

Sedimentary Rock Identification

1 Which rock is classified as an evaporite?

- (1) clastic shale (3) nonfoliated marble
 (2) foliated phyllite (4) crystalline rock salt

2 Which chart correctly matches rock salt and rock gypsum with how the minerals from these rocks are used?

(1)

Rock Type	Mineral Use
Rock salt	ore of lead
Rock gypsum	building stones

(2)

Rock Type	Mineral Use
Rock salt	roofing
Rock gypsum	jewelry

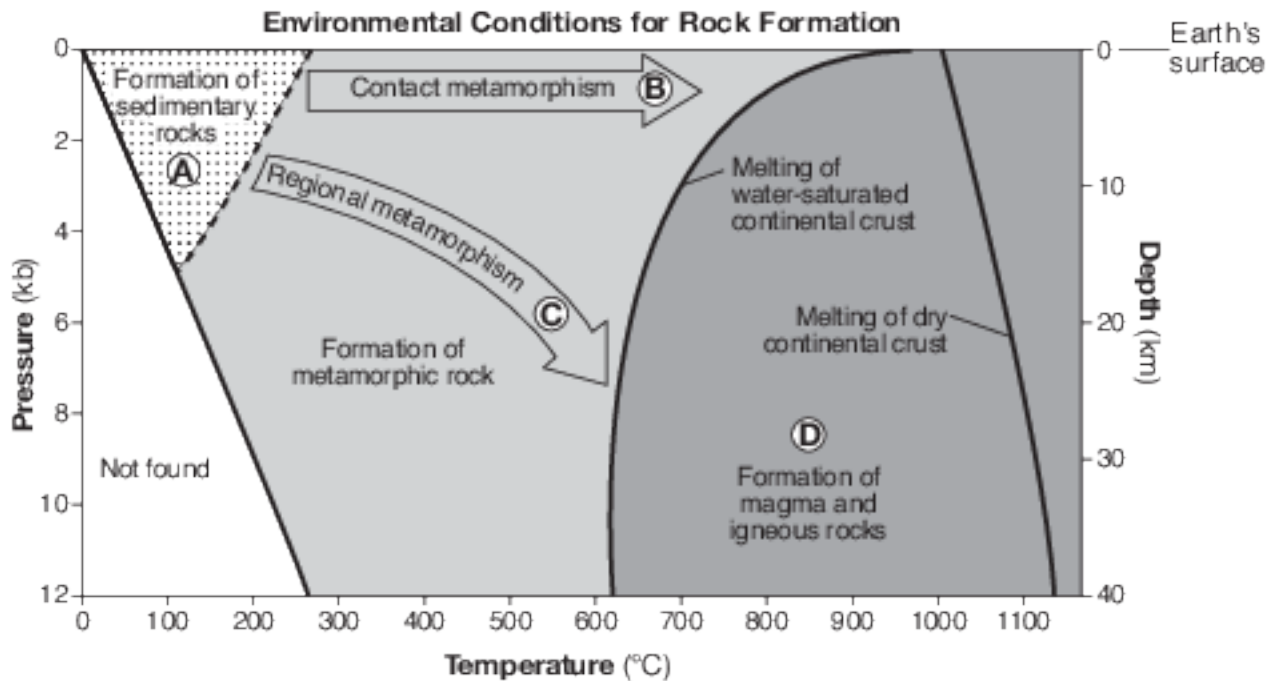
(3)

Rock Type	Mineral Use
Rock salt	food additive
Rock gypsum	ore of iron

(4)

