KEY

Name: _____

Minerals Review

Use the ESRT and your knowledge of Minerals to answer the following questions.

1. Directions: Use the word bank to the right to fill in the blanks in the paragraph about Minerals.

Word Bank
Flat
Scratched
Streak
Internal Arrangement
Luster
Color
Fracture

Minerals have a variety of chemical and physical properties which are all determined by the internal arrangement of their atoms. The property that describes the way a mineral reflects light is luster. The hardness of a mineral is determined by how easily it can be scratched. When a mineral breaks along flat surfaces it is said to have cleavage. Fracture describes a mineral that breaks unevenly. When a mineral is rubbed on an unglazed porcelain tile, the streak is the color of the powder the mineral leaves behind. The properties above are all helpful in identifying a mineral, while a mineral's color is not a reliable identification characteristic.

2. What are three ways you can tell calcite apart from quartz?
   a. calcite (3) is softer than quartz (7)
   b. calcite has cleavage and quartz has fracture
   c. calcite bubbles with acid and quartz does not

3. Which mineral can scratch glass (hardness of 5.5), but not pyrite?
   a. Gypsum
   b. Orthoclase (potassium feldspar)
   c. Quartz
   d. Fluorite

4. Which mineral leaves a green-black powder when rubbed against an unglazed porcelain tile?
   a. Galena
   b. Hematite
   c. Graphite
   d. Pyrite

5. Minerals from this chart are found in different rocks. Which two rocks are primarily composed of minerals that bubble with acid?
   a. Limestone and marble
   b. Granite and dolostone
   c. Sandstone and quartzite
   d. Slate and conglomerate

6. The internal arrangement of atoms of a mineral determines a mineral's
   a. Hardness, cleavage, and crystal shape
   b. Origin, exposure, and fracture
   c. Size, location, and luster
   d. Color, streak, and age.

7. Which of the characteristics of minerals is LEAST reliable for mineral identification?
   a. Luster
   b. Hardness
   c. Color
   d. Breakage (cleavage or fracture

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Igneous Rocks Review

Use the ESRT and your knowledge of Igneous Rocks to answer the following questions.

1. What minerals are found in granite? potassium feldspar, quartz, plagioclase feldspar ,biotite, amphibole

2. How does obsidian differ from pumice? obsidian is non-vesicular and pumice is vesicular

3. Which minerals are present in mafic igneous rocks, but not in felsic igneous rocks?
   pyroxene and olivine

4. Describe the environment of formation of gabbro. gabbro forms slowly deep inside the Earth (intrusive)

5. How do felsic and mafic rocks differ in density, color, and composition? Felsic rocks are lower in density, lighter in color and are rich in Al and Si.
   Mafic rocks are higher in density, darker in color and rich in Mg and Fe.

6. What processes must a rock undergo in order to become an igneous rock? melting and solidification of lava or magma

7. The solidification of magma produces
   a. Igneous rocks and metamorphic rocks
   b. Sedimentary rocks and igneous rocks
   c. Only igneous rocks
   d. Only metamorphic rocks

8. For an igneous rock to be classified as basalt, it must be dark in color, fine grained, and contain:
   a. Quartz
   b. Calcite
   c. Pyroxene
   d. Scoria

9. An igneous rock that is light in color and formed when a lava flow cooled and solidified quickly on the surface of the Earth is classified as an:
   a. Extrusive igneous rock with coarse texture and mafic composition
   b. Intrusive igneous rock with fine texture and felsic composition
   c. Extrusive igneous rock with fine texture and felsic composition
   d. Intrusive igneous rock with coarse texture and felsic composition

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Sedimentary Rocks Review

Use the ESRT and your knowledge of Sedimentary Rocks to answer the following questions.

1. What are the two major divisions of sedimentary rocks? 1.)inorganic land-derived 2.) chemically and/or ogranically formed

2. How is breccia different from conglomerate? breccia has angular fragments and conglomerate has rounded fragments

3. What is the composition of rock salt? halite

4. Which two sedimentary rocks can be organically formed? limestone and coal

5. What characteristic of sedimentary rocks allows us to see the difference between sandstone, siltstone, and shale? grain or particle size

6. Describe the process of formation of crystalline sedimentary rocks. (evaporites and precipitates)
   These rocks form when water evaporates and the minerals precipitate out.

