Bloom's: Understand

9. Calcite is an example of a silicate mineral.
   a. True
   b. False

ANSWER: False

REFERENCES: Minerals - The Building Blocks of Rocks

LEARNING OBJECTIVES: HGEO.WICA.16.2.2 - Of the 3.800 or so minerals known, only a few, perhaps two dozen, are common in rocks, but many others are found in small quantities in rocks, and some of these are natural resources.

OTHER: Bloom's: Remember

10. Metamorphic rock around a batholith most likely formed by contact metamorphism.

a. True
b. False

ANSWER: True
REFERENCES: Metamorphic Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.7 - Any type of rock may be altered by heat, pressure, fluids, or any combination of these to form metamorphic rocks.
OTHER: Bloom's: Understand

11. The glassy texture of obsidian is the result of extremely slow cooling.
a. True
b. False

ANSWER: False
REFERENCES: Igneous Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.4 - Geologists use mineral content (composition) and textures to classify plutonic rocks (intrusive igneous rocks) and most volcanic rocks (extrusive igneous rocks).
OTHER: Bloom's: Understand

12. Igneous rocks are classified by composition and texture.
a. True
b. False

ANSWER: True
REFERENCES: Igneous Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.4 - Geologists use mineral content (composition) and textures to classify plutonic rocks (intrusive igneous rocks) and most volcanic rocks (extrusive igneous rocks).
OTHER: Bloom's: Remember

13. Magmas are classified based on silica content.
a. True
b. False

ANSWER: True
REFERENCES: Igneous Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.3 - Cooling and crystallization of magma and lava and the consolidation of pyroclastic materials such as volcanic ash account for the origin of igneous rocks.
OTHER: Bloom's: Remember

14. The majority of the more than 3,800 minerals are silicates.
a. True
b. False

ANSWER: True
REFERENCES: Minerals - The Building Blocks of Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.2 - Of the 3.800 or so minerals known, only a few, perhaps two dozen, are common in rocks, but many others are found in small quantities in rocks, and some of these are natural resources.
OTHER: Bloom's: Remember

15. Sedimentary rocks that are composed of rounded gravel-sized particles are classified as conglomerates.

a. True
b. False

ANSWER: True
REFERENCES: Sedimentary Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.6 - Texture and composition are the criteria geologists use to classify sedimentary rocks.
OTHER: Bloom's: Remember

16. Igneous rocks that form underground are more likely to have an aphanitic texture.
a. True
b. False

ANSWER: False
REFERENCES: Igneous Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.4 - Geologists use mineral content (composition) and textures to classify plutonic rocks (intrusive igneous rocks) and most volcanic rocks (extrusive igneous rocks).
OTHER: Bloom's: Understand

17. Running water is the most effective method of erosion.
a. True
b. False

ANSWER: True
REFERENCES: Sedimentary Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.5 - Mechanical and chemical weathering of rocks yields sediment that is transported, deposited, and then lithified to form detrital and chemical sedimentary rocks.
OTHER: Bloom's: Remember

18. Converging plate boundaries are often sites of metamorphism and igneous activity.
a. True
b. False

ANSWER: True
REFERENCES: Sedimentary Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.9 - The fact that Earth materials are continually recycled and that the three groups of rocks are interrelated is summarized in the rock cycle.
OTHER: Bloom's: Remember

19. A limestone that is metamorphosed becomes marble.
a. True
b. False

ANSWER: True
REFERENCES: Metamorphic Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.7 - Any type of rock may be altered by heat, pressure, fluids, or any combination of these to form metamorphic rocks.
OTHER: Bloom's: Remember

20. A shale that is subject to metamorphism may become a slate.
a. True

b. False

ANSWER: True
REFERENCES: Metamorphic Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.8 - One feature used to classify metamorphic rocks is foliation-that is, a platy or layered aspect, but some lack this feature and are said to be nonfoliated.
OTHER: Bloom's: Remember

21. Evaporites are examples of chemical sedimentary rocks.
a. True
b. False

ANSWER: True
REFERENCES: Sedimentary Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.6 - Texture and composition are the criteria geologists use to classify sedimentary rocks.
OTHER: Bloom's: Remember

