Minerals & Rocks

Minerals

5 Characteristics:

A. Minerals are classified according to their _____ and _____ properties.

Physical Properties:

1) Color - _____

Example: quartz - _____

calcite and halite – _____

2) Streak - _____

Test: _____

3) Luster - _____

Metallic - _____

Non-Metallic- _____

4) Hardness -

Test:

Moh's hardness scale -

Moh's hardness scale:
1. Talc
2. Gypsum
3. Calcite
4. Flourite
5. Apatite
6. Feldspar
7. Quartz
8. Topaz
9. Corundum
10. Diamond

5.5 – approximate hardness of a glass plate

5) Cleavage -

Test:

6) Fracture -

7) Specific Gravity -

8) Special Properties -

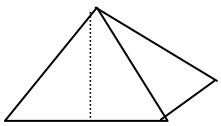
Examples -

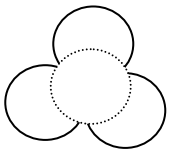
B. Minerals are grouped according to their _____

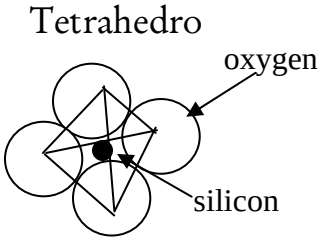
1. The elements _____ and _____ combine to form tetrahedral units.

Together, the mass of these two elements are most abundant in the Earth's crust.

Silicates - any mineral composed of silicon and oxygen



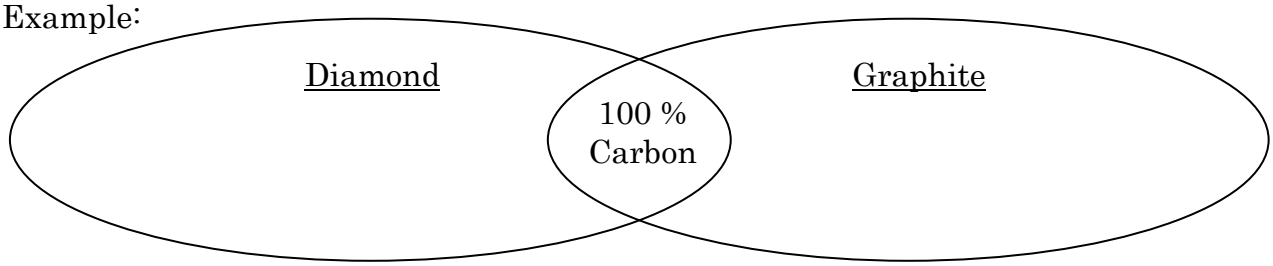




2. The physical properties of minerals depend upon the _____

_____

Example:



3. Of the thousands of known minerals, only a few are found almost _____
4. If you know how to identify about a _____ of the most common minerals you will be able to identify minerals in most rocks you are likely to find.
5. Nearly all rocks are composed of one or more _____
6. Minerals are the _____ of most rocks. Some exceptions include: _____ and _____

C. Rocks are classified on the basis of their origin. - _____

(a) Igneous - _____

_____

(b) Sedimentary - _____

_____

(c) Metamorphic - _____

_____

Minerals
Characteristics
Physical Properties
Special Properties

Fill in the missing information in the chart below by using the "Properties of Common Minerals" in the *Earth Science Reference Tables page 16*

Luster	Hardness	Composition	Color	Mineral Name
Nonmetallic	6		white to pink	
	2	S		
	4		colorless/variable	
Metallic	2.5		metallic silver	
		$Mg_3Si_4O_{10}(OH)_2$		Talc
	1-6.5	Fe_2O_3		
Nonmetallic	2	$CaSO_4 \cdot 2H_2O$	white to pink	
Nonmetallic		CaF_2		
			brassy yellow	
		$Fe_3Al_2Si_3O_{12}$	dark red	
		C		
Nonmetallic	3		colorless/variable	
Metallic	5.5-6.5		black to silver	
	6.5	$(Fe, Mg)_2SiO_4$		

Which mineral has the following characteristics?

Mineral Characteristics	Mineral Name
Bubbles with acid when powdered	
Cleaves at 56° and 124°	
Food additive and melts ice	
Easily scratched by a fingernail	
Red-brown streak	
Feels greasy	
Used in glass, jewelry and electronics	
Polarizing prism and used in cement	

Review Questions – Minerals

1. Name the mineral that contains iron, has a metallic luster, is hard, and has the same color and streak. _____

2. Name the mineral that is an ore of iron and has a characteristic reddish brown streak? _____

3. The physical properties of a mineral are largely due to its _____

_____

4. Why is coal not a mineral? _____

5. What are the four most abundant elements in Earth's crust by volume?

_____ _____

_____ _____

6. Why are diamonds and graphite so different even though they are both composed of the element Carbon? _____

7. Equal volumes of the minerals garnet, galena, biotite & olivine are placed in a rotating tumbler by a student. After 4 days of tumbling, the minerals are removed and examined. What will be observed? Explain. _____

_____

_____

8. Using Moh's Hardness Scale, name a mineral that will scratch a glass plate but will not scratch Olivine. _____

9. Diamonds and quartz crystals look very similar but diamonds cost considerably more. Give two reasons why diamonds cost more. _____

_____

10. A student on a mineral dig unearths a clear mineral. Name two tests that would help identify this mineral. _____

11. Name the mineral test that is least useful in mineral identification. _____

12. 4 oxygen elements and 1 silicon element combine to form the

_____

13. The tendency of a mineral to split along 1 or more smooth, flat surfaces or planes is referred to as _____

14. What are most rocks composed of? _____

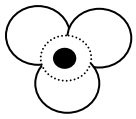
15. Name the hardest mineral on Moh's Hardness Scale. _____

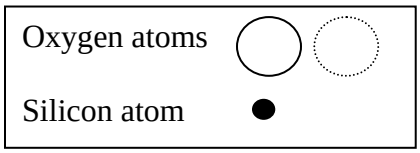
16. Name the softest mineral on Moh's Hardness Scale. _____

17. How are rocks classified? _____

Regents Question Review:

1. The diagram below represents a basic atomic structure that forms when oxygen and silicon unit. This structure is called a
   (1) Tetrahedron
   (2) cube
   (3) sphere
   (4) cylinder





2. The grouping of rocks as igneous, sedimentary, and metamorphic is based primarily upon differences in
   (1) age (2) origin (3) size (4) hardness

3. What do most igneous, sedimentary and metamorphic rocks have in common?
   (1) They are formed from molten material.
   (2) They are produced by heat and pressure.
   (3) They are composed of minerals.
   (4) They exhibit crystals, banding, and distinct layers.

