Let's Practice!

Unit 2 [redacted] Sedimentary Rocks [redacted] Name _____

Date _____ Per. _____

Most sedimentary rocks are composed of the weathered remains of other rocks that have been compressed and cemented in layers. Other sedimentary rocks are left behind when salt water evaporates, or when organic remains accumulate and change to solid rock. Some sedimentary rocks contain the fossil remains of prehistoric life.

Sedimentary rocks are classified into three groups on the basis of their origin. These three groups are clastic, organic, and chemical precipitates, based on texture, composition + how they formed.

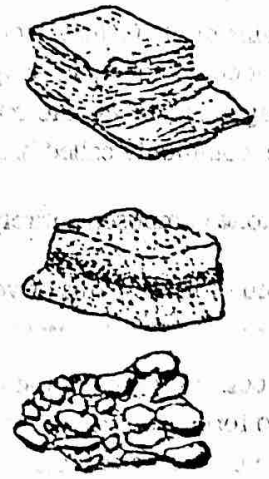
✳ **CLASTIC**, or fragmental rocks, are the most common sedimentary rocks. They are made from sediments that have been weathered, eroded, deposited, compressed, and cemented to form new rock. Unlike sediments, sedimentary rock is hard because it has been compressed and cemented. Compression is caused by the weight of sediments deposited on top of the rock layers. Silica (quartz), calcite (limestone) and clay are three common rock forming cements. These cements are usually deposited by water percolating through the sediments. Clastic rocks are classified on the basis of the size of the grains of sediment.

Shale is composed of clay particles so small that they cannot be seen without magnification. Shale feels smooth and breaks into thin layers.

Siltstone is made of larger particles, but it sometimes breaks into thin layers.

Sandstone contains sand particles large enough to feel gritty. Although sandstone may show layering, it usually breaks into irregular fragments.

Conglomerate may looks like a cement containing pebbles. It is composed of large, rounded particles of sediment held together by a natural cement.



Clastic (fragmental) Sedimentary Rocks are classified by the Size of the Grains:

smallest ↓ largest

Shale: < 0.0004 cm

Siltstone: 0.0004 – 0.006 cm

Sandstone: 0.006 – .2 cm

Conglomerate: > .2 cm

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1. How are sedimentary rocks classified into the three groups? _____
2. What two changes are required to change sediments into sedimentary rock? _____ & _____
3. Three natural cements are _____, _____, & _____.
4. On what basis are the clastic rocks classified? _____
5. Shale is made of grains of sediment so small the rock feels _____.
6. A rock composed of pebbles cemented together would be called _____.

(crystalline)

* Most **CHEMICAL** sedimentary rocks are made of material that settle out of solution in sea water as the water evaporates. This group of rocks is sometimes known as the evaporites. Unlike the other sedimentary rocks, evaporites are composed of relatively soft, intergrown crystals. You should note that most rocks composed of intergrown crystals are *not* sedimentary rocks.

As ocean water evaporates, a variety of salts are left behind. **Rock salt** is the first and most abundant chemical to precipitate. Sodium chloride (table salt) is the mineral halite, which forms the sedimentary rock, rock salt. Rock salt is followed in precipitation by other salts. **Gypsum** (hydrous calcium sulfate) is one of the materials deposited later if evaporation continues. This kind of precipitation is now occurring in the Persian Gulf of Asia, and in the Great Salt Lake in Utah. Underground beds of rock salt in Western New York show that our part of North America was covered by a tropical inland sea millions of years ago.

Dolostone forms by a chemical reaction with sea water as magnesium is added to calcite (limestone).

(Bioclastic)

* The **ORGANIC** sedimentary rocks are made from the remains of plant and animals. They are called organic because the rocks are made from material that was once alive, and because they all contain carbon.

Coal is composed of the remains of plants that lived in tropical swamps millions of years ago. The plant material fell into water where it could not decay as quickly as it accumulated. Compression by burial turned these remains into peat, then lignite and then into bituminous coal, which are relative low in density. Deeper burial may produce anthracite, commonly called hard coal, because it is harder and more dense.

- **Coquina** is a variety of limestone composed entirely of sea shells cemented by a calcite matrix.

Natural **chalk** is also composed of the remains of very tiny marine animal, too small to be readily visible.

Limestone is a sedimentary rock composed of the mineral calcite. In places like the Bahamas, calcite is precipitating from sea water to form chemical limestone. Organic coquina limestone is composed mostly of sea shells. If the shells have been abraded into a calcite sand, fragmental limestone is the result.

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7. The chemical precipitate rocks are left behind when when sea water _____.
8. The solution material in sea water is mostly _____.
9. Sedimentary rocks composed of material that was once alive are the _____ rocks.
10. What is an "evaporite"? _____
11. List the three groups of sedimentary rocks and give two examples of each.

Group 1: _____: _____ & _____

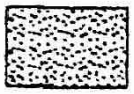
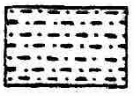
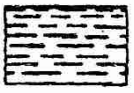
Group 2: _____: _____ & _____

Group 3: _____: _____ & _____

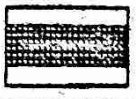
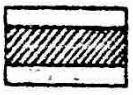
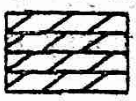
The chart below is from the Earth Science Reference Tables. Use this chart to answer the following questions.