22. The chemical composition of a mineral never has any variation.
a. True
b. False

ANSWER: False
REFERENCES: Introduction
LEARNING OBJECTIVES: HGEO.WICA.16.2.1 - Chemical elements are composed of atoms, all of the same kind, whereas compounds form when different atoms bond together. Most minerals are compounds, which are naturally occurring, inorganic, crystalline solids.
OTHER: Bloom's: Remember

23. Elongated minerals aligned in a parallel manner in metamorphic rocks create a foliated texture.
a. True
b. False

ANSWER: True
REFERENCES: Metamorphic Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.8 - One feature used to classify metamorphic rocks is foliation-that is, a platy or layered aspect, but some lack this feature and are said to be nonfoliated.
OTHER: Bloom's: Remember

24. Foliated metamorphic rocks can form from both regional and contact metamorphism.
a. True
b. False

ANSWER: True
REFERENCES: Metamorphic Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.8 - One feature used to classify metamorphic rocks is foliation-that is, a platy or layered aspect, but some lack this feature and are said to be nonfoliated.
OTHER: Bloom's: Remember

25. Felsic rocks are lighter in color than mafic rocks.
a. True

b. False

ANSWER: True
REFERENCES: Igneous Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.3 - Cooling and crystallization of magma and lava and the consolidation of pyroclastic materials such as volcanic ash account for the origin of igneous rocks.
OTHER: Bloom's: Understand

Multiple Choice

26. Any rock altered in the solid state from pre-existing rocks by any combination of heat, pressure, and chemically active fluids is a(n) ____ rock.

a. metamorphic
b. igneous
c. sedimentary
d. clastic
e. igneous or metamorphic

ANSWER: a
REFERENCES: Metamorphic Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.7 - Any type of rock may be altered by heat, pressure, fluids, or any combination of these to form metamorphic rocks.
OTHER: Bloom's: Remember

27. According to the rock cycle, a sedimentary rock can be formed from a(n)____.

a. igneous rock only
b. sedimentary rock only
c. metamorphic rock only
d. igneous or metamorphic rock
e. igneous, sedimentary, or metamorphic rock

ANSWER: e
REFERENCES: Minerals - The Building Blocks of Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.9 - The fact that Earth materials are continually recycled and that the three groups of rocks are interrelated is summarized in the rock cycle.
OTHER: Bloom's: Understand

28. What is a naturally occurring, inorganic, crystalline solid, having characteristic physical properties and a narrowly defined chemical composition?

a. rock
b. gem
c. mineral
d. glass
e. magma

ANSWER: c
REFERENCES: Minerals - The Building Blocks of Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.1 - Chemical elements are composed of atoms, all of the same kind, whereas compounds form when different atoms bond together. Most minerals are compounds, which are naturally occurring, inorganic, crystalline solids.

OTHER: Bloom's: Remember

29. The process by which loose sand from a beach or desert is converted into a solid rock called sandstone is an example of ____.

a. lava
b. evaporite
c. lithification
d. mafic
e. metamorphism

ANSWER: c
REFERENCES: Sedimentary Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.5 - Mechanical and chemical weathering of rocks yields sediment that is transported, deposited, and then lithified to form detrital and chemical sedimentary rocks.
OTHER: Bloom's: Remember

30. In a(n) ____ bond, elements share electrons.

a. ionic
b. van der Waals
c. electromagnetic
d. covalent
e. noble

ANSWER: d
REFERENCES: Matter - What Is It?
LEARNING OBJECTIVES: HGEO.WICA.16.2.1 - Chemical elements are composed of atoms, all of the same kind, whereas compounds form when different atoms bond together. Most minerals are compounds, which are naturally occurring, inorganic, crystalline solids.
OTHER: Bloom's: Remember

31. Metamorphism taking place adjacent to a body of magma (a pluton) or beneath a lava flow from heat and chemically active fluids is called ____.

a. orogenic metamorphism
b. contact metamorphism
c. burial metamorphism
d. uncomformable metamorphism
e. regional metamorphism

