


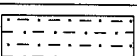



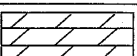
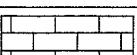
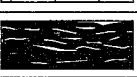


Scheme for Sedimentary Rock Identification

INORGANIC LAND-DERIVED SEDIMENTARY ROCKS					
TEXTURE	GRAIN SIZE	COMPOSITION	COMMENTS	ROCK NAME	MAP SYMBOL
Clastic (fragmental)	Pebbles, cobbles, and/or boulders embedded in sand, silt, and/or clay	Mostly quartz, feldspar, and clay minerals; may contain fragments of other rocks and minerals	Rounded fragments	Conglomerate	
			Angular fragments	Breccia	
	Sand (0.006 to 0.2 cm)		Fine to coarse	Sandstone	
	Silt (0.0004 to 0.006 cm)		Very fine grain	Siltstone	
	Clay (less than 0.0004 cm)		Compact; may split easily	Shale	
CHEMICALLY AND/OR ORGANICALLY FORMED SEDIMENTARY ROCKS					
TEXTURE	GRAIN SIZE	COMPOSITION	COMMENTS	ROCK NAME	MAP SYMBOL
Crystalline	Fine to coarse crystals	Halite	Crystals from chemical precipitates and evaporites	Rock salt	
		Gypsum		Rock gypsum	
		Dolomite		Dolostone	
Crystalline or bioclastic	Microscopic to very coarse	Calcite	Precipitates of biologic origin or cemented shell fragments	Limestone	
Bioclastic		Carbon	Compacted plant remains	Bituminous coal	

Overview:

The origin of sedimentary rocks is almost always associated with a water environment. In lakes and shallow seas, sediments are deposited, buried, compacted, and/or cemented, producing sedimentary rocks. These processes are shown on the Rock Cycle chart. Sedimentary rocks have a wide variation of sediment sizes, texture, and composition. To help organize these rocks, they are classified into three groups: *Inorganic Land-Derived Sedimentary Rocks*, *Chemically Formed Sedimentary Rocks*, and *Organically Formed Sedimentary Rocks*. The above chart – Scheme for Sedimentary Rock Identification – is organized by this classification system and contains much information about the given 10 rocks.

The Chart:

Inorganic Land-Derived Sedimentary Rocks – This upper section consists of 5 inorganic (non-living) rocks (see Rock Name column). The origin of the sediments for these rocks were land-derived and were eventually compacted and/or cemented under water. These rocks have a clastic texture, meaning minerals or fragment particles (sediments) make up the rock. These sediments can be seen in sandstone and especially in conglomerates. These five rocks are organized by Grain Size, which is their sediment size. The smallest sediment is clay, being smaller than 0.0004 cm. When clay undergoes compaction and/or cementation, the resulting rock is shale. The largest grain sizes are found in conglomerates. Because sedimentary rocks are a mixture of different rocks, their composition varies greatly. The Map Symbol column shows the designated diagrammed symbols for the given rocks.

Chemically Formed Sedimentary Rocks – The chart shows three chemically formed sedimentary rocks: rock salt, rock gypsum, and dolostone, having crystalline texture – a texture that shows crystals. Each one of them has different mineral compositions, but all are made by the evaporation of water. As water evaporates, the dissolved minerals become concentrated and start to precipitate (release) out of the water, settling to the bottom and building an evaporite sedimentary rock. This is how salt layers are produced. In the Comments column are the terms “precipitates and evaporites.”

