

**Name:** KEY

# Rocks & Minerals

## Notes

# Minerals

## KEY CONCEPT #1:

What is a mineral?

It is a naturally occurring, inorganic substance which has a definite chemical composition

What would be the opposite of this?

**man-made, organic, random chemical composition**

## KEY CONCEPT #2:

What causes minerals to have different physical properties?

**\*\*\*THEIR INTERNAL ARRANGEMENT OF ATOMS\*\*\***

Give an example of two minerals which have the same chemical composition but different physical properties.

**graphite and diamond**

## KEY CONCEPT #3:

### The Main Physical Properties Used to Identify Minerals

1. Color a poor indicator  
many minerals are the same color, one mineral can be multiple colors

2. Streak the powder form of a mineral  
more reliable than color

3. Luster how light reflects off a mineral

metallic: looks like a metal

nonmetallic: looks earthy, waxy, greasy, or brilliant

4. Cleavage the mineral breaks in a predictable pattern (perfect angles)
- 
5. Fracture the mineral breaks randomly
- 
6. Hardness resistance to being scratched  
it is not the same as breaking!
- 

**MOH'S SCALE OF HARDNESS**

<i>Hardness</i>	<i>Mineral</i>	<i>Hardness</i>	<i>Mineral</i>
<b>1 (softest)</b>	talc	<b>6</b>	orthoclase
<b>2</b>	gypsum	<b>7</b>	quartz
<b>3</b>	calcite	<b>8</b>	topaz
<b>4</b>	fluorite	<b>9</b>	corundum
<b>5</b>	apatite	<b>10 (hardest)</b>	diamond

*Mineral Composition*

**KEY CONCEPT #4:** *Minerals have a definite chemical composition*

What two elements, by mass, make up the greatest percentage of the Earth's crust?

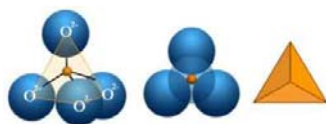
a. oxygen

b. silicon

These two elements combine to form compounds called silicates.

They combine in a specific structure called a:

oxygen - silicon tetrahedra



Draw this structure below.

# Rocks

MONO-MINERALIC

MADE FROM ONE MINERAL

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POLY-MINERALIC

MADE OF TWO OR MORE MINERALS

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MOST ROCKS ARE POLY - MINERALIC

THREE CLASSIFICATIONS OF ROCKS ARE:

SEDIMENTARY

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IGNEOUS

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METAMORPHIC

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*Draw the rock cycle below.*

**REFER TO PAGE 6 OF THE EARTH SCIENCE  
REFERENCE TABLES**

# Sedimentary Rocks

**Key Concept #1:** Most sedimentary rocks are made of pieces ( **clasts** ) of other rocks.

**Key Concept #2:** Name two processes that form sedimentary rocks.

a. cementation---the pieces are held together by minerals (cement)

b. compaction---the weight of the overlying sediments forces the particles together

**Key Concept #3:** In what type of environment are most sedimentary rocks formed?  
watery

**Key Concept #4:** Key Identifying Features of Sedimentary Rocks

a. Strata a clear layering of sediments

b. Clasts pieces of other rocks

c. Fossils the remains of once-living organisms

## Sedimentary Rock ESRT Questions

- limestone Name a non-clastic sedimentary rock which is composed of calcite.
- breccia Name a clastic sedimentary rock which has mixed, angular particle sizes.
- limestone Name a non-clastic sedimentary rock composed of marine shell fragments.
- coal Name a dark-colored, organically formed sedimentary rock composed mostly of carbon.
- rock gypsum Name the sedimentary rock formed by the process of evaporation and composed mostly of gypsum.

# Sedimentary Rock Questions

1. According to the Earth Science Reference Tables, which characteristic determines whether a rock is classified as a shale, a siltstone, a sandstone, or a conglomerate?
  - (a) the mineral composition of the sediments within the rock
  - (b) the density of the sediments in the rock
  - (c) the absolute age of the sediments within the rock
  - (d) the particle size of the sediments within the rock
2. According to the Earth Science Reference Tables, some sedimentary rocks form as the direct result of
  - (a) freezing of the material
  - (b) cementation of rock fragments
  - (c) melting of minerals
  - (d) solidification of molten magma
3. According to the Earth Science Reference Tables, which is a sedimentary rock that forms as a result of precipitation from seawater?
  - (a) shale
  - (b) basalt
  - (c) conglomerate
  - (d) gypsum
4. Which property best describes a rock which has formed from sediments?
  - (a) distorted structure
  - (b) crystalline structure
  - (c) banding or zoning of minerals
  - (d) fragmented particles arranged in layers
5. Which is most likely a nonsedimentary rock?
  - (a) a rock composed of layers of gravel cemented together
  - (b) a rock consisting of large intergrown crystals
  - (c) a rock containing fossil shells
  - (d) a rock showing ripple marks and mud cracks

