

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>
1 (softest)	talc	6	orthoclase
2	gypsum	7	quartz
3	calcite	8	topaz
4	fluorite	9	corundum
5	apatite	10 (hardest)	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?

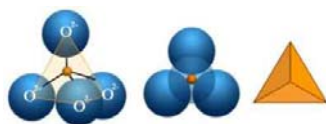
a. oxygen

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

POLY-MINERALIC

MADE OF TWO OR MORE MINERALS

MOST ROCKS ARE POLY - MINERALIC

THREE CLASSIFICATIONS OF ROCKS ARE:

SEDIMENTARY

IGNEOUS

METAMORPHIC

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?

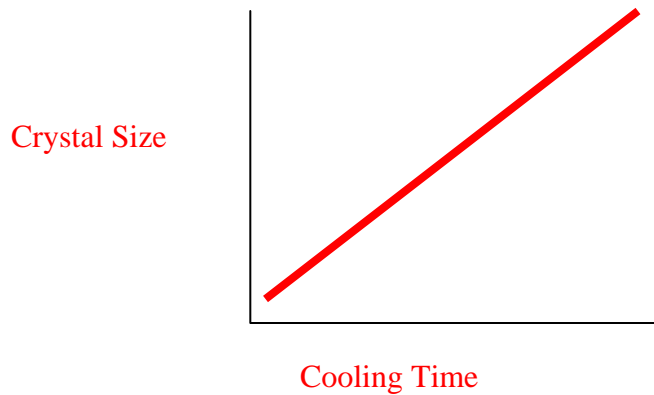
by the melting and solidification of magma

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