Do Now key

Rock + Mineral Review

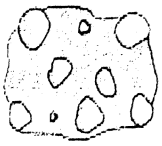
Earth Science

Name: _____

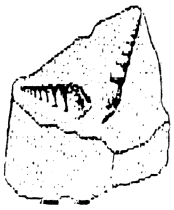
Date: _____ Period: __

WHAT ROCK TYPE IS THIS AND WHY?

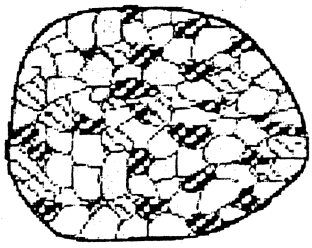
Sample A



Sample B



Sample C



Sample D

ROCK TYPE?	ROCK TYPE?	ROCK TYPE?
Metamorphic	Sedimentary	Igneous
CHARACTERISTICS THAT PROVE ROCK TYPE:	**CHARACTERISTICS THAT PROVE ROCK TYPE:**	**CHARACTERISTICS THAT PROVE ROCK TYPE:**
Banding Distorted Foliation  Recrystallization	Pebbles Fossils Sand Pieces of other rocks Shells	Large crystals Intergrown Crystals

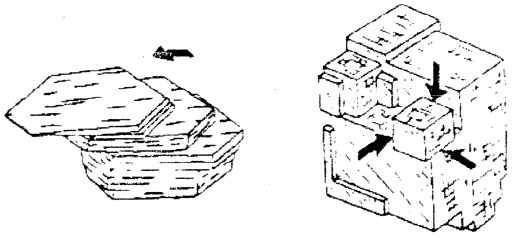
Keywords:

ROCKS & MINERALS REVIEW

A) Mineral: ***Naturally occurring solid substance with a definite chemical composition.***

1) not necessarily inorganic - coal and limestone are organic
2) not necessarily crystalline - sulfur, coal, and many more are amorphous minerals (amorphous - having no definite shape or pattern)
3) Minerals are identified by various properties:
    a) color
    b) ***hardness (1 - 10 on Moh's scale)*** 1 = talc (soft), 10 = diamond (hard)
    c) ***streak (color of mineral in powdered form)***
        1) pyrite is gold but its streak is black
    d) ***luster (reflective qualities of surface)*** - metallic, dull
    e) ***cleavage: the tendency to break along predetermined lines (cleavage planes)***
        1) This applies to crystalline minerals only
        2) Non-crystalline minerals such as glass do not cleave, they fracture.
    f) taste (halite - salt) or smell (sulfur)

4) ***Physical properties are determined by the internal arrangement of atoms:***
    a) ***Crystalline: minerals which have a regular, repeating pattern of atoms or molecules.*** Such minerals break along predetermined lines called ***cleavage planes***. Examples:
        1) salt - halite (cubic crystals)
        2) quartz: silicon-oxygen tetrahedron
    b) Amorphous: no crystal structure: coal, glass
        1) ***NO CLEAVAGE - FRACTURE***



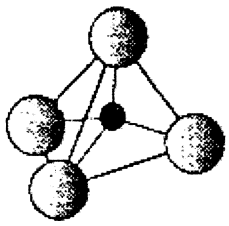
The diagrams above illustrate cleavage. In both illustrations a mineral is breaking along lines called ***cleavage planes.*** The cleavage planes are determined by the ***internal arrangement of atoms.*** Only ***crystalline*** minerals show cleavage.

A glassy, non-crystalline mineral showing typical fracture pattern.

c) Diamond, graphite, and coal are all minerals made from the same atom, carbon but they have very different physical properties because they have different ***internal arrangement of atoms.***

5) Most minerals are made of the same few atoms because they are the most abundant: see reference tables (most abundant elements in crust & lithosphere). Different combinations of these same atoms produce many different kinds of minerals.

6) The ***silicate*** minerals are the most abundant. They are formed from silicon and oxygen (SiO_2) with the atoms arranged into a 4-sided structure called a ***tetrahedron.*** Quartz is a common silicate mineral.



The Silicon-Oxygen tetrahedron

The silicon atom is at the center and it is surrounded by four oxygen atoms.

ROCK REVIEW

SEDIMENTARY ROCKS:

A. *CLASTIC*: fragmental particles cemented together.
   1) They are classified according to particle size.
   2) Only rock containing FOSSILS.

B. *NONCLASTIC (evaporites)*:
   1. Crystals from chemical ***precipitates*** (dolostone, rock gypsum).
   2. Fossil limestone & Bituminous coal.

KEY TERMS: > Burial - compaction - cementation (of sediments)
> ***Precipitation*** from evaporating seawater.
> Form a thin *VENEER* over the surface of the Earth.
> Sediments deposited in *LAYERS*.
> May contain *FOSSILS, RIPPLE MARKS, and MUD CRACKS*

IGNEOUS ROCKS:

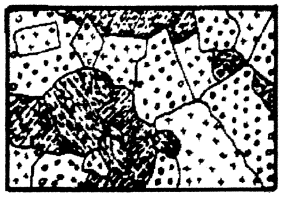
A. *INTRUSIVE (Plutonic)*
   Slow cooling within the Earth = large crystal grains*
   *large crystal grains = ***coarse texture***

B. *EXTRUSIVE (Volcanic)*

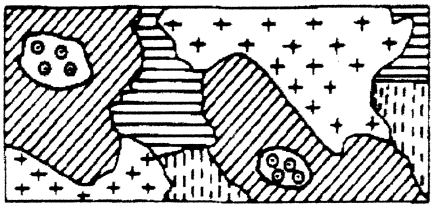
1. Ultra-fast cooling = no crystals = ***glassy***
2. Fast cooling on surface = small crystal grains*
   *small crystal grains = ***fine texture***

KEY TERMS: > ***Melting - solidification*** of molten material (magma or lava)
> ***Intergrown crystals***
> ***Magma - lava***

Note the diagrams below taken from Regents exams. Diagrams 1 and 2 represent IGNEOUS rocks. The mineral grains (crystals) are intergrown with no spaces between them. Diagram 3 is a sedimentary rock such as sandstone or siltstone. The grains here are not intergrown. There are spaces between them. The grains are cemented together where they contact one another.



(1)



(2)

(3)

METAMORPHIC ROCKS:

These are rocks that have been ***CHANGED by heat and/or pressure*** but have not melted. MAY contain intergrown crystals. Pressure increases density and reduces porosity.

1) ***REGIONAL*** - a large area, perhaps thousands of square miles, has undergone metamorphism. Example: The Adirondack mountains of New York State. (***heat <u>and</u> pressure)***
2) ***CONTACT*** - a small area of rock has been altered by direct contact with magma or lava. Example: Rock surrounding an igneous intrusion. (***heat <u>only</u>***)

KEY TERMS: > ***Heat and/or pressure***
> ***Allignment of minerals or crystals***
> ***Recrystalization***
> ***Very large crystals***
> ***Banding of minerals***
> ***Distortion of structure*** ---------->
> ***Folliation***