7. Which sedimentary rock will bubble with acid and why? limestone
   It will bubble with acid because it is made of calcite which reacts with acid.

8. Uplift, weathering, and erosion leads to the formation of:
   a. Magma
   b. Cementation
   c. Sediments
   d. Igneous rocks

9. Which rock is made up of the largest particles?
   a. Conglomerate
   b. Sandstone
   c. Shale
   d. Rock Salt

10. Which rock was organically formed and sometimes contains fossilized plant impressions?
    a. Rock gypsum
    b. Bituminous Coal
    c. Phyllite
    d. Breccia

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Metamorphic Rocks Review

Use the ESRT and your knowledge of Metamorphic Rocks to answer the following questions.

1. Which mineral is present in all foliated metamorphic rocks? mica

2. What is the composition of anthracite coal? carbon

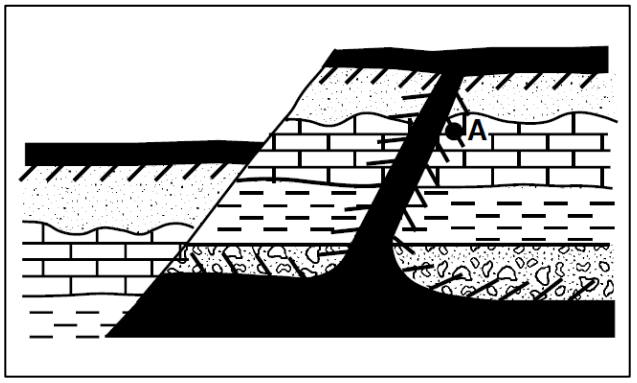
3. What is the difference between mineral alignment and banding? Mineral alignment occurs when minerals line up and form "layers" while banding occurs when minerals separate by colors to form bands.

4. What are the two major types of metamorphism? contact & regional

5. What are the two textures of metamorphic rocks? foliated & non-foliated

6. Quartzite is a metamorphic rock formed when sandstone is metamorphosed.

7. The diagram to the right is an example of what type of metamorphism? contact



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8. Which metamorphic rock formed at location A? marble

9. The crystals of many metamorphic rocks are aligned in bands as a result of:
   a. Earthquake faulting
   b. Cooling and solidification
   c. Mechanical weathering
   (d.) Heat and pressure

10. Which physical characteristic best describes the rock Phyllite?
    a. Glassy texture with gas pockets
    b. Clastic texture with angular fragments
    (c.) Foliated texture with microscopic mica crystals
    d. Bioclastic texture with cemented shell fragments

11. How do the metamorphic rocks schist and quartzite differ?
    a. Quartzite contains the mineral quartz and schist does not
    b. Quartzite forms from regional metamorphism and schist does not
    c. Schist is organically formed and quartzite is not
    (d.) Schist is foliated and quartzite is not

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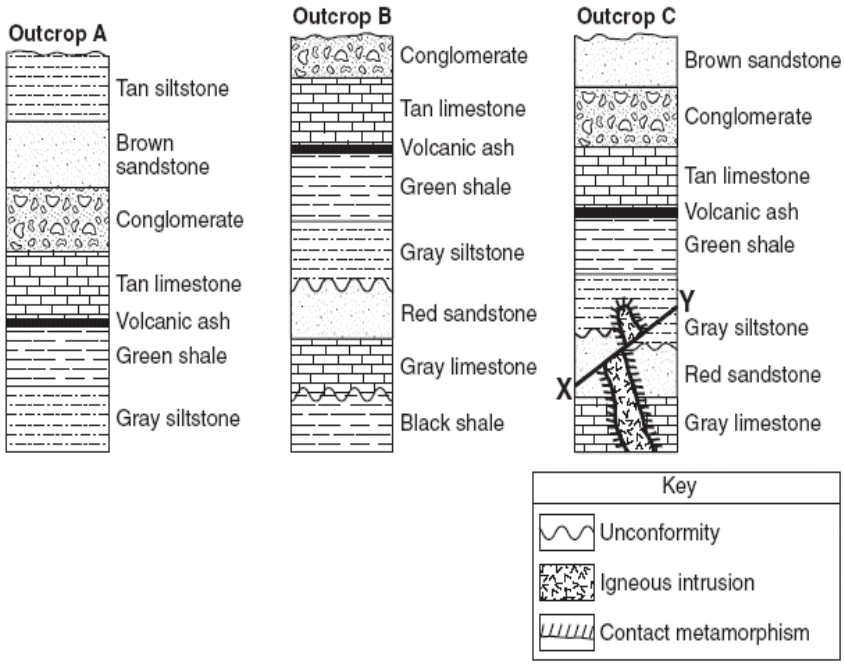
Rock Cycle Review