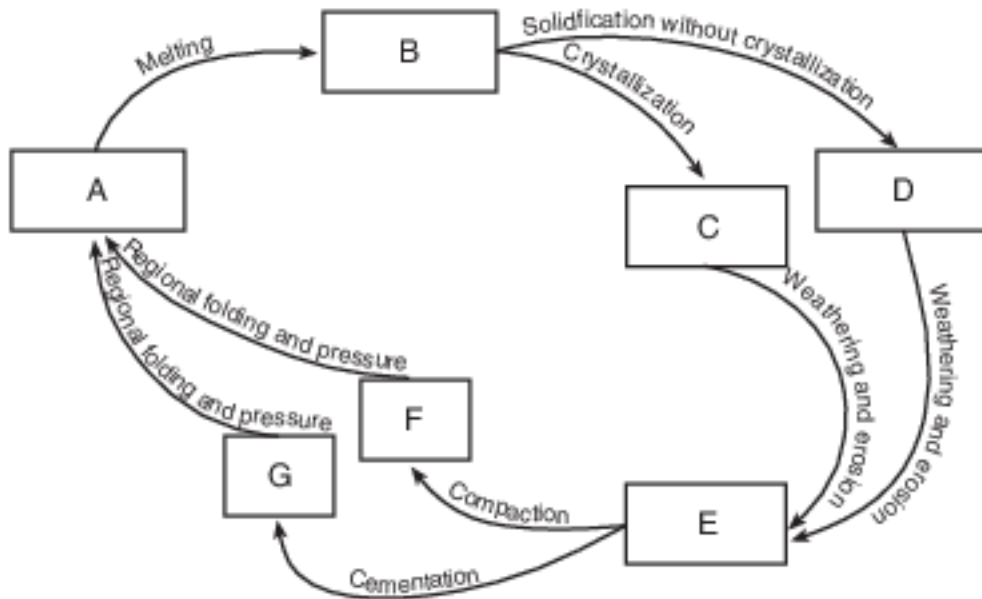
Rock Type	Mineral Use
Rock salt	melts ice
Rock gypsum	plaster of paris

Base your answers to questions 3 on the graph below and on your knowledge of Earth science. The graph shows the temperature, pressure, and depth environments for the formation of the three major rock types. Pressure is shown in kilobars (kb). Letters A through D identify different environmental conditions for rock formation.



- 3 Which rock is most likely to form directly from rock material at a depth of 30 km and a temperature of 1000°C?
- | | |
|---------------|-------------|
| (1) quartzite | (3) shale |
| (2) scoria | (4) granite |
- 4 Which medium-grain-sized metamorphic rock is composed mostly of the same mineral as the sedimentary rock limestone?
- | | |
|------------|---------------|
| (1) gneiss | (3) quartzite |
| (2) marble | (4) schist |
- 5 Which rock is composed of the mineral halite that formed when seawater evaporated?
- | | |
|---------------|-----------------|
| (1) limestone | (3) rock gypsum |
| (2) dolostone | (4) rock salt |

Base your answers to questions 6 on the flowchart below and on your knowledge of Earth science. The boxes labeled A through G represent rocks and rock materials. Arrows represent the processes of the rock cycle.



6 Which lettered box could represent the rock conglomerate?

- (1) E
- (2) G
- (3) C
- (4) D

Base your answers to questions 7 on the table below and on your knowledge of Earth science. The data table describes some types of limestone.

Types of Limestone

Limestone Name	Description
Chalk	thick accumulations of microscopic shells of tiny organisms with calcite cement
Coquina	poorly cemented shells and shell fragments
Coral	skeletons of coral organisms with calcite cement
Travertine	deposits left by hot springs or dripping water in caves

7 Which limestone is classified as inorganic?

- (1) chalk
- (2) coquina
- (3) coral
- (4) travertine

8 A mixture of rounded pebbles and sand was deposited in a river. Over time, these sediments were compacted and cemented together to form the sedimentary rock

- (1) conglomerate
- (2) sandstone
- (3) breccia
- (4) shale

Base your answers to questions 9 on the diagram below, which represents a rock composed of cemented pebbles and sand.



9 This rock should be classified as

- (1) an intrusive igneous rock
- (2) an extrusive igneous rock

- (3) a bioclastic sedimentary rock
- (4) a clastic sedimentary rock

Base your answers to questions 10 on the passage below and on your knowledge of Earth science.