ANSWER: b
REFERENCES: Metamorphic Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.7 - Any type of rock may be altered by heat, pressure, fluids, or any combination of these to form metamorphic rocks.
OTHER: Bloom's: Remember

32. You are hiking in the desert in Namaqualand in South Africa and notice an area covered with white sedimentary deposits. You taste the deposits and they taste salty. This is most likely an example of a(n) ____.

a. evaporite
b. metamorphic rock
c. detrital sedimentary rock

d. pyroclastic rock
e. volcanic rock

ANSWER: a
REFERENCES: Sedimentary Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.5 - Mechanical and chemical weathering of rocks yields sediment that is transported, deposited, and then lithified to form detrital and chemical sedimentary rocks.
OTHER: Bloom's: Apply

33. What adjective describes fragmental materials, such as ash, explosively erupted from volcanoes?
a. metamorphic
b. intrusive
c. pyroclastic
d. cementation
e. sedimentary

ANSWER: c
REFERENCES: Igneous Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.4 - Geologists use mineral content (composition) and textures to classify plutonic rocks (intrusive igneous rocks) and most volcanic rocks (extrusive igneous rocks).
OTHER: Bloom's: Remember

34. The three categories of rocks are classified by ____.
a. geographic location
b. color
c. mineral content
d. method of formation
e. time of formation

ANSWER: d
REFERENCES: Minerals - The Building Blocks of Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.9 - The fact that Earth materials are continually recycled and that the three groups of rocks are interrelated is summarized in the rock cycle.
OTHER: Bloom's: Understand

35. Molten rock material below the surface of Earth is called ____.
a. lithosphere
b. evaporite
c. mantle
d. magma
e. lava

ANSWER: d
REFERENCES: Igneous Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.3 - Cooling and crystallization of magma and lava and the consolidation of pyroclastic materials such as volcanic ash account for the origin of igneous rocks.
OTHER: Bloom's: Remember

36. A strong chemical bond in which electrons are shared rather than transferred or exchanged is a(n) ____. (HINT: An

example is the bond in quartz.)

a. covalent bond
b. metallic bond
c. hydrogen bond
d. van der Waals bond
e. ionic bond

ANSWER: a
REFERENCES: Matter - What Is It?
LEARNING OBJECTIVES: HGEO.WICA.16.2.1 - Chemical elements are composed of atoms, all of the same kind, whereas compounds form when different atoms bond together. Most minerals are compounds, which are naturally occurring, inorganic, crystalline solids.
OTHER: Bloom's: Remember

37. An uncharged particle in the nucleus of an atom is a(n) ____.

a. neutron
b. proton
c. ion
d. isotope
e. electron

ANSWER: a
REFERENCES: Matter - What Is It?
LEARNING OBJECTIVES: HGEO.WICA.16.2.1 - Chemical elements are composed of atoms, all of the same kind, whereas compounds form when different atoms bond together. Most minerals are compounds, which are naturally occurring, inorganic, crystalline solids.
OTHER: Bloom's: Remember

38. The process of ____ is responsible for breaking down rocks into smaller pieces.

a. weathering
b. erosion
c. sedimentation
d. lithification
e. clastification

ANSWER: a
REFERENCES: Sedimentary Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.5 - Mechanical and chemical weathering of rocks yields sediment that is transported, deposited, and then lithified to form detrital and chemical sedimentary rocks.
OTHER: Bloom's: Remember

39. What type of metamorphic rock results from the recrystallization of quartz sandstone?

a. marble
b. slate
c. gneiss
d. anthracite
e. quartzite

ANSWER: e

REFERENCES: Metamorphic Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.8 - One feature used to classify metamorphic rocks is foliation-that is, a platy or layered aspect, but some lack this feature and are said to be nonfoliated.
OTHER: Bloom's: Remember

40. Detrital sedimentary rocks are classified by ____.
    a. composition
    b. color
    c. depositional environment
    d. clast size
    e. foliation

ANSWER: d
REFERENCES: Sedimentary Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.6 - Texture and composition are the criteria geologists use to classify sedimentary rocks.
OTHER: Bloom's: Remember