4. Rocks are classified as igneous, metamorphic, or sedimentary according to
   (1) chemical composition (3) grain size
   (2) density (4) origin

5. When various minerals are split by a wedge, some break evenly along a flat surface while others fracture unevenly. Which property of a mineral is responsible for the way in which it splits?
   (1) softness (3) atomic arrangement
   (2) density (4) chemical composition

6. Which factor causes flat surfaces to be produced when some minerals are broken?
   (1) The arrangement of the atoms of the minerals
   (2) The rock type in which the mineral were formed
   (3) The average densities of the minerals
   (4) The hardness of the minerals

7. Of the Earth's more than 2,000 identified minerals, only a small number are commonly found in rocks. This fact indicates that most
   (1) Minerals weather before they can be identified
   (2) Minerals have properties that are difficult to identify
   (3) Rocks have a number of minerals in common
   (4) Exposed surface rocks are igneous

Igneous Rocks

Earth Science Reference Tables, page 6

Intrusive	Environment of Formation	Extrusive
	Also known as	
	Rate of cooling	
	Size of crystals	
	Texture	

1. The two extrusive glassy textured rocks that are non-vesicular are

2. The two extrusive glassy textured rocks that are vesicular are

3. What is the grain size of an extrusive rock with a glassy texture?
4. What is the cooling rate for extrusive rocks with a glassy texture?
5. Where are extrusive rocks formed?

6. The three extrusive fine textured rocks that are vesicular are

7. The three extrusive fine textured rocks that are non-vesicular are

8. What is the grain size of an extrusive rock with a fine texture?
9. What is the cooling rate for extrusive rocks with a fine texture?
10. Where are extrusive rocks formed?

11. What is another word for extrusive?
12. What does vesicular mean?

13. List the five intrusive, course textured rocks listed in the Reference Tables.

_____ _____

_____ _____

_____

14. Name the intrusive, very course textured rock listed in the Reference Tables.

_____

15. What is another word for intrusive? _____
16. What is the grain size of coarse textured rocks? _____
17. What is the grain size of the very coarse textured rocks? _____
18. Are these rocks vesicular or non-vesicular? _____
19. What is the cooling rate for intrusive rocks? _____
20. Where were these rocks formed? _____

_____

21. Which rock is non-vesicular and can be either intrusive or extrusive? _____

22.. Complete the chart below using your Earth Science Reference Tables:

	Color Light / Dark	**Density** High / Low	**Composition** Felsic / Mafic
Pegmatite			
Granite			
Gabbro			
Pumice			
Basalt Glass			
Scoria / Vesicular Basalt			
Rhyolite			
Basalt			
Vesicular Rhyolite			
Diabase			

23. Complete the following sentences.

a. Mafic rocks are _____ in color, have a _____ density and contain _____ and _____ .

b. Felsic rocks are _____ in color, have a _____ density and contain _____ .

Reading the Reference Tables:

1. Composition:

List five examples of mafic rocks.
1
2
3
4
5

List five examples of felsic rocks.
1
2
3
4
5

2. Name the minerals that may be found in each of the following igneous rocks.

Obsidian, Pumice, Vesicular Rhyolite, Rhyolite, Granite, Pegmatite
1
2
3
4
5
Basalt Glass, Scoria, Vesicular Basalt, Basalt, Diabase, Gabbro
1
2
3
4
5

Obsidian, Andesite, Diorite
1
2
3
4
5
Peridotite
1
2
Dunite
1

3. Name five rocks that apply to the following criteria.

Course crystals
1
2
3
4
5
Light in Color
1
2
3
4
5

High in aluminum
1
2
3
4
5
High in Density
1
2
3
4
5

4. **Percentage of minerals found in rocks.** Determine the percent (%) of the various minerals that would be in the following rocks.

Granite (mid zone)

_____ % _____
_____ % _____
_____ % _____
_____ % _____
_____ % _____

Diorite (mid zone)

_____ % _____
_____ % _____
_____ % _____

Basalt (mid zone)

_____ % _____
_____ % _____
_____ % _____
_____ % _____

5. **General Questions**

a. What is the major difference between gabbro and basalt? _____
Explain the cause of this difference. _____
b. What does basalt and gabbro have in common? _____
c. What is the major difference between rhyolite and pumice? _____
d. Which rock is vesicular, rhyolite or pumice? _____
e. What is the characteristics for a rock that is 100% olivine?
density _____ color _____ composition _____

6. **Name the rock that**

a. has a glassy, vesicular texture and is dark in color _____
b. is felsic, non-vesicular and has a grain size of less than 1mm _____
c. is glassy and may appear black _____
d. is mafic and coarse grained and contains pyroxene and olivine only _____
e. is felsic and has a very coarse texture _____
f. has fine grained, non-vesicular texture and is high in density _____
g. is intrusive, light colored, and has a coarse texture _____

Regents Questions:

1. Which is usually a characteristic of igneous rocks with a high density?
   (1) They are light in color
   (2) They are felsic.
   (3) They have a high aluminum content.
   (4) They contain iron.