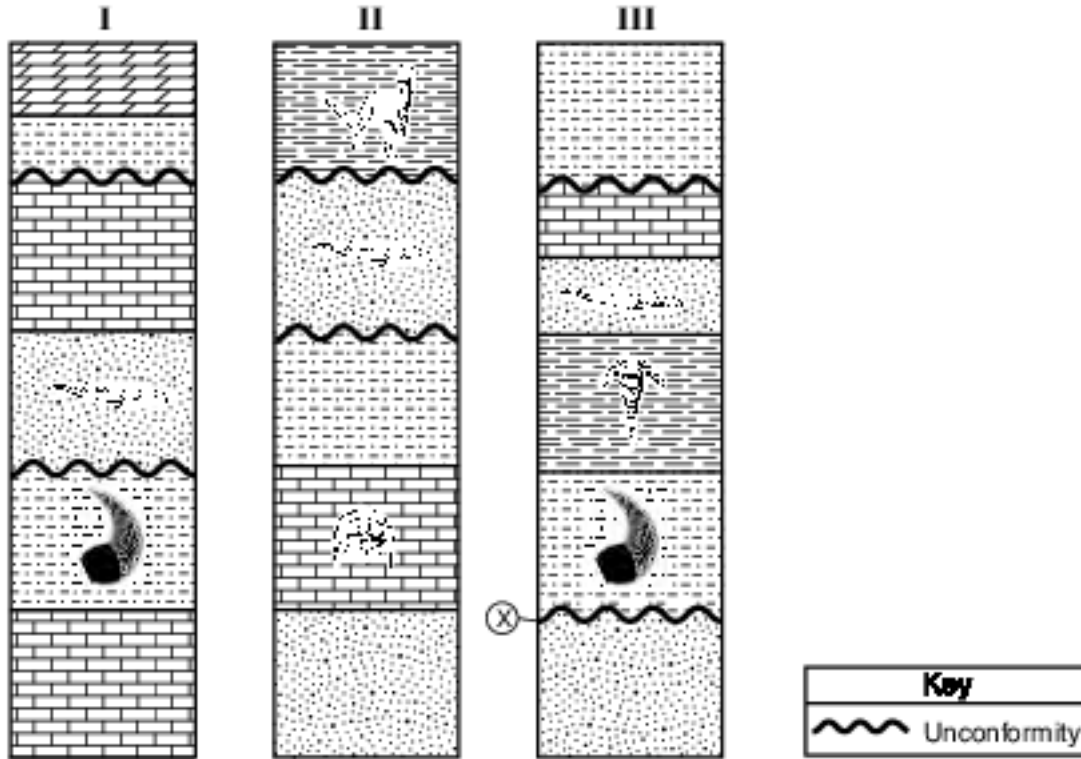
Carrara Marble

Carrara marble is named for the town of Carrara on the west coast of Italy. This dazzling white marble has been mined since the time of the ancient Romans and remains the major industry of the area today. The marble has many commercial uses, such as tombstones, countertops, tiles, and building stones. Its chemical purity, uniform color, and hardness make this marble an ideal material for artists who carve statues from rock. Major museums around the world have statues carved from Carrara marble.

The formation of Carrara marble began 200 million years ago when a great thickness of tiny shells was deposited at the bottom of a warm, shallow sea. Over time, burial and compaction of these sediments formed sedimentary rock primarily composed of pure calcite. Approximately 27 million years ago, tectonic forces caused this area of the seafloor bedrock to be deformed and metamorphosed, forming the Carrara marble. Uplift and erosion later exposed huge formations of this famous marble.