41. Isotopes of the same element have ____.
    a. different numbers of protons, but the same number of neutrons
    b. the same number of electrons, but different numbers of neutrons
    c. different numbers of neutrons, but the same number of protons
    d. different numbers of electrons, but the same number of neutrons
    e. different numbers of protons and neutrons

ANSWER: c
REFERENCES: Matter - What Is It?
LEARNING OBJECTIVES: HGEO.WICA.16.2.1 - Chemical elements are composed of atoms, all of the same kind, whereas compounds form when different atoms bond together. Most minerals are compounds, which are naturally occurring, inorganic, crystalline solids.
OTHER: Bloom's: Understand

42. Which type(s) of rock can be metamorphosed?
    a. igneous rocks only
    b. sedimentary rocks only
    c. metamorphic rocks only
    d. igneous and sedimentary rocks
    e. igneous, sedimentary, and metamorphic rocks

ANSWER: e
REFERENCES: Plate Tectonics and the Rock Cycle
LEARNING OBJECTIVES: HGEO.WICA.16.2.9 - The fact that Earth materials are continually recycled and that the three groups of rocks are interrelated is summarized in the rock cycle.
OTHER: Bloom's: Understand

43. For a neutrally-charged atom to become a positively-charged ion of the same element, it must ____.
    a. lose a proton
    b. lose an electron

c. gain a proton
d. gain an electron
e. lose an electron and gain a proton

ANSWER: b
REFERENCES: Matter - What Is It?
LEARNING OBJECTIVES: HGEO.WICA.16.2.1 - Chemical elements are composed of atoms, all of the same kind, whereas compounds form when different atoms bond together. Most minerals are compounds, which are naturally occurring, inorganic, crystalline solids.
OTHER: Bloom's: Understand

44. When an atom becomes positively charged, it is called a(n) ____.
a. electron
b. neutron
c. ion
d. isotope
e. positron

ANSWER: c
REFERENCES: Matter - What Is It?
LEARNING OBJECTIVES: HGEO.WICA.16.2.1 - Chemical elements are composed of atoms, all of the same kind, whereas compounds form when different atoms bond together. Most minerals are compounds, which are naturally occurring, inorganic, crystalline solids.
OTHER: Bloom's: Remember

45. You observe a dark colored igneous rock with very fine crystals that are only visible under magnification. What can be said about this rock?
a. It cooled slowly in a magma chamber.
b. It cooled quickly in a magma chamber.
c. It cooled slowly on Earth’s surface.
d. It cooled quickly on Earth’s surface.
e. It was ejected as a fine ash and later cemented together.

ANSWER: d
REFERENCES: Igneous Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.4 - Geologists use mineral content (composition) and textures to classify plutonic rocks (intrusive igneous rocks) and most volcanic rocks (extrusive igneous rocks).
OTHER: Bloom's: Apply

46. What is the mineral responsible for lustrous paint on cars and glittery cosmetics?
a. quartz
b. gypsum
c. muscovite
d. kaolin
e. calcite

ANSWER: c
REFERENCES: Perspective: The Industrial Minerals
LEARNING OBJECTIVES: HGEO.WICA.16.2.2 - Of the 3.800 or so minerals known, only a few, perhaps two dozen,

are common in rocks, but many others are found in small quantities in rocks, and some of these are natural resources.

OTHER: Bloom's: Remember

47. What type of mineral is neither an energy resource nor a metallic resource, but still has commercial value?
    a. construction mineral
    b. economic mineral
    c. silicate mineral
    d. industrial mineral
    e. rare earth mineral

ANSWER: d

REFERENCES: Perspective: The Industrial Minerals

LEARNING OBJECTIVES: HGEO.WICA.16.2.2 - Of the 3.800 or so minerals known, only a few, perhaps two dozen, are common in rocks, but many others are found in small quantities in rocks, and some of these are natural resources.