2. As the percentage of mafic minerals in an igneous rock increases, the rocks color becomes
   (1) lighter and its grain size decreases
   (2) lighter and its grain size increases
   (3) darker and its density decreases
   (4) darker and its density increases

3. Which rock is of felsic composition, low in density, light in color, and coarse grained?
   (1) Rhyolite (2) Basalt (3) Granite (4) Gabbro

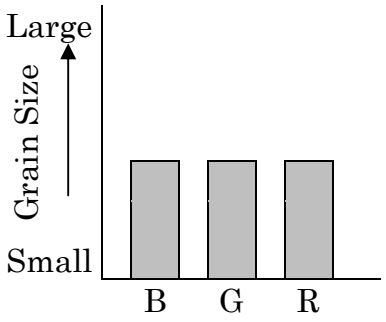
4. Which statement is true of granite and gabbro?
   (1) they are both intrusive
   (2) they both contain potassium feldspar
   (3) they have different grain sizes
   (4) they are both extrusive

5. Which characteristic of an igneous rock would provide the most information about the environment in which the rock solidified?
   (1) color (2) texture (3) hardness (4) streak

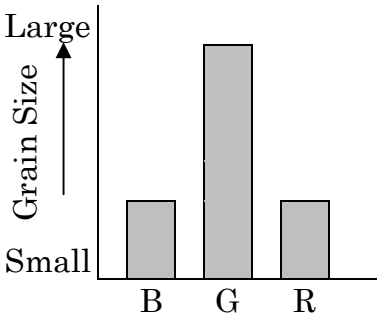
6. Which graph best represents the comparison of the average grain sizes in basalt, granite, and rhyolite?

Key to Graph Abbreviations:

B – Basalt ***G – Granite*** ***R – Rhyolite***



(1)



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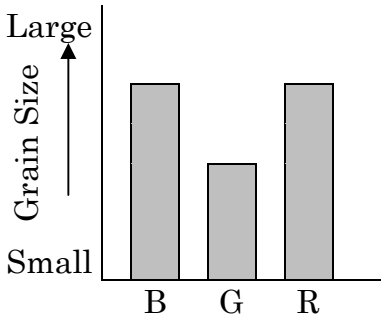

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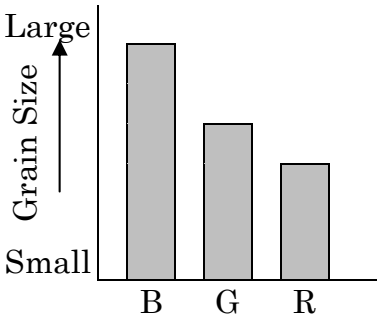


(4)

7. Larger crystal size in one of two igneous rocks of similar composition usually indicates that the rock with the larger crystals cooled for
   (1) a shorter period of time than the other rock
   (2) a longer period of time than the other rock
   (3) the same amount of time as the other rock

8. Large crystals in an igneous rock most likely form as a result of the
   (1) mineral composition of the magma
   (2) fossil content of the rock
   (3) cooling rate of the magma
   (4) color of the rock

9. Which property is common to most light-colored igneous rocks?
   (1) course grained texture
   (2) intrusive formation
   (3) abundant felsic minerals
   (4) high density

10. Which property is common to most dark-colored igneous rocks?
   (1) course grained texture
   (2) intrusive formation
   (3) abundant felsic minerals
   (4) high density

11. Compared to basalt, granite is
   (1) lighter in color
   (2) greater in density
   (3) more mafic in composition
   (4) more fine grained in texture

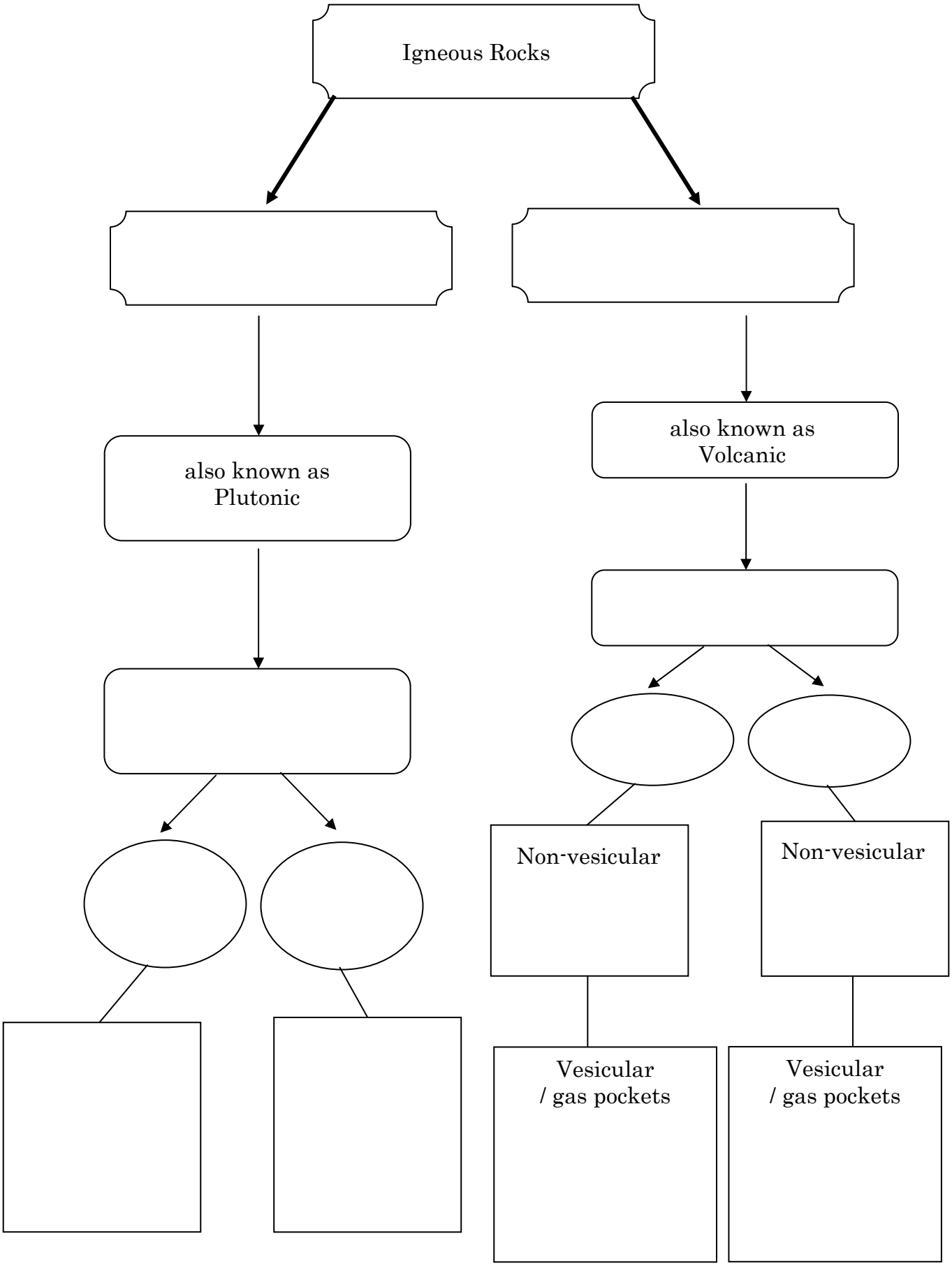
12. Rhyolite and granite are alike in that they both are
   (1) fine grained (2) dark colored (3) mafic (4) felsic