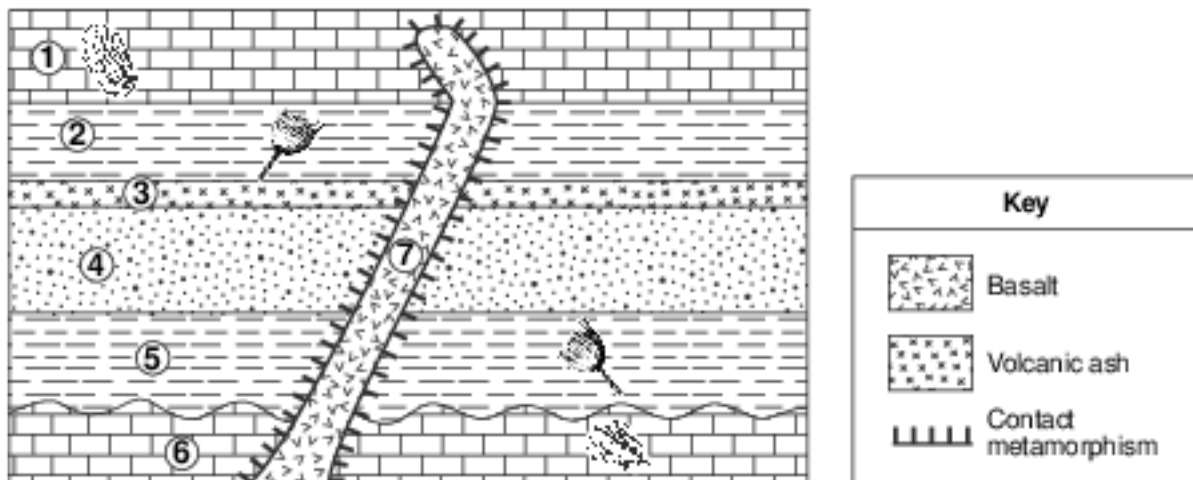
- 10 Identify the most likely sedimentary rock that formed when the sediments of tiny shells were buried and compacted. [1]

Base your answers to questions 11 on the diagrams below and on your knowledge of Earth science. The diagrams represent three sedimentary rock outcrops labeled I, II, and III, found in the northeastern United States. The outcrops have not been overturned. Some rock layers contain New York State index fossils. One unconformity has been labeled X.



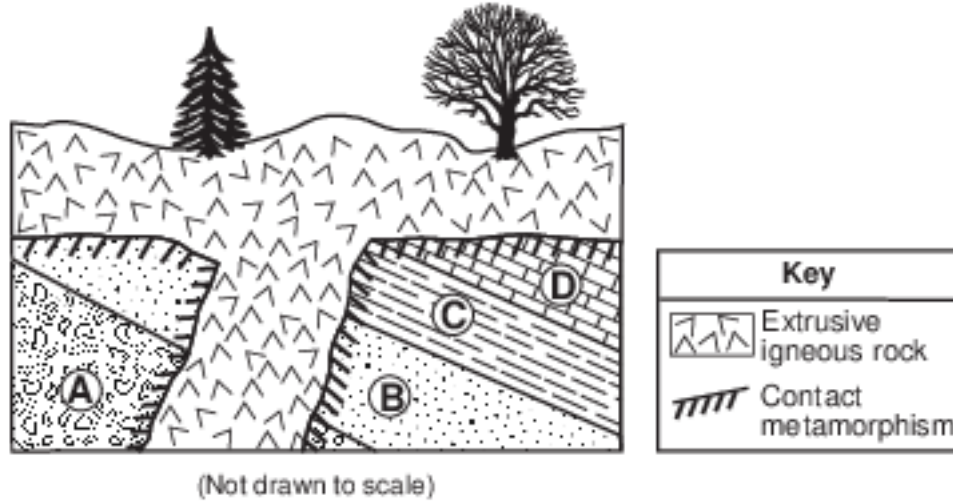
11 Identify, by name, the sedimentary rock layer that is missing from rock outcrop III due to the formation of unconformity X. [1]

Base your answers to questions 12 on the geologic cross section below, which shows rock units 1 through 7 that have not been overturned. Some of the rock units contain New York State index fossils. An unconformity exists between rock units 5 and 6.



12 State the grain size of the sediment that was deposited to form rock unit 2. [1]

Base your answers to questions 13 on the cross section below and on your knowledge of Earth science. The cross section represents a portion of Earth's crust. Letters A, B, C, and D indicate sedimentary rock layers that were originally formed from deposits in a sea. The rock layers have not been overturned.



13 Describe one piece of evidence that suggests that rock layer C formed in a deeper sea environment than did rock layer A. [1]

Base your answers to questions 14 on the passage below and on your knowledge of Earth science.