# Igneous Rocks

**Key Concept #1:** How are igneous rocks formed?

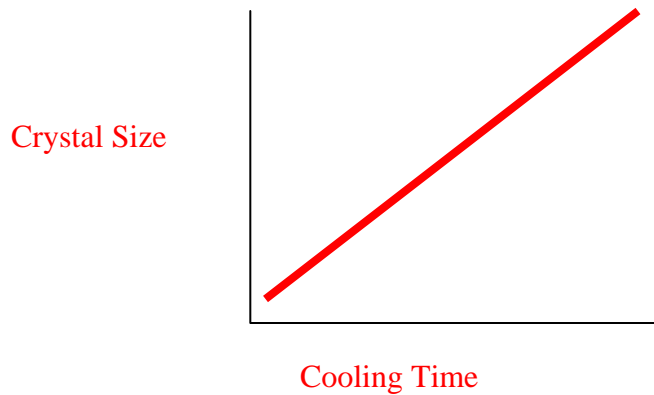
by the melting and solidification of magma

**Key Concept #2:** Name two places where igneous rocks form.

a. volcanoes

b. rifts/ridges

**Key Concept #3:** What determines the crystal size in igneous rocks? cooling time



Large crystals indicate a long cooling time

Small crystals indicate a short cooling time

**Key Concept #4:** What is the difference between extrusive and intrusive igneous rocks?

Extrusive form on or near the Earth's surface (small crystals)

Intrusive form below the Earth's surface (large crystals)

*Key Concept #5: Characteristics used to classify igneous rocks.*

a. Texture

glassy

fine

coarse

very coarse

} EXTRUSIVE

} INTRUSIVE

b. Color

light

or dark

c. Density

for its size, low or high mass

d. Composition

mafic

-----contains Fe and Mg

felsic

-----contains Al

*Key Concept #6:*

*Key Identifying Features of Igneous Rocks*

a. Glassy texture:

will usually appear black in color

b. Interlocked grains:

the grains have been melted are now physically connected

## *Igneous Rock ESRT Questions*

1. basaltic glass An extrusive, dark-colored, glassy textured igneous rock composed mostly of pyroxene.
2. granite A coarse-grained, felsic igneous rock, composed of 50% quartz, 25% potassium feldspar, and 25% plagioclase feldspar.
3. basalt A fine-grained igneous rock containing 25% olivine.



# Igneous Rock Questions

1. What observation about an igneous rock would support the inference that the rock cooled slowly underground?
  - a. The rock is light in color and low in density
  - b. The rock is about 50% plagioclase feldspar.
  - c. The rock has large crystals.
  - d. The rock has fossils.
2. Which two igneous rocks could have the same mineral composition?
  - a. pumice and scoria
  - b. peridotite and andesite
  - c. rhyolite and diorite
  - d. gabbro and basalt
3. Rhyolite and granite are alike in that they both are:
  - a. fine grained
  - b. mafic
  - c. felsic
  - d. dark-colored
4. Most igneous rocks contain
  - a. fossils
  - b. sediments
  - c. intergrown crystals
  - d. recrystallized minerals
5. An igneous rock that has a glassy texture, mostly likely solidified
  - a. quickly on/near the Earth's surface
  - b. quickly deep under the Earth's surface
  - c. slowly on/near the Earth's surface
  - d. slowly deep under the Earth's surface
6. Most igneous rocks form by which processes?
  - a. heat and pressure
  - b. melting and solidification
  - c. erosion and deposition
  - d. compaction and cementation

# Metamorphic Rocks

**Key Concept #1:** How are metamorphic rocks formed?  
**by heat and pressure**

**Key Concept #2:** Melting **DOES NOT** occur.  
If melting does occur, it is classified as a(n) igneous rock.

**Key Concept #3:** What is the difference between Regional and Contact Metamorphism?

**REGIONAL:** **large geographic area (mountains)**

**CONTACT:** **small geographic area---when rocks come in contact with magma**

**Key Concept #4:** *Key Identifying Features of Metamorphic Rocks*

a. Foliation: **banding of minerals**  
**usually black and white**

b. Distorted Structure: **folded layers**

c. Key Identifier Minerals:

- garnet** Dark Red Color
- mica** Shiny, flaky mineral

# Metamorphic Rock ESRT Questions

1. gneiss A foliated, coarse-grained metamorphic rock with distinct banding.
2. quartzite A non-foliated metamorphic rock formed from the metamorphism of quartz.
3. Identify the sedimentary rock each of the following metamorphic rocks started as:

Metamorphic Rock Name	Sedimentary Rock Formed From
Quartzite	sandstone
Slate	shale
Marble	limestone