
ROCKS!

- When you look closely, the sparkles you see are individual crystals of minerals. A **rock** is a mixture of minerals, rock fragments, volcanic glass, organic matter, or other natural materials

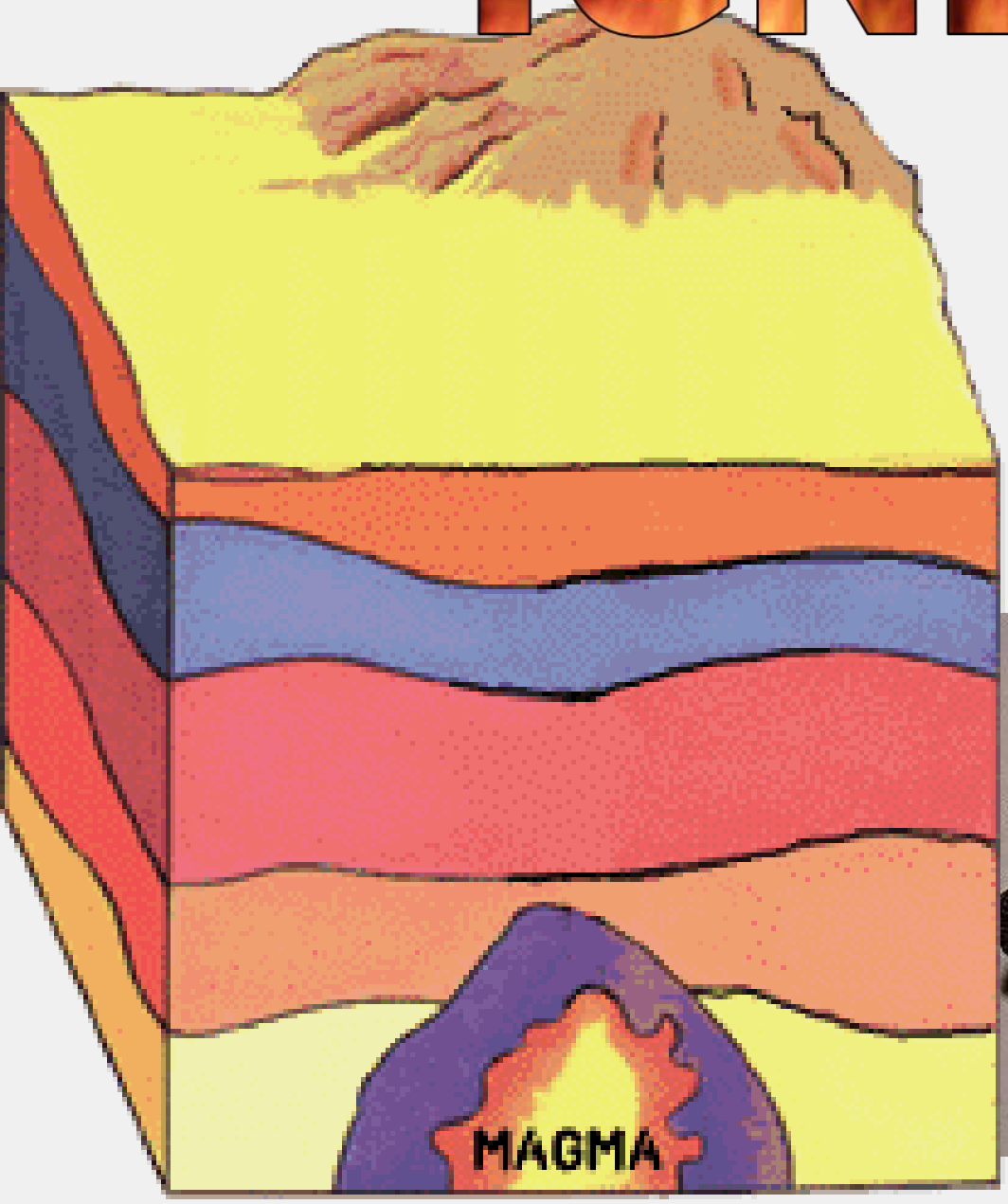
- THERE ARE
- 3 TYPES OF
- ROCKS

CHAPTER RESOURCES

END

type of rock	example	how it is made

•IGNEOUS



•IGNEOUS

•Forms from melted rock that has cooled & hardened

•Made from lava and magma.

