

Sedimentary and Metamorphic Rocks

SECTION 6.1 *Formation of Sedimentary Rocks*

In your textbook, read about the processes that form sedimentary rocks. Use each of the terms below to complete the following statements.

cementation

chemical weathering

clastic sediments

deposition

lithification

physical weathering

sedimentary rock

sorted deposits

sediment

unsorted deposits

- _____ consists of solid material that has been deposited on Earth's surface by wind, water, ice, gravity, or chemical precipitation.
- Glaciers and landslides tend to create _____ in which sediments of different sizes are mixed together.
- During _____, the minerals in a rock are dissolved or otherwise chemically changed.
- The process by which mineral growth binds sediment grains together into solid rock is _____.
- Weathering produces _____, which are rock and mineral fragments.
- When sediments become cemented together, they form _____.
- As a result of _____, sediments are laid down on the ground or on the bottom of bodies of water.
- The physical and chemical process called _____ transforms sediments into sedimentary rocks.
- During _____, minerals remain chemically unchanged, and rock fragments simply break off of the solid rock along fractures or grain boundaries.
- Sediments tend to form _____ when transported by water and wind.

SECTION 6.1 *Formation of Sedimentary Rocks, continued*

In your textbook, read about lithification.

For each statement below, write *true* or *false*.

- _____ **11.** Lithification begins with erosion.
- _____ **12.** Muds may contain up to 60 percent water and shrink as excess water is squeezed out.
- _____ **13.** Sands are usually poorly compacted during deposition, and they tend to compact a great deal during burial.
- _____ **14.** Groundwater, oil, and natural gas are commonly found within pore spaces in sedimentary rocks.
- _____ **15.** The temperature in Earth's crust decreases with depth.
- _____ **16.** Sediments buried 3 to 4 km deep experience temperatures that start the chemical and mineral changes that cause cementation.
- _____ **17.** In one type of cementation, a new mineral grows between sediment grains.
- _____ **18.** In one type of cementation, existing mineral grains grow larger as the same mineral precipitates and crystallizes around them.

In your textbook, read about the features of sedimentary rocks.

Use each of the terms below to complete the passage.

cross-bedding	fossils	graded bedding	lithification
ripple marks	sand dunes	transport	bedding

The primary feature of sedimentary rocks is **(19)** _____, or horizontal layering.

The type of bedding that occurs depends upon the sediment's method of **(20)** _____.

Bedding is called **(21)** _____ when the heaviest and coarsest material is on the bottom. A second type of bedding called **(22)** _____ forms as inclined layers of sediment

migrate forward across a horizontal surface. Large-scale cross-bedding can be formed by migrating

(23) _____. When sediment is moved into small ridges by wind or wave action,

(24) _____ can form. Many sedimentary rocks contain **(25)** _____,

the preserved remains, impressions, or any other evidence of once-living organisms. During

(26) _____, parts of an organism can be replaced by minerals and turned into rock.

SECTION 6.2 *Types of Sedimentary Rocks*

In your textbook, read about the about different types of sedimentary rocks.

Complete the table by filling in the type of sedimentary rock described: *clastic*, *organic*, or *chemical*.

Description	Type of Sedimentary Rock
1. Breccias and conglomerates are examples.	
2. Classified by particle size	
3. Coal is an example.	
4. Formed from the remains of once-living things	
5. Formed from deposits of loose sediments	
6. Often contains calcite, halite, or gypsum	
7. Forms evaporites	
8. Sandstone is a medium-grained example.	
9. Formed from precipitation and growth of mineral crystals	
10. Formed from the shells of sea organisms	

In your textbook, read about how sedimentary rocks form and their importance to humans.

Answer the following questions.

11. How does fossil-containing limestone form?

12. What is coal composed of, and how do humans use it?

13. What information can fossils provide?

14. What do some of the features of sedimentary rocks indicate about ancient bodies of water?

SECTION 6.3 Metamorphic Rocks

In your textbook, read about metamorphic rocks.

For each item in Column A, write the letter of the matching item in Column B.

Column A

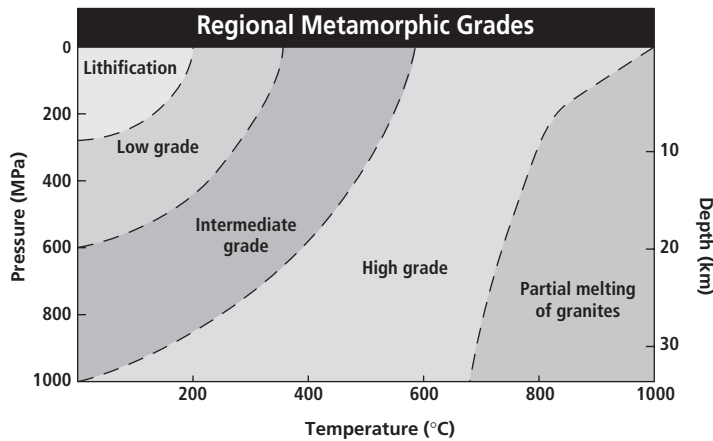
- _____ 1. Occurs when rocks come into contact with molten rock
- _____ 2. Rock whose texture, mineralogy, or chemical composition has been altered without melting it
- _____ 3. Metamorphism resulting from high temperature and pressure that affects a large region
- _____ 4. Large crystals of new metamorphic minerals
- _____ 5. Occurs when very hot water reacts with rock
- _____ 6. Characterized by wavy layers and bands of light and dark minerals
- _____ 7. Composed mainly of minerals with blocky crystal shapes

Column B

- a. contact metamorphism
- b. foliated metamorphic rock
- c. nonfoliated metamorphic rock
- d. metamorphic rock
- e. hydrothermal metamorphism
- f. porphyroblasts
- g. regional metamorphism

In your textbook, read about types of metamorphism.