13. Which relative concentrations of elements are found in a felsic rock
   (1) A high concentration of aluminum and a low concentration of iron
   (2) A high concentration of iron and a low concentration of aluminum
   (3) A high concentration of magnesium and a low concentration of iron
   (4) A high concentration of magnesium and a low concentration of aluminum

14. A mafic igneous rock is most likely to be relatively
   (1) high in density and dark in color
   (2) high in density and light in color
   (3) low in density and dark in color
   (4) low in density and light in color

15. The best evidence for determining the cooling rate of an igneous rock during its solidification is provided by
   (1) index fossils
   (2) faults in the rock
   (3) the crystal size of its minerals
   (4) the disintegration of radioactive substances

16. As the hot molten rock material (magma) cools, the size of the crystals in the igneous rock formed depends chiefly on the
   (1) amount of iron present
   (2) dissolved gases present in the magma
   (3) amount of silicate present
   (4) rate at which the magma cools


Igneous Rocks
also known as
Plutonic
also known as
Volcanic
Non-vesicular
Non-vesicular
Vesicular
/ gas pockets
Vesicular
/ gas pockets

Sedimentary Rocks

Classification of Sedimentary Rocks – Earth Science Reference Tables page 7

Clastic	Crystalline	Bioclastic
Classified by	*Classified by*	*Classified by*
formed by	*formed by*	*formed from*
Example		*Example*
	Example	*formed from*
		Example

1) Formed in _____

on _____

because _____

_____

2) Fossils are almost exclusively found in _____

because _____

_____

Igneous: _____

Metamorphic: _____

3) Fossils provide _____

_____

A. Clastic Sedimentary Rocks: Fill in the chart below.

Rock name	Grain size (name)	Grain size (cm)	Comments
Conglomerate	Mixed	Variable	Rounded fragments
Breccia			
Sandstone			
Siltstone			
Shale			

1. What is another name for Clastic rocks? _____
2. How are Clastic sedimentary rocks classified? _____
3. By what process did Clastic rocks form? _____

_____

B. Crystalline & Bioclastic Sedimentary rocks: Fill in the chart below

Rock Name	Composition	Crystalline (or) Bioclastic?	Grain size
Rock Salt			
Rock Gypsum			
Dolostone			
Limestone			
Coal			

1. How are Crystalline and Bioclastic sedimentary rocks classified? _____
2. By what process do crystalline rocks form? _____
3. Where does coal come from? _____
4. What is limestone sometimes made up of? _____

C. Fill in the following chart using the Earth Science Reference Tables page 6: *Relationship of Transported Particle Size to Water Velocity"*

Grain size	Name of the	Rock name
0.00001	Clay	Shale
0.1		
0.002		
0.007		
0. 9 (round)		
0.5 (angular)		
0.00004		
0.005		

D. Reference Table Practice

1. Name two bioclastic rocks. _____ and _____
2. How are bioclastic and crystalline rocks classified? _____
3. Name the rock composed of calcite. _____
4. Name the sedimentary rock that my bubble is HCl is placed on it. _____
   Explain why _____
5. Name the rock that is the product of decayed plants _____
6. Name the rock that is composed of halite. _____
7. What is the composition of coal? _____
8. Fragmental sedimentary rocks are classified on the basis of _____ size.
9. Name the rock that contains angular fragments (mixed silt to boulders). _____
10. Name the rock that has a grain sizes of 0.0004 to 0.006cm. _____
11. What is the size of the grains in a piece of shale? _____
12. Sandstone is made up of _____ size particles with a grain size of _____ cm.
13. Name three rocks that may form from the evaporation of sea water.

    _____ _____ _____

14. Name two rocks that may be formed from organic remains.

    _____ _____

15. Name the rock made of clay particles _____
16. Name the rock made of rounded pebbles cemented together. _____
17. Name the rock made of microscopic shells and skeletons. _____
18. Name the rock made of sand grains cemented together. _____
19. Name the rock made of the mineral gypsum. _____
20. Name the rock made of the mineral dolomite. _____
21. Is coal crystalline or bioclastic? _____
22. Is conglomerate organic or inorganic? _____
23. Is gypsum crystalline or bioclastic? _____
24. Sedimentary rocks form at or near the _____ of Earth.
    Explain why? _____

25. Looking at the Generalized Bedrock Geology of New York State in the Earth Science Reference Tables (page 3), what rock <u>type</u> is MOST abundant? _____
25. Why are fossils found almost exclusively in sedimentary rocks? _____

26. How do sedimentary rocks form? _____

Regents Questions:

1. Which rock is formed when rock fragments are deposited and cemented together
   (1) dolostone (2) sandstone (3) rhyolite (4) gabbro

2. Which rock type most likely would contain fossils?
   (1) intrusive igneous rock
   (2) extrusive igneous rock
   (3) sedimentary rock
   (4) metamorphic rock

3. Some sedimentary rocks are composed of rock fragments that had different origins. Which statement best explains why this could occur?
   (1) Fossils are often found in sedimentary rocks.
   (2) Sedimentary rocks form from the weathered products of any type of rock.
   (3) When molten lava solidifies to form sedimentary rock it often contains foreign particles.
   (4) Under high heat and pressure, recrystallization results in the formation of many minerals.