2

Formation of Igneous Rocks

- When some volcanoes erupt, they eject a flow of molten rock material.
- Molten rock material, called magma, flows when it is hot and becomes solid when it cools.
- When hot magma cools and hardens, it forms **igneous** (IHG nee us) **rock**.

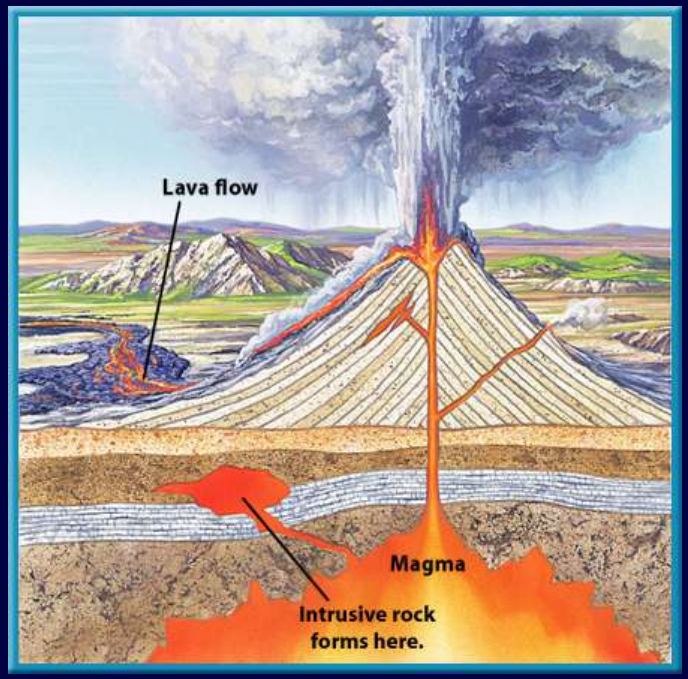
2

Magma

- Because magma is less dense than surrounding solid rock, it is forced upward toward the surface
- When magma reaches Earth's surface and flows from volcanoes, it is called **lava**.