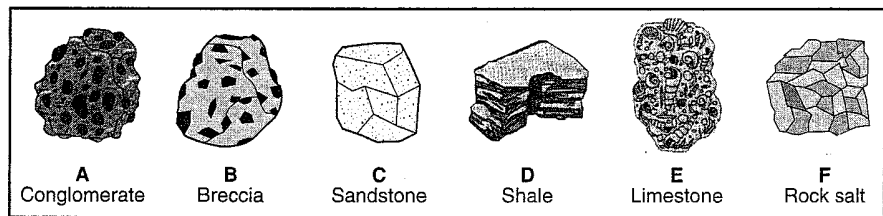
Organically Formed Sedimentary Rocks – These rocks were formed from once living material, making a bioclastic or crystalline texture. Coal, having a bioclastic texture, is composed of carbon from the compaction of trees and plant remains. The other given example of a bioclastic or crystalline texture is limestone. The Comments section for limestone states “Precipitates of biologic origin or cemented shell fragments.” Limestone contains the mineral calcite, which reacts by bubbling when in contact with hydrochloric acid. This is why an acid test is useful in identifying limestone.

Additional Information:

- Breccia is a type of conglomerate. The difference between breccia and a conglomerate is that breccia shows angular fragments, while a conglomerate has mostly rounded sediments.
- Fossils are almost always found in sedimentary rocks.

Set 1 — Scheme for Sedimentary Rock Identification

Base your answers to question 1 on the drawings of six sedimentary rocks labeled A through F.



1. a) Most of the rocks shown were formed by
- (1) volcanic eruptions and crystallization
 - (2) compaction and/or cementation
 - (3) heat and pressure
 - (4) melting and/or solidification a _____
- b) Which two rocks are composed primarily of quartz, feldspar, and clay minerals?
- (1) rock salt and conglomerate
 - (2) rock salt and breccia
 - (3) sandstone and shale
 - (4) sandstone and limestone b _____

c) Which table shows the rocks correctly classified by texture?

(1)

Texture	clastic	bioclastic	crystalline
Rock	A, B, C, D	E	F

(2)

Texture	clastic	bioclastic	crystalline
Rock	A, B, C	D	E, F

(3)

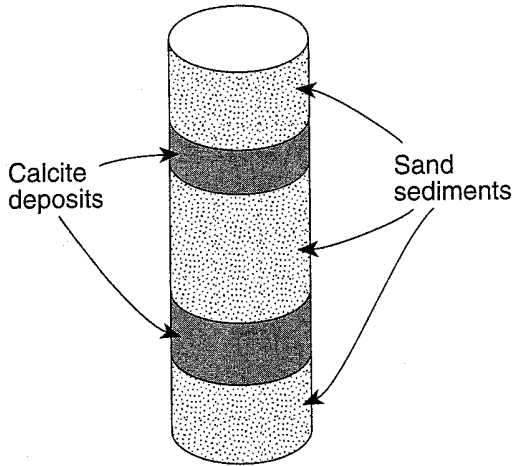
Texture	clastic	bioclastic	crystalline
Rock	A, C	B, E	D, F

(4)

Texture	clastic	bioclastic	crystalline
Rock	A, B, F	E	C, D

c _____

2. The diagram below shows a drill core of sediment that was taken from the bottom of a lake.



Which types of rock would most likely form from compaction and cementation of these sediments?

- (1) sandstone and limestone
 (2) shale and coal
 (3) breccia and rock salt
 (4) conglomerate and siltstone 2 _____

3. Which rock was organically formed and sometimes contains fossilized plant impressions?

- (1) rock gypsum
 (2) phyllite
 (3) breccia
 (4) bituminous coal 3 _____

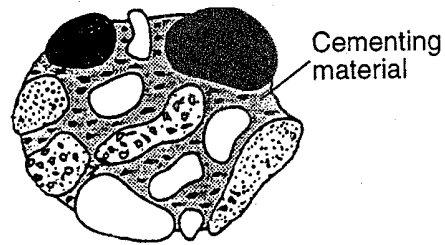
4. Which rock is made up of the largest particles?