OTHER: Bloom's: Remember

48. What type of metamorphism would be most associated with mountain building?
    a. hydrothermal metamorphism
    b. deformational metamorphism
    c. contact metamorphism
    d. fault-block metamorphism
    e. regional metamorphism

ANSWER: e

REFERENCES: Metamorphic Rocks

LEARNING OBJECTIVES: HGEO.WICA.16.2.7 - Any type of rock may be altered by heat, pressure, fluids, or any combination of these to form metamorphic rocks.

OTHER: Bloom's: Understand

49. The sedimentary rock ____ forms from the burial and compaction of land plants.
    a. chert
    b. dolostone
    c. conglomerate
    d. coal
    e. shale

ANSWER: d

REFERENCES: Sedimentary Rocks

LEARNING OBJECTIVES: HGEO.WICA.16.2.2 - Of the 3.800 or so minerals known, only a few, perhaps two dozen, are common in rocks, but many others are found in small quantities in rocks, and some of these are natural resources.

OTHER: Bloom's: Remember

50. The transportation of sediment away from its source is called ____.
    a. weathering
    b. erosion
    c. lithification

d. sedimentation
e. foliation

ANSWER: b
REFERENCES: Sedimentary Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.5 - Mechanical and chemical weathering of rocks yields sediment that is transported, deposited, and then lithified to form detrital and chemical sedimentary rocks.
OTHER: Bloom's: Remember

Completion

51. The three major rock groups are _____, _____, and _____.
ANSWER: igneous; sedimentary; metamorphic
igneous; metamorphic; sedimentary
sedimentary; igneous; metamorphic
sedimentary; metamorphic; igneous
metamorphic; igneous; sedimentary
metamorphic; sedimentary; igneous
REFERENCES: Minerals - The Building Blocks of Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.9 - The fact that Earth materials are continually recycled and that the three groups of rocks are interrelated is summarized in the rock cycle.
OTHER: Bloom's: Remember

52. The _____ is the record of physical and biological events preserved in rocks.
ANSWER: geologic record
REFERENCES: Introduction
LEARNING OBJECTIVES: HGEO.WICA.16.2.9 - The fact that Earth materials are continually recycled and that the three groups of rocks are interrelated is summarized in the rock cycle.
OTHER: Bloom's: Remember

53. All silicate minerals have the _____ in common.
ANSWER: silica tetrahedron
REFERENCES: Minerals - The Building Blocks of Rocks
LEARNING OBJECTIVES: HGEO.WICA.16.2.2 - Of the 3.800 or so minerals known, only a few, perhaps two dozen, are common in rocks, but many others are found in small quantities in rocks, and some of these are natural resources.
OTHER: Bloom's: Remember

54. Minerals are _____ _____, because they are solids with orderly arrangements of atoms in three-dimensional networks.
ANSWER: crystalline solids
REFERENCES: Introduction
LEARNING OBJECTIVES: HGEO.WICA.16.2.1 - Chemical elements are composed of atoms, all of the same kind, whereas compounds form when different atoms bond together. Most minerals are compounds, which are naturally occurring, inorganic, crystalline solids.
OTHER: Bloom's: Remember

55. The two textural types of metamorphic rocks are _____ and _____.
ANSWER: foliated; nonfoliated

nonfoliated; foliated

REFERENCES: Metamorphic Rocks

LEARNING OBJECTIVES: HGEO.WICA.16.2.8 - One feature used to classify metamorphic rocks is foliation-that is, a platy or layered aspect, but some lack this feature and are said to be nonfoliated.

OTHER: Bloom's: Remember

56. _____ involves the study and search for minerals and rocks that are economically important.

ANSWER: Economic geology

REFERENCES: Economic Geology

LEARNING OBJECTIVES: HGEO.WICA.16.2.2 - Of the 3.800 or so minerals known, only a few, perhaps two dozen, are common in rocks, but many others are found in small quantities in rocks, and some of these are natural resources.

OTHER: Bloom's: Remember

57. The four states of matter are solid, liquid, gas, and _____.

ANSWER: plasma

REFERENCES: Matter - What Is It?

LEARNING OBJECTIVES: HGEO.WICA.16.2.1 - Chemical elements are composed of atoms, all of the same kind, whereas compounds form when different atoms bond together. Most minerals are compounds, which are naturally occurring, inorganic, crystalline solids.