Sedimentary Rocks

INORGANIC LAND-DERIVED SEDIMENTARY ROCKS

TEXTURE	GRAIN SIZE	COMPOSITION	COMMENTS	ROCK NAME	MAP SYMBOL
Clastic (fragmental)	Sand, pebbles, cobbles, boulders	Mostly quartz, feldspar, clay minerals	Particles rounded and cemented by fine particles	Conglomerate	
	Sand		Can be fine to coarse	Sandstone	
	Silt		Can be compact or easily split	Siltstone	
	Clay			Shale	

CHEMICALLY AND ORGANICALLY FORMED SEDIMENTARY ROCKS

TEXTURE	GRAIN SIZE	COMPOSITION	COMMENTS	ROCK NAME	MAP SYMBOL
Nonclastic (Crystalline)			Crystals from chemical precipitates (Includes the evaporites)		
	All sizes	Mostly halite		Rock Salt	
	All sizes	Gypsum		Rock Gypsum	
	All sizes	Dolomite	Changed from limestone by replacement	Dolostone	
(Bio Clastic) Organic	Microscopic to coarse (larger than 0.2 cm)	Calcite	Cemented shells, shell fragments, and skeletal remains	Fossiliferous Limestone	
	All sizes	Carbon from plant remains	Black and nonporous	Coal	

12. What name is given to a fragmental rock composed of pebbles or cobbles cemented together?

    _____

13. What is coal made from?

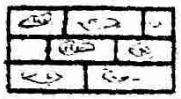
    _____

14. What clastic rock has the smallest grains of sediment?

    _____

15. What nonclastic rock started as limestone and was made by a chemical replacement?

    _____

16. What rock is represented by this pattern? 

    _____

17. What group of sedimentary rocks is classified by the size of the rock fragments?

    _____

18. What rock is made of clay?

    _____

19. What common sedimentary rock is composed mostly of the mineral calcite? _____

20. The most common minerals in the clastic rocks are... _____

21. What is the most abundant mineral in natural rock salt? _____

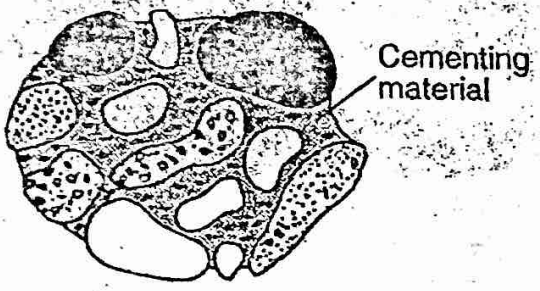
Name _____ Earth Science Mrs. Norris

Sedimentary Rock Review

22 Which sedimentary rocks are clastic and consist of particles that have diameters smaller than 0.006 centimeter?

(1) conglomerate and sandstone
(2) siltstone and shale
(3) bituminous coal and breccia
(4) fossil limestone and chemical limestone

23 Base your answer on the rock sample shown below.



(Actual size)

The average size of the pebbles in the sample is approximately

(1) 1.2 cm
(2) 0.2 cm
(3) 6.4 cm
(4) 13.2 cm

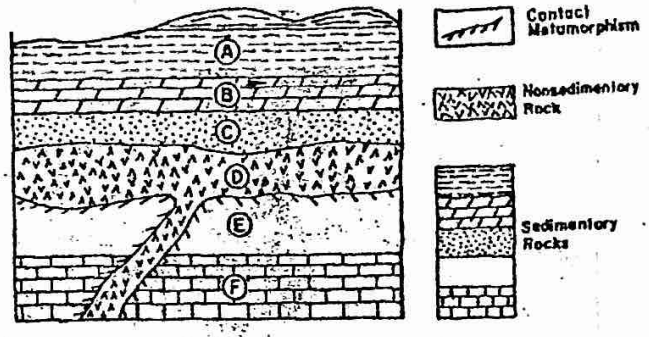
24 Which feature is characteristic of sedimentary rocks?

(1) layering
(2) foliation
(3) distorted structure
(4) glassy texture

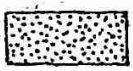
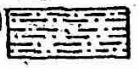
25 According to the *Earth Science Reference Tables*, which characteristic determines whether a rock is classified as a shale, a siltstone, a sandstone, or a conglomerate?

(1) the absolute age of the sediments within the rock
(2) the mineral composition of the sediments within the rock
(3) the particle size of the sediments within the rock
(4) the density of the sediments within the rock

26 Base your answer on your knowledge of Earth science and the diagram below. The diagram represents a geologic cross section consisting of various sedimentary and nonsedimentary rocks which have not been overturned.



Rock layer *E* is composed of nonuniform particle sizes ranging in diameter from 0.9 to 2.3 centimeters. According to the *Earth Science Reference Tables*, this rock layer should be represented by which symbol?

(1) 
(2) 
(3) 
(4) 

27 Which rock is made up of angular fragments of rock held together by a natural cement?

(1) breccia
(2) scoria
(3) granite
(4) quartzite

28 Large deposits of rock gypsum and rock salt usually form in areas of

(1) active volcanoes
(2) continental ice sheets
(3) fault zones in the crust
(4) shallow evaporating seas

29 Which sedimentary rock may form as a result of biologic processes?

(1) shale
(2) siltstone
(3) fossil limestone
(4) breccia