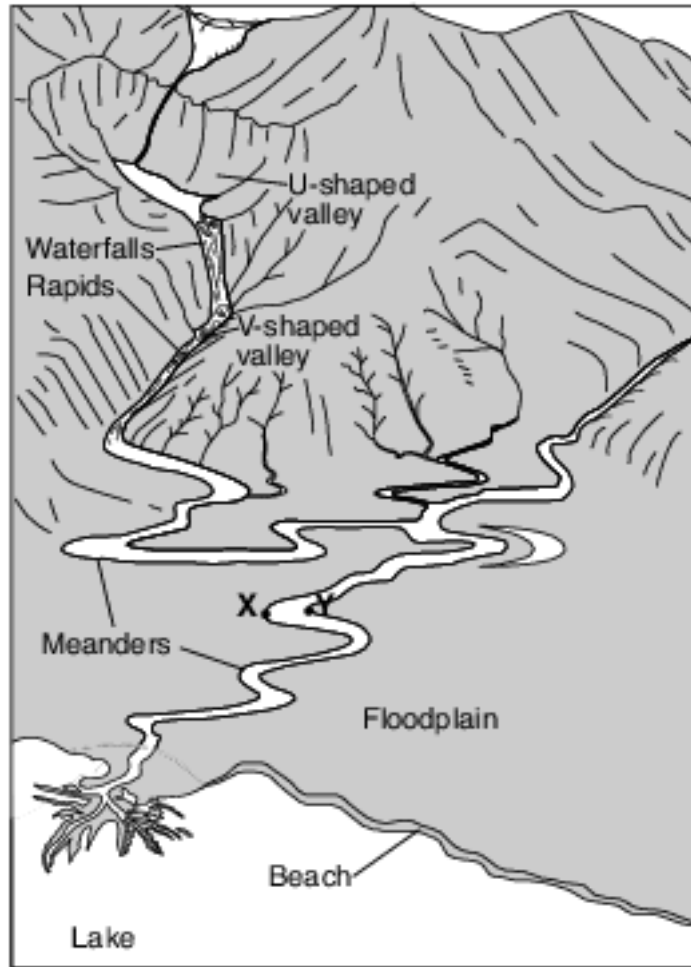
Dinosaur Fossils

Bones of juvenile long-necked sauropod dinosaurs, *Abydosaurus mcintoshi*, have recently been found in 105-million-year-old sandstone at the Dinosaur National Monument in Utah. The remains of four individual dinosaurs were found, including two intact skulls. This find is unusual because the softer tissue holding the thin sauropod dinosaur skull bones together usually disintegrates, allowing the skull bones to separate. Only 8 of 120 types of sauropods discovered have complete skull specimens. These dinosaurs were herbivores, with large numbers of sharp teeth that were probably replaced five to six times each year. These teeth allowed only for the harvesting of plant material, but not for chewing it afterward. The plant-harvesting teeth and long neck identify *Abydosaurus mcintoshi* as a descendant of the brachiosaurs.

14 Indicate the range of grain sizes in the type of bedrock in which *Abydosaurus mcintoshi* bones were found. [1]

_____ cm to _____ cm

Base your answers to questions 15 on the diagram below, which shows several different landscape features. Points X and Y indicate locations on the streambank.



- 15 The beach consists of particles with diameters from 0.01 cm to 0.1 cm. Identify the sedimentary rock that will form when burial and cementation of these sediments occur. [1]

Answer Keys

1 4

2 4

3 4

4 2

5 4

6 2

7 4

8 1

9 4

10 Allow 1 credit for limestone or coquina.

11 Allow 1 credit for limestone.

12 Allow 1 credit for clay or for a size equal to or less than 0.0004 cm.

13 Allow 1 credit. Acceptable responses include, but are not limited to:

- — The grain size of rock layer C is smaller.
- — Smaller sediment is deposited in deeper water.
- — Shale is made of clay-sized particles/clay.
- — Rock layer A contains larger sediments.

14 Allow 1 credit. Acceptable responses include, but are not limited to:

- — 0.006 cm to 0.2 cm
- — 0.2 cm to 0.006 cm

15 Allow 1 credit for sandstone.