2

Intrusive Rocks

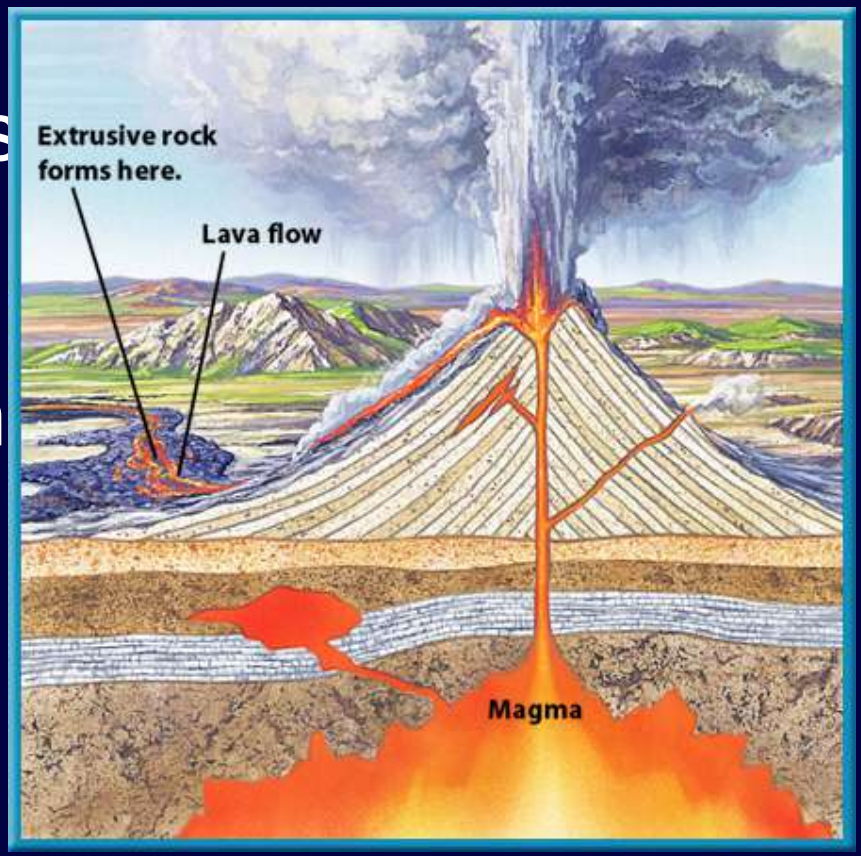


- Rocks that form from magma below the surface are called **intrusive** igneous rocks.

2

Extrusive Rocks

- **Extrusive** igneous rocks are formed as lava cools on the surface of Earth.
- When lava flows on the surface, it is exposed to air and water, and cools quickly under these conditions.



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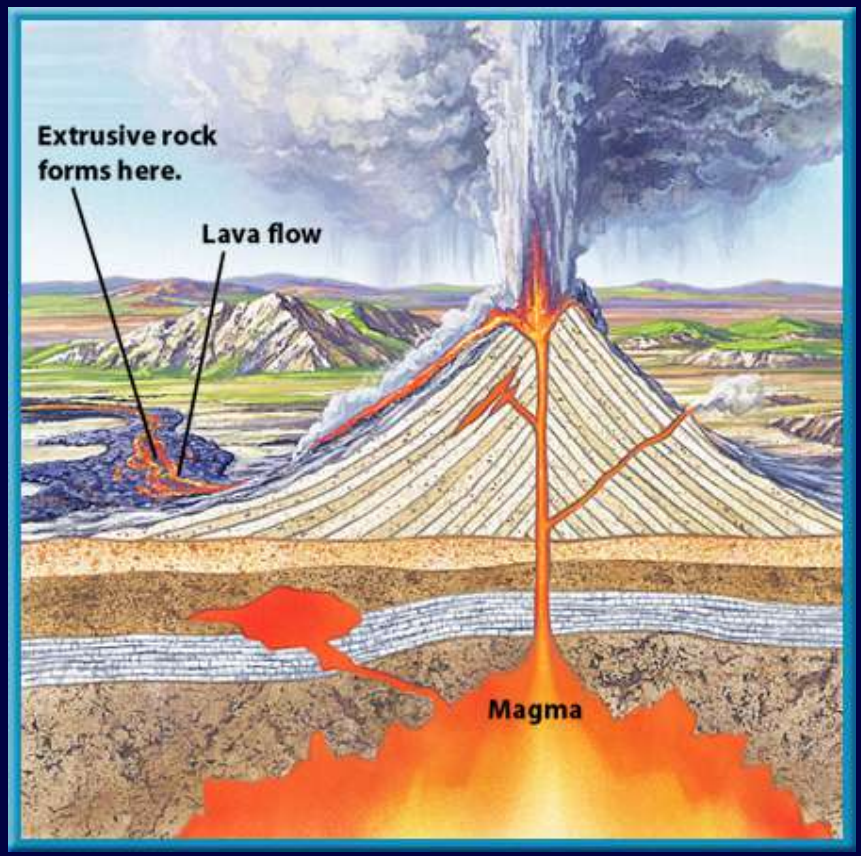
Extrusive Rocks

- The quick cooling rate keeps mineral grains from growing large, because the atoms in the liquid don't have the time to arrange into large crystals.



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Classifying Igneous Rocks

- Igneous rocks are intrusive or extrusive depending on how they are formed.
- A way to further classify these rocks is by the magma from which they form. An igneous rock can form from basaltic, andesitic, or granitic magma.

2

Classifying Igneous Rocks

- The type of magma that cools to form an igneous rock determines important chemical and physical properties of that rock.
- These include mineral composition, density, color, and melting temperature.