OTHER: Bloom's: Remember

58. A volcanic rock with a glassy texture commonly has experienced _____ cooling.

ANSWER: rapid

REFERENCES: Igneous Rocks

LEARNING OBJECTIVES: HGEO.WICA.16.2.3 - Cooling and crystallization of magma and lava and the consolidation of pyroclastic materials such as volcanic ash account for the origin of igneous rocks.

OTHER: Bloom's: Remember

59. Isotopes of an element have the same _____ number and different _____ numbers.

ANSWER: atomic; mass
atomic; atomic mass
proton; neutron

REFERENCES: Matter - What Is It?

LEARNING OBJECTIVES: HGEO.WICA.16.2.1 - Chemical elements are composed of atoms, all of the same kind, whereas compounds form when different atoms bond together. Most minerals are compounds, which are naturally occurring, inorganic, crystalline solids.

OTHER: Bloom's: Understand

60. A(n) _____ forms when two or more elements bond.

ANSWER: compound

REFERENCES: Matter - What Is It?

LEARNING OBJECTIVES: HGEO.WICA.16.2.1 - Chemical elements are composed of atoms, all of the same kind, whereas compounds form when different atoms bond together. Most minerals are compounds, which are naturally occurring, inorganic, crystalline solids.

OTHER: Bloom's: Remember

Chapter 02 - MINERALS AND ROCKS

Essay

61. Write a short essay comparing and contrasting the definitions of “mineral” and “rock.” Illustrate how these concepts are related with specific examples.

ANSWER: The student should discuss the definitions of both terms and recognize that rocks are aggregates of one or more minerals. Examples of minerals may include quartz, calcite, diamond, etc. Examples of rocks may include limestone, quartz sandstone, etc.

REFERENCES: Minerals - The Building Blocks of Rocks

LEARNING OBJECTIVES: HGEO.WICA.16.2.2 - Of the 3.800 or so minerals known, only a few, perhaps two dozen, are common in rocks, but many others are found in small quantities in rocks, and some of these are natural resources.

OTHER: Bloom's: Analyze

62. How does the atomic structure of different minerals vary? Give specific examples of various elements and discuss their characteristics.

ANSWER: The student should discuss electrons, neutrons, protons, the nucleus of an atom, and electron energy levels. Also important are the terms atomic mass number and atomic number.

REFERENCES: Matter - What Is It?

LEARNING OBJECTIVES: HGEO.WICA.16.2.1 - Chemical elements are composed of atoms, all of the same kind, whereas compounds form when different atoms bond together. Most minerals are compounds, which are naturally occurring, inorganic, crystalline solids.

OTHER: Bloom's: Analyze

63. Why is it difficult to estimate how long natural resources like copper, oil, and coal will last?

ANSWER: It is difficult to estimate because estimates depend on many variables.

1. It is hard to determine how much of a resource is potentially available.

2. Estimates are typically based on current rates of production and consumption, both of which fluctuate.

REFERENCES: Economic Geology

LEARNING OBJECTIVES: HGEO.WICA.16.2.2 - Of the 3.800 or so minerals known, only a few, perhaps two dozen, are common in rocks, but many others are found in small quantities in rocks, and some of these are natural resources.

OTHER: Bloom's: Analyze

64. Compare and contrast magma and lava. Why do scientists consider these materials separately?

ANSWER: The student should recognize that magma is molten rock below the surface of Earth and lava is molten rock above the surface of Earth. The most important reason that scientists consider these two materials separately is that their cooling rates are very different. Magma cools very slowly because it is insulated by surrounding rock and lava cools very quickly because it is in contact with air or water.

REFERENCES: Igneous Rocks

LEARNING OBJECTIVES: HGEO.WICA.16.2.3 - Cooling and crystallization of magma and lava and the consolidation of pyroclastic materials such as volcanic ash account for the origin of igneous rocks.

OTHER: Bloom's: Analyze

65. Compare and contrast the igneous rocks basalt and granite in terms of texture and composition.

ANSWER: Granite is a coarse-grained felsic rock. It cooled slowly from magma underground. Like basalt, it is rich in silica, but it has more aluminum, giving it a lighter color.