- (1) conglomerate
 (2) sandstone
 (3) shale
 (4) rock salt 4 _____

5. Which type of rock most likely contains fossils?

- (1) scoria
 (2) gabbro
 (3) schist
 (4) shale 5 _____

6. The rounded pebbles of this rock have been cemented together to form



(Actual size)

- (1) granite, an igneous rock
 (2) conglomerate, a sedimentary rock
 (3) siltstone, a sedimentary rock
 (4) gneiss, a metamorphic rock 6 _____

7. Give at least two processes to form a sedimentary rock.
- _____

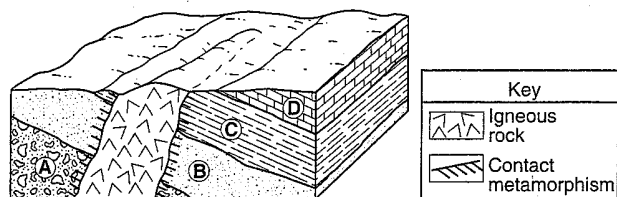
8. Which sedimentary rock is made from the cementation and/or compaction of sediments that are 0.03 cm to 0.1 cm in size? _____

Set 2 — Scheme for Sedimentary Rock Identification

9. Which sedimentary rock may form as a result of biologic processes?
- (1) shale (3) fossil limestone
 (2) siltstone (4) breccia 9 _____

10. Dolostone is classified as which type of rock?
- (1) land-derived sedimentary rock
 (2) chemically formed sedimentary rock
 (3) nonfoliated metamorphic rock
 (4) foliated metamorphic rock 10 _____

11. The block diagram below shows a portion of the Earth's crust. Letters *A*, *B*, *C*, and *D* indicate sedimentary layers.



Which processes produced rock layer *B*?

- (1) subduction and melting
 (2) uplift and solidification
 (3) heat and pressure
 (4) compaction and cementation 11 _____
12. Which sedimentary rocks are clastic and consist of particles that have diameters smaller than 0.005 centimeter?
- (1) conglomerate and sandstone
 (2) siltstone and shale
 (3) bituminous coal and breccia
 (4) fossil limestone and chemical limestone 12 _____

13. Most rock gypsum is formed by the
- (1) heating of previously existing foliated bedrock
 (2) cooling and solidification of lava
 (3) compaction and cementation of shells and skeletal remains
 (4) chemical precipitation of minerals from seawater 13 _____

14. Evaporite deposits could be composed of which minerals?
- (1) garnet and pyroxene
 (2) mica and feldspar
 (3) hornblende and olivine
 (4) halite and gypsum 14 _____

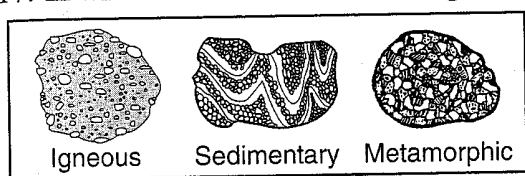
15. The diagram below shows some features in a cave.



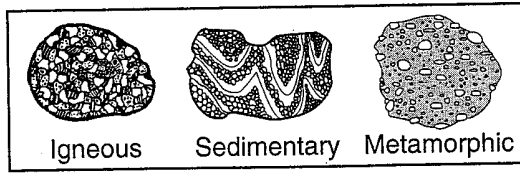
Which type of rock was chemically weathered by acidic groundwater to produce the cave and its features?

- (1) siltstone (3) quartzite
 (2) basalt (4) limestone 15 _____
16. The precipitation of the mineral halite would form a layer of
- (1) limestone (3) coal
 (2) rock salt (4) dolostone 16 _____

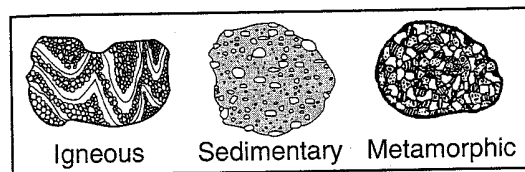
17. In which set are the rock drawings labeled with their correct rock types?