4. Which rocks form relatively thin layers, compared to the thickness of the continent, over large areas of the continents?
   (1) granite and gabbro
   (2) sandstone and shale
   (3) metamorphic rocks
   (4) intrusive igneous rocks

5. One similarity between a sand pile and sandstone is that they
   (1) contain a cementing agent
   (2) always contain fossils
   (3) have a crystalline structure
   (4) are composed of sediments

6. Which kind of bedrock would most likely contain fossils?
   (1) A mass of granite in the core of a mountain
   (2) A series of alternating layers of shale and sandstone
   (3) A basalt lava flow from an ancient volcano
   (4) A high-grade metamorphic rock layer made from mixed igneous and sedimentary layers

7. Which statement correctly describes the distribution of sedimentary rocks on the Earth?
   (1) Sedimentary rock layers are the thickest in the middle of the oceans.
   (2) Sedimentary rocks extend down into the earth's crust as far as the inner core.
   (3) Sedimentary rocks are usually located in volcanic regions.
   (4) Sedimentary rocks usually form a thin layer over large areas of the continents.

8. The thick sedimentary rocks of central and western New York State, which were formed from shallow water deposits, were most probably produced by
   (1) glaciation
   (2) the uplift of this region
   (3) deposition
   (4) volcanic eruption

9. Which sedimentary rock is land derived?
(1) limestone (2) gypsum (3) siltstone (4) salt

10. Compaction and cementation of pebble-size particles would form the sedimentary rock known as
(1) shale (2) conglomerate (3) sandstone (4) siltstone

11. A sediment contains particles that range in diameter from 2 to 4 centimeters. Which sedimentary rock would be formed when this sediment is compressed and cemented together?
(1) shale (2) siltstone (3) sandstone (4) conglomerate

12. Which property is used to classify the land-derived sedimentary rocks listed in the Earth Science Reference Tables?
(1) particle size
(2) fossil content
(3) color
(4) mineral composition

13. Sedimentary rocks formed by compaction and cementation of land-derived sediments are classified on the basis of
(1) rate of formation (2) composition (3) type of cement (4) particle size

14. Which sedimentary rock most likely formed as an evaporite?
(1) siltstone (2) conglomerate (3) gypsum (4) shale

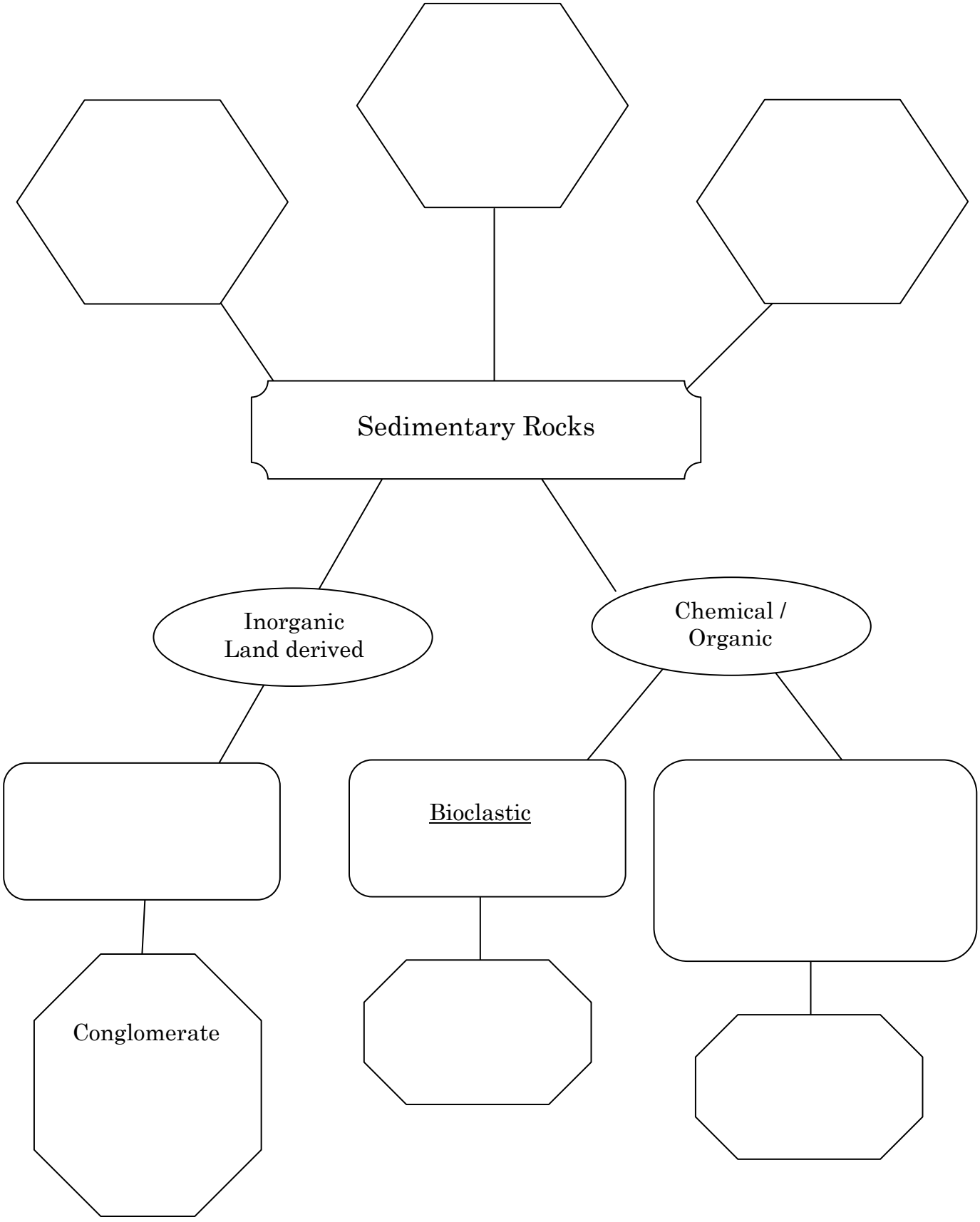
15. Which sedimentary rock is composed of fragmented skeletons and shells of sea organisms compacted and cemented together?
(1) shale (2) sandstone (3) gypsum (4) limestone