Basalt is a fine-grained extrusive igneous rock rich in iron and magnesium (mafic).

REFERENCES: Igneous Rocks

LEARNING OBJECTIVES: HGEO.WICA.16.2.4 - Geologists use mineral content (composition) and textures to classify plutonic rocks (intrusive igneous rocks) and most volcanic rocks (extrusive igneous rocks).

OTHER: Bloom's: Analyze

66. Provide a detailed description and discussion of the Rock Cycle. Provide specific examples of each of the three rock families.

ANSWER: The student should be able to describe the formation of the three rock families: igneous, metamorphic, and sedimentary. The student also should recognize that there are cross-paths within the Rock Cycle. For example, metamorphic rocks may be uplifted and weathered to form sediments and sedimentary rocks. The term “lithification” also should be part of the discussion.

REFERENCES: Plate Tectonics and the Rock Cycle

LEARNING OBJECTIVES: HGEO.WICA.16.2.9 - The fact that Earth materials are continually recycled and that the three groups of rocks are interrelated is summarized in the rock cycle.

OTHER: Bloom's: Analyze

67. Compare and contrast detrital and chemical sedimentary rocks. Provide specific examples of each group.

ANSWER: The student should recognize that detrital sedimentary rocks are made of detritus, including fragments of other rock types and weathering products. In contrast, chemical sedimentary rocks are composed of minerals derived from solutions. Examples of detrital sedimentary rocks may include sandstones and breccias. Examples of chemical sedimentary rocks may include limestones and evaporites.

REFERENCES: Sedimentary Rocks

LEARNING OBJECTIVES: HGEO.WICA.16.2.6 - Texture and composition are the criteria geologists use to classify sedimentary rocks.

OTHER: Bloom's: Analyze

68. Discuss the three agents responsible for metamorphism. How does each agent influence the metamorphic process?

ANSWER: The student should discuss heat, pressure, and chemical fluids. Heat increases the rate of chemical reactions and may cause recrystallization of minerals. Pressure may cause tabular or platy minerals to display parallel orientations. Chemical fluids may result in deposition of soluble compounds in metamorphic rocks.

REFERENCES: Metamorphic Rocks

LEARNING OBJECTIVES: HGEO.WICA.16.2.7 - Any type of rock may be altered by heat, pressure, fluids, or any combination of these to form metamorphic rocks.

OTHER: Bloom's: Understand

69. Discuss the relationship between plate tectonics and the rock cycle. Provide examples of where various types of rocks might be found in terms of plate tectonics.

ANSWER: The student should recognize that volcanic and igneous rocks very often are formed at convergent and divergent plate boundaries. Metamorphic rocks also are commonly found along these boundaries due to the heat and pressure generated at convergent plate boundaries. Sedimentary rocks may be formed in intraplate areas that are undergoing weathering and subsidence.

REFERENCES: Plate Tectonics and the Rock Cycle

LEARNING OBJECTIVES: HGEO.WICA.16.2.9 - The fact that Earth materials are continually recycled and that the

three groups of rocks are interrelated is summarized in the rock cycle.

OTHER: Bloom's: Analyze

70. The five major steps in the formation of sedimentary rock are deposition, erosion, lithification, burial and compaction, and weathering. List each step in order from first to last, and explain what happens during each step.

ANSWER: 1. Weathering - A rock is fragmented by physical or chemical processes.

2. Erosion - The rock fragments are moved to another location.

3. Deposition - Rock fragments are deposited.

4. Burial and Compaction - The deposited sediments are buried by overlying sediments and subject to pressure that squeezes them together

5. Lithification - A precipitate or cement forms between grains, gluing them together into sedimentary rock.

REFERENCES: Sedimentary Rocks

LEARNING OBJECTIVES: HGEO.WICA.16.2.5 - Mechanical and chemical weathering of rocks yields sediment that is transported, deposited, and then lithified to form detrital and chemical sedimentary rocks.

OTHER: Bloom's: Evaluate