Use the ESRT and your knowledge of the Rock Cycle to answer the following questions.

1. Which statement is best supported by the information provided in the reference diagram of the ***Rock Cycle in Earth's Crust***?
   a. Igneous rocks are formed from eroded sediments of metamorphic rocks.
   b. Sedimentary rocks are composed of intergrown crystals.
   c. Metamorphic rocks are formed by the complete melting of any other rock.
   d. Rocks may be formed from other rocks by various processes.

2. Rocks are classified as igneous, sedimentary, or metamorphic based primarily on their
   a. texture
   b. crystal or grain size
   c. method of formation
   d. mineral composition

Base your answer to questions 3-5 on the cross sections of three rock outcrops, *A*, *B*, and *C*.



3. Which processes were the final steps in the formation of most of the rock in outcrop *A*?
   a. melting and solidification
   b. heating and/or pressure
   c. compaction and cementation
   d. weathering and erosion

4. Which processes were responsible for the formation of the igneous intrusion?
   a. melting and solidification
   b. heating and/or pressure
   c. compaction and cementation
   d. weathering and erosion

5. Which processes were responsible for the formation of the contact metamorphic rock surrounding the igneous intrusion?
   a. melting and solidification
   b. heating and/or pressure
   c. compaction and cementation
   d. weathering and erosion

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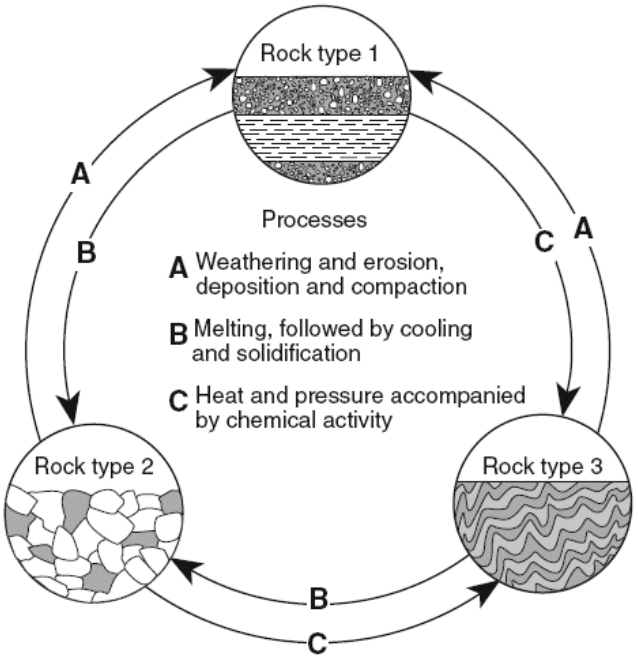
The diagram below represents geological processes that act continuously on Earth to form different rock types.

6. Which table correctly classifies each rock type?



a. a

Rock Type	Classification
1	sedimentary
2	metamorphic
3	igneous

b.

Rock Type	Classification
1	sedimentary
2	igneous
3	metamorphic

c.