16. Dolostone, gypsum, and salt are rocks formed by the process of
(1) melting and solidification
(2) evaporation and precipitation
(3) erosion and deposition
(4) weathering and metamorphism

17. Which rock could be formed either by deposition of animal shells and skeletons or by precipitation from evaporating seawater?
(1) limestone (2) conglomerate (3) shale (4) rock salt

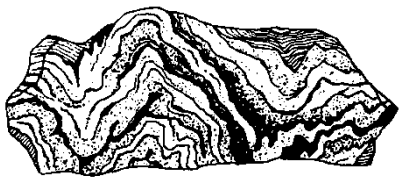
18. Which rock is composed of materials that show the greatest variety of rock origins?
(1) A conglomerate composed of pebbles of granite, siltstone, and basalt
(2) A very fine-grained basalt with sharp edges
(3) A sandstone composed of rounded grains of quartz
(4) A limestone composed of coral fragments cemented together by calcium carbonate

19. Which rock is sometimes called an evaporite because it results from the evaporation of water?
(1) sandstone (2) granite (3) shale (4) limestone


Sedimentary Rocks
Inorganic
Land derived
Chemical /
Organic
Bioclastic
Conglomerate

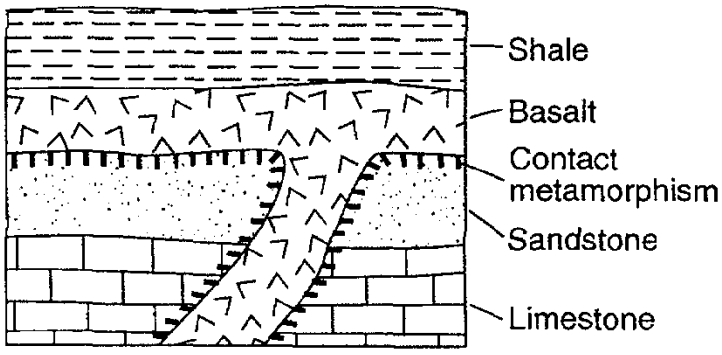
Metamorphic Rocks

Changes in Rocks do to Metamorphism



Regional Metamorphism

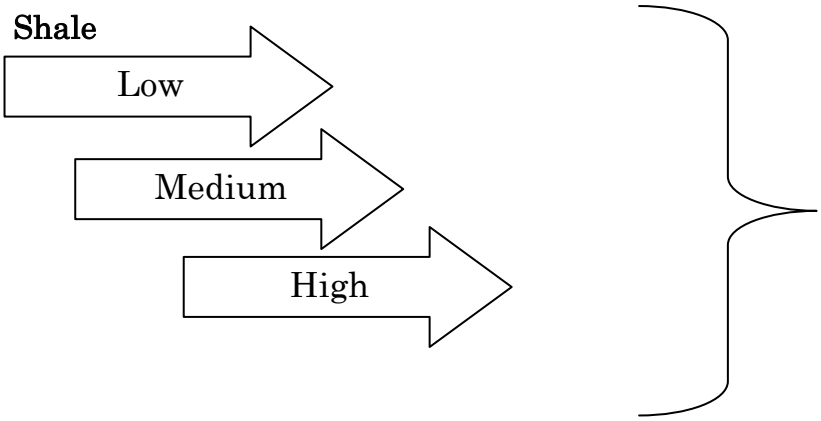
Contact Metamorphism



Classification of Metamorphic Rocks:

Degree of Metamorphism

Parent material



Use the table on page 7 – Scheme for Metamorphic Rock Identification - to determine the following.

1. Name the parent rock of each of the following metamorphic rocks.

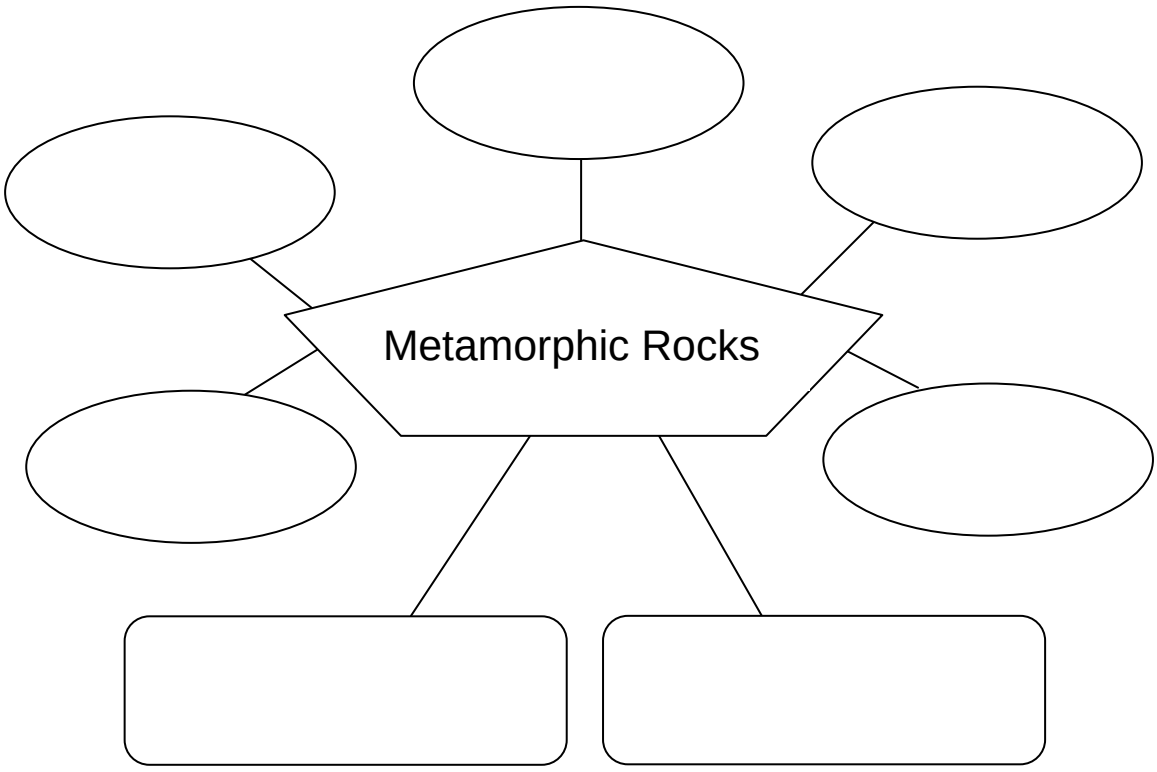
Slate		Marble	
Phyllite			
Schist		Anthracite Coal	
Gneiss		Metaconglomerate	
Quartzite			