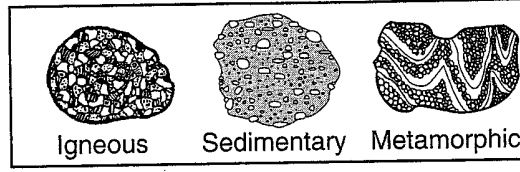
(1)



(3)



(2)

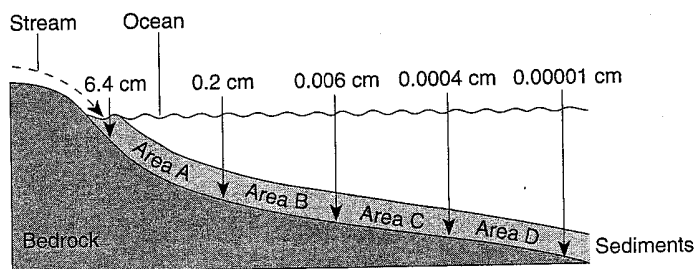


(4)

17 _____

18. The accompanying profile shows the average diameter of sediment that was sorted and deposited in specific areas *A*, *B*, *C*, and *D* by a stream entering an ocean.

As compaction and cementation of these sediments eventually occur, which area will become sandstone?



(1) *A*

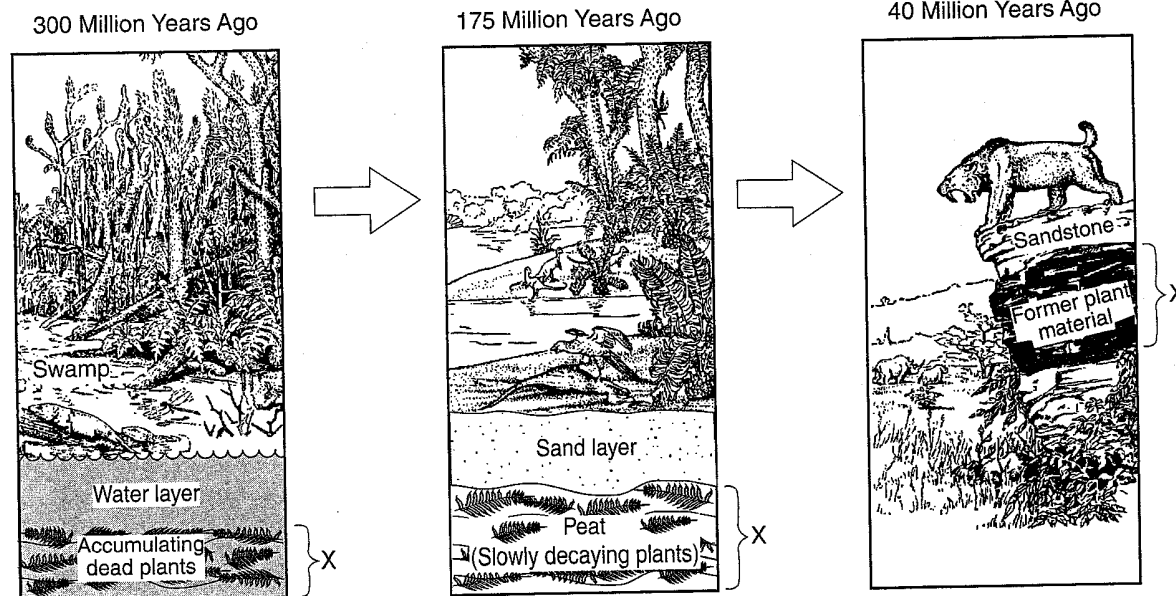
(2) *B*

(3) *C*

(4) *D*

18 _____

19. The sequence of diagrams below represents the gradual geologic changes in layer **X**, located just below Earth's surface.



Which type of sedimentary rock was formed at layer **X**?