Use the diagram to answer the following questions.



8. What grades of regional metamorphism are shown on the graph?

9. Which grades represent the highest pressure conditions?

10. Which grade generally occurs between 0 and 20 km below Earth's surface?

SECTION 6.3 *Metamorphic Rocks, continued*

In your textbook, read about causes and types of metamorphism.

Circle the letter of the choice that best completes the statement.

11. The pressure required for metamorphism can be generated by
 - a. pressure from weight of overlying rock.
 - b. heat from magma bodies in contact with surrounding rock.
 - c. cementation and lithification.
 - d. hydrothermal solutions.

12. A regional metamorphic belt is divided into zones based upon
 - a. the number of volcanoes in the area.
 - b. mineral groups found in the rocks.
 - c. types of fossils found in the rocks.
 - d. current underground temperatures.

13. Contact metamorphism occurs under conditions of
 - a. high temperature and high pressure.
 - b. high temperature and moderate-to-low pressure.
 - c. low temperature and very high pressure.
 - d. low temperature and moderate-to-low pressure.

14. Minerals that crystallize at higher temperatures as a result of contact metamorphism tend to be found near
 - a. coal deposits.
 - b. bodies of water.
 - c. coral reefs.
 - d. igneous intrusions.

15. The type of metamorphism that occurs when very hot water reacts with and alters the mineralogy of rock is
 - a. contact.
 - b. regional.
 - c. hydrothermal.
 - d. local.

16. Metamorphic rocks in which the long axes of their minerals are perpendicular to the pressure that altered them are described as
 - a. marble-like.
 - b. quartzite-like.
 - c. foliated.
 - d. nonfoliated.

17. Metamorphic rocks that lack mineral grains with long axes oriented in one direction are described as
 - a. marble-like.
 - b. quartzite-like.
 - c. foliated.
 - d. nonfoliated.

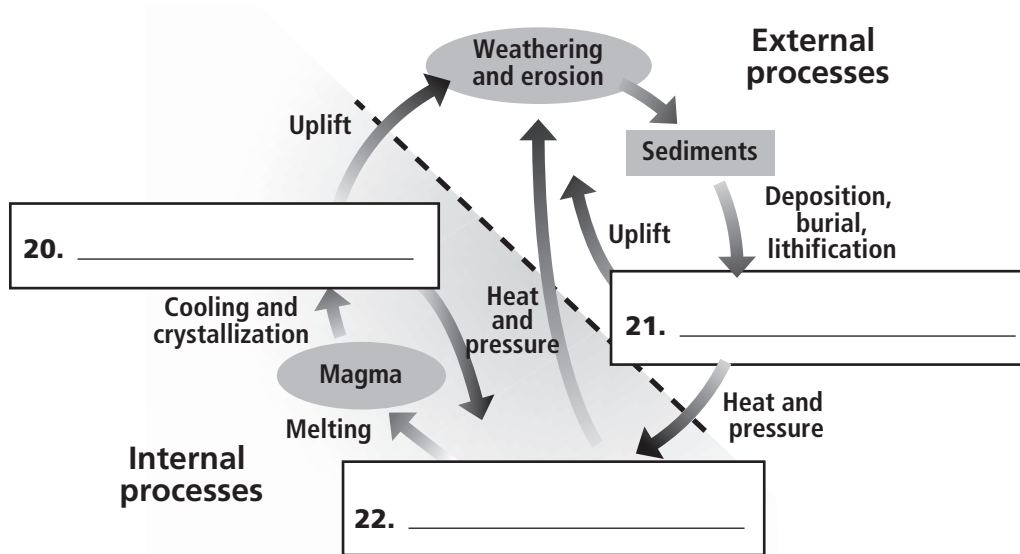
18. Porphyroblasts differ from the minerals surrounding them in terms of
 - a. size.
 - b. color.
 - c. axis of orientation.
 - d. shape.

19. Hot fluids migrating into and out of a rock during metamorphism can change the rock's
 - a. chemistry.
 - b. energy.
 - c. grade.
 - d. fossil content.

SECTION 6.3 *Metamorphic Rocks, continued*

In your textbook, read about the rock cycle.

Label each blank below as *igneous rocks*, *sedimentary rocks*, or *metamorphic rocks*.



Answer the following questions.

23. How are igneous rocks formed?

24. What happens to igneous rocks that undergo weathering and erosion?

25. How do sediments become sedimentary rock?

26. What forces cause sedimentary rocks to be transformed into metamorphic rocks?

27. How can metamorphic rock be transformed into igneous rock?

28. How can sandstone be transformed into sediment without becoming metamorphic or igneous rock first?