2. Name the minerals that may be found in Phyllite

3. What mineral may or may not appear in a sample of schist?
4. Name the rock type that is produced when various rocks are changed by nearby magma or lava.

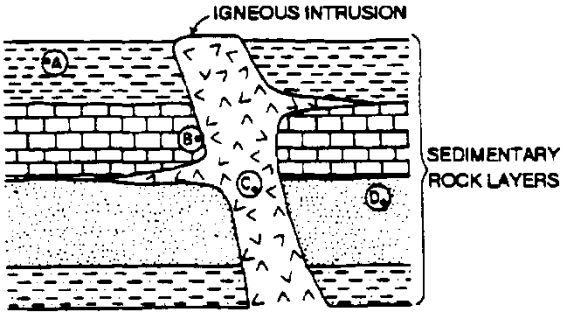
5. Name the metamorphic rock that is

a. Foliated, fine-grained , low-grade metamorphism of shale	
b. Nonfoliated , Fine-grained	
c. Foliated, High grade metamorphism, Contains pyroxene, and quartz	
d. Nonfoliated, Contains quartz, Contact metamorphism	
e. Coarse grained, Parent rock is conglomerate, Pebbles may be distorted	
f. Parent rock is dolostone.	
g. Contains only mica	
h. Fine to medium grain size, contains clay minerals, but never contains pyroxene	
i. Has banding	
j. Contact metamorphism – due to extreme heat from nearby lava	
k. Metamorphism of sandstone	
l. Its minerals are aligned and it has visible platy mica crystals	



Regents Questions:

1. The diagram to the right shows an igneous intrusion in sedimentary rock layers. At which point would metamorphic rock most likely be found?
   (1) A (2) B (3) C (4) D



2. Which characteristics would indicate that a rock has undergone metamorphic change?
   (1) The rock shows signs of being heavily weathered and forms the floor of a large valley.
   (2) The rock becomes less porous when exposed at the surface and is finely layered.
   (3) The rock contains a mixture of different-sized, rounded grains of both felsic and mafic silicate minerals.
   (4) The rock is composed of intergrown mineral crystals and shows signs of deformed fossils and structure.

3. Which characteristic of rocks tends to increase as the rocks are metamorphosed?
   (1) number of fossils present (3) density
   (2) permeability (4) volume

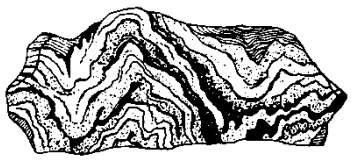
4. Metamorphic rocks result from the
   (1) erosion of rocks
   (2) recrystallization of rocks
   (3) cooling and solidification of molten magma
   (4) compression and cementation of soil particles

5. Which metamorphic rock will have visible mica crystals and a foliated texture?
   (1) marble (2) quartzite (3) schist (4) slate

6. Which rocks would most likely be separated by a transition zone of altered rock (metamorphic rock)
   (1) sandstone and limestone (3) shale and sandstone
   (2) granite and limestone (4) conglomerate and siltstone

7. Which characteristics are most useful for identifying the conditions under which a metamorphic rock was formed
   (1) color and luster (3) hardness and size
   (2) shape and mass (4) composition and structure

8. The diagram to the right represents a rock with a distorted layer structure. The distorted structure of this rock is most likely the result of
   (1) a long period of weathering
   (2) glacial activity
   (3) wind erosion
   (4) extreme pressure



The Rock Cycle

Use the diagram found in the Earth Science Reference Table on page 6 to answer the following.

1. Describe how each of the following rocks form.
   a) Sedimentary _____
   b) Igneous _____
   c) Metamorphic _____

2. Name the rock type comes directly from other rocks? _____
3. What type of rock comes from magma? _____
4. What type of rock comes from sediments? _____

5. Name three things that could happen to any rock:

   _____

   _____

   _____

Regents Questions

1. A sample of conglomerate consists mostly of fragments of granite and sandstone. The best inference that can be made from the sample is that this conglomerate
   (1) Contains fossils
   (2) Resulted from solidification
   (3) Formed from other rocks
   (4) Formed during the Cambrian Period

2. Metamorphic rock could be the direct result of the
   (1) melting and solidification of sedimentary rock
   (2) weathering and erosion of igneous rock
   (3) compaction and heating of metamorphic rock
   (4) erosion and deposition of sediments

3. The recrystallization of unmelted material under high temperature and pressure results in
   (1) metamorphic rock
   (2) igneous rock
   (3) sedimentary rock
   (4) volcanic rock

4. Which sequence of events occurs in the formation of a sedimentary rock?

(1) Source material eroded → Sediments deposited → Sediments compacted and cemented

(2) Sediments compacted and cemented → Sediments deposited → Source material eroded

(3) Sediments deposited → Sediments compacted and cemented → Source material eroded

(4) Sediments deposited → Source material eroded → Sediments compacted and cemented

5. Metamorphic rocks are formed by
   (1) compaction and cementation
   (2) melting and solidification
   (3) heating and pressure
   (4) erosion and deposition

6. Which processes have all igneous rocks undergone?
   (1) deposition and burial
   (2) solidification from a melt
   (3) volcanic eruption
   (4) weathering and erosion

7. Which type of rock can be the source of deposited sediments?
   (1) Igneous and metamorphic rocks, only
   (2) Metamorphic and sedimentary rocks, only
   (3) Sedimentary rocks, only
   (4) Igneous, metamorphic and sedimentary rocks

8. Some sedimentary rocks form as the direct result of the
   (1) solidification of molten magma
   (2) recrystallization of material
   (3) melting of minerals
   (4) cementation of rock fragments

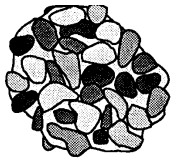
9. Most igneous rocks from by which processes?
   (1) melting and solidification
   (2) heat and pressure
   (3) erosion and deposition
   (4) compaction and cementation

10. Which statement is supported by the Rock Cycle diagram?
   (1) Metamorphic rock results directly from melting and crystallization
   (2) Sedimentary rock can only be formed from igneous rock.
   (3) Igneous rock always results from melting and solidification.
   (4) All sediments turn directly into sedimentary rock.