(1) conglomerate

(2) shale

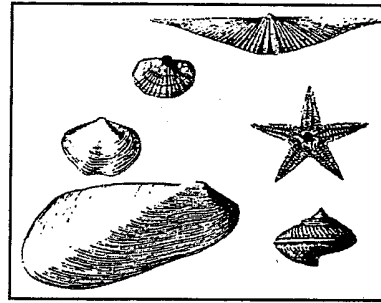
(3) rock salt

(4) coal

19 _____

20. The accompanying diagram represents the fossils found in a bedrock formation located in central New York State. In which type of rock were the fossils most likely found?

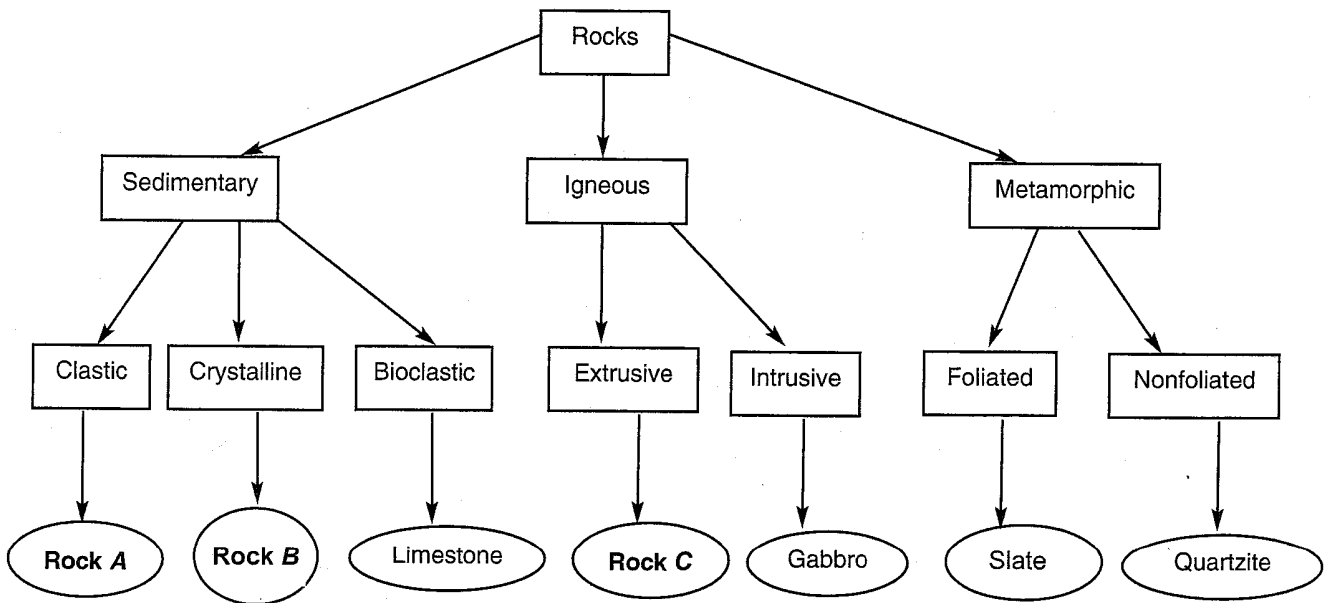
- (1) sedimentary rock that formed in an ocean environment
- (2) sedimentary rock that formed in a land environment
- (3) igneous rock that formed in an ocean environment
- (4) igneous rock that formed in a land environment



20 _____

Base your answers to question 21 on the Rock Classification Flowchart shown below. Letters *A*, *B*, and *C* represent specific rocks in this classification scheme.

Rock Classification Flowchart



21. a) Rock *B* reacts with hydrochloric acid. State the name of Rock *B*. _____

b) Rock *A* is composed of fine-grained quartz and feldspar particles 0.008 cm in diameter. State the name of Rock *A*. _____

c) Which rock could also be placed where limestone is positioned? _____

22. Fossils are almost always found in sedimentary rocks. Give one reasons why sedimentary rocks tend to contain fossils.