Rock Type	Classification
1	metamorphic
2	igneous
3	sedimentary

7. What steps must occur before sediments can be compacted and/or cemented together to form a sedimentary rock?

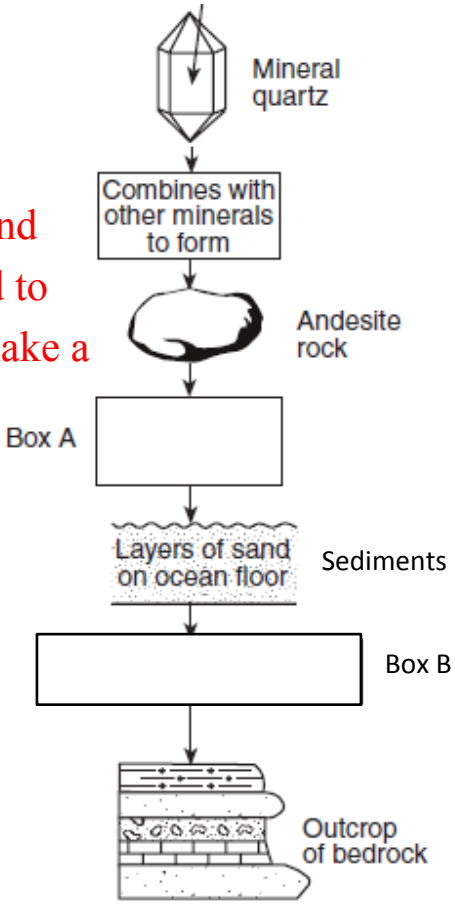
A preexisting rock needs to be uplifted, weathered and eroded to make sediments. The sediments then need to be deposited, buried, compacted, and cemented to make a sedimentary rock.

8. Which processes that you mentioned in question 7 are represented by Box A on the diagram to the right?

weathering, erosion, and deposition

9. Which processes that you mentioned in question 7 are represented by Box B on the diagram to the right?

burial, compaction, and cementation



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Density Review

Use the ESRT and your knowledge of Minerals to answer the following questions.

ROCK NAME	AVERAGE DENSITY (g/cm^3)
Basalt	2.9
Diorite	2.9
Dolomite	2.85
Granite	2.65
Limestone	2.5
Sandstone	2.6
Shale	2.5
Slate	2.75

1. What is the equation for DENSITY?

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

2. What are the equations for VOLUME and MASS?

$$\text{Volume} = \frac{\text{Mass}}{\text{Density}} \qquad \text{Mass} = \text{Density} \times \text{Volume}$$

Use the rock density chart on the right to complete questions 3 and 4.

3. A sample of SHALE has a mass of 100g. Calculate the sample's VOLUME. Label your answer with the correct units.

$$\text{Volume} = \frac{\text{Mass}}{\text{Density}} = \frac{100g}{2.5g/cm^3} = 40cm^3$$

4. A sample of BASALT has a volume of $250cm^3$. Calculate the sample's MASS. Label your answer with the correct units.

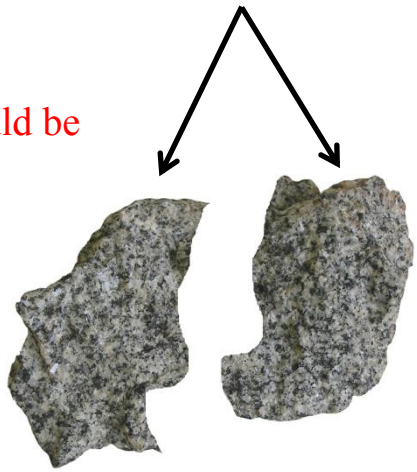
$$\text{Mass} = \text{Density} \times \text{Volume} \quad = 2.9g/cm^3 \times 250cm^3 = 725g$$

Use the ESRT to help you answer question 5.

5. Why does BASALT have a higher density than RHYOLITE?

Basalt is a mafic rock which has more Mg and Fe making it denser.
Rhyolite is a felsic rock which has more Al and Si making it less dense.

The picture to the right shows a sample of diorite being broken in half.



6. What is the DENSITY of each of the two pieces after the original sample was split in half?

The density would not change. The density for each sample would be the same at $2.9g/cm^3$

7. Each new piece of diorite has a smaller volume than the original sample. Circle the graph below that shows the correct relationship between the change in volume and the density of each smaller piece.