11. What is the main difference between metamorphic rocks and most other rocks?
    (1) Many metamorphic rocks contain only one mineral.
    (2) Many metamorphic rocks have an organic composition.
    (3) Many metamorphic rocks exhibit banding and distortion of structure.
    (4) Many metamorphic rocks contain a high amount of oxygen-silicon tetrahedra.

12. Which characteristics would give the best evidence about the conditions under which a rock was formed?
    (1) The rock's density and size
    (2) The rock's structure and texture
    (3) The rock's mineral and color
    (4) The rock's shape and phase

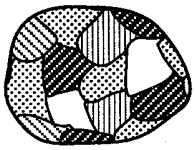
Base your answers to questions 13 and 16 on the diagrams below which represent cross sections of four rock samples A, B, C, and D.



(A)

(B)

(C)



(D)

13. _____ Which rock sample is most likely metamorphic?
    Explain your answer. _____

14 _____ Which sample is most likely an extrusive igneous rock?
    Explain your answer. _____

15 _____ Which sample is most likely an intrusive igneous rock?
    Explain your answer. _____

16 _____ Which rock sample is most likely sedimentary?
    Explain your answer. _____

Mineral & Rock Unit Review

1. Name the mineral that bubbles with acid. _____
2. Name the mineral that is attracted by a magnet _____
3. Name the mineral that is used as a food additive. _____
4. Name the mineral that may or may not be metallic. _____
5. Name a mineral that is used as pencil lead. _____

6. Name the mineral with a greasy feel. _____
7. What is pyroxene commonly called? _____
8. What is the name of the particle size that is 0.001 cm ? _____
9. What two minerals can be found in Peridotite? _____ and _____
10. Is the density of pumice high or low? _____
11. What is the environment of formation for a rock that cools very quickly? _____
12. What is the texture of Rock Salt? _____
13. Name a rock that has angular fragments of pebbles and cobbles. _____
14. Name three things that Andesite and Diorite have in common.

_____ _____ _____

15. Name the rock that is composed of primarily mica. _____
16. Name the 6 minerals listed on the reference tables that may be found in Gneiss.

_____ _____ _____

_____ _____ _____

17. Name the sedimentary rock that may bubble in dilute acid. _____
18. Name the metamorphic rock that may bubble in dilute acid. _____
20. Name the rock type formed by the solidification of magma. _____
21. Name the rock type formed by compaction and cementation. _____
22. Name the rock type formed directly from other rocks. _____
23. What is the rock name that has grain sizes of .007 cm _____
24. What is present in a rock that has a vesicular texture? _____
25. Name the largest particle size listed in the reference tables. _____
26. Name a coarse rock that contains a lot of potassium feldspar. _____
27. Name the crystalline rock that is composed of halite. _____
28. What does a mineral have when it breaks along flat surfaces. _____
29. What are you testing for when you try and scratch a glass plate? _____
30. What is the luster of a mineral that shines like metal? _____
31. Name the volcanic rock that contains potassium feldspar and quartz but usually appears black _____
32. Name the rock that contains pebbles that may be distorted.. _____
33. Name the rock that underwent low-grade metamorphism of shale _____
34. Between which two rock types would you find contact metamorphism?

_____ and _____

35. Name the rock that has platy mica crystals visible. _____

Base your answers to questions 36 through 38 on the data table below, which shows some characteristics of four rock samples, numbered 1 through 4. Some information has been left blank.

Data Table

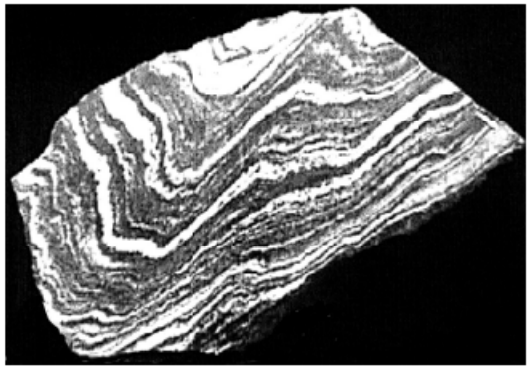
Rock Sample Number	Composition	Grain Size	Texture	Rock Name
1	mostly clay mineral		clastic	Shale
2	all mica	microscopic, fine	Foliated with mineral alignment	
3	Mica, quartz, feldspar, amphibole, garnet, pyroxene	Medium to coarse	Foliated with banding	Gneiss
4	Potassium feldspar, quartz, biotite, plagioclase feldspar, amphibole	5 mm		Granite

36. State a possible grain size, in centimeters, for most of the particles found in sample 1.

37. Write the rock name of sample 2.

38. Write a term or phrase that correctly describes the texture of sample 4.

Base your answers to questions 39 through 41 on the photograph of a sample of gneiss below.



39. What observable characteristic could be used to identify this rock sample as gneiss?

40. Identify *two* minerals found in gneiss that contain iron and magnesium.

41. A dark-red mineral with a glassy luster was also observed in this gneiss sample.
    (a) Identify the mineral

    (b) State *one* possible use for this mineral.

Rocks
Granite
Gabbro
Rhvolit
Basalt Glass
Clastic
Sandstone
Rock Salt
Coal
Foliated ()banding)
Marble