2

Basaltic Rocks

- **Basaltic** (buh SAWL tihk) igneous rocks are dense, dark-colored rocks.
- They form from magma that is rich in iron and magnesium and poor in silica, which is the compound SiO_2.
- The presence of iron and magnesium in minerals in basalt gives basalt its dark color.
- Basaltic lava is fluid and flows freely from volcanoes in Hawaii, such as Kilauea.

2

Granitic Rocks

- **Granitic** igneous rocks are light-colored rocks of lower density than basaltic rocks.
- Granitic magma is thick and stiff and contains lots of silica but lesser amounts of iron and magnesium.

2

Question 1

Igneous rock is formed by _____.

A. cooling of hot magma
B. change in pressure
C. compression of loose materials
D. pressure from watery fluids

2

Answer

The answer is A. If igneous rock is melted, it changes to magma.

2

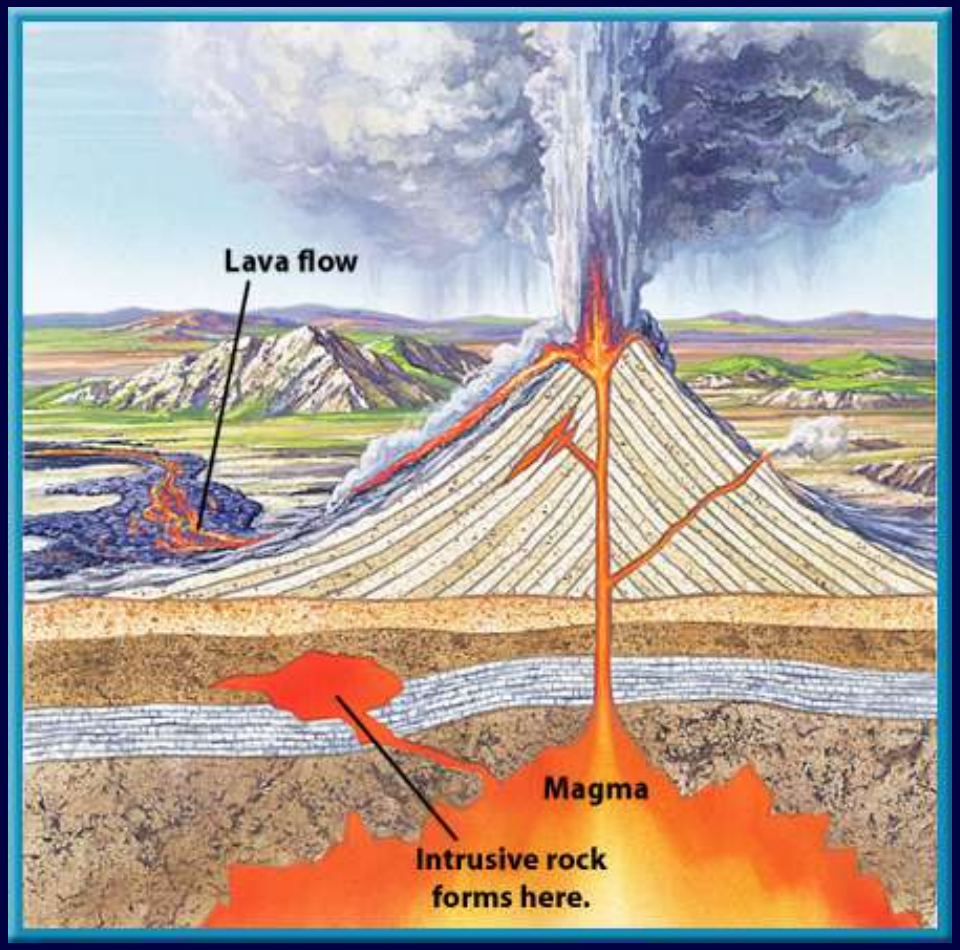
Question 2

What is the difference between intrusive and extrusive igneous rock?

2

Answer

Intrusive igneous rocks form from magma below Earth's surface. Extrusive igneous rocks form from lava flowing at Earth's surface.



2

Question 3

From which material would EXTRUSIVE igneous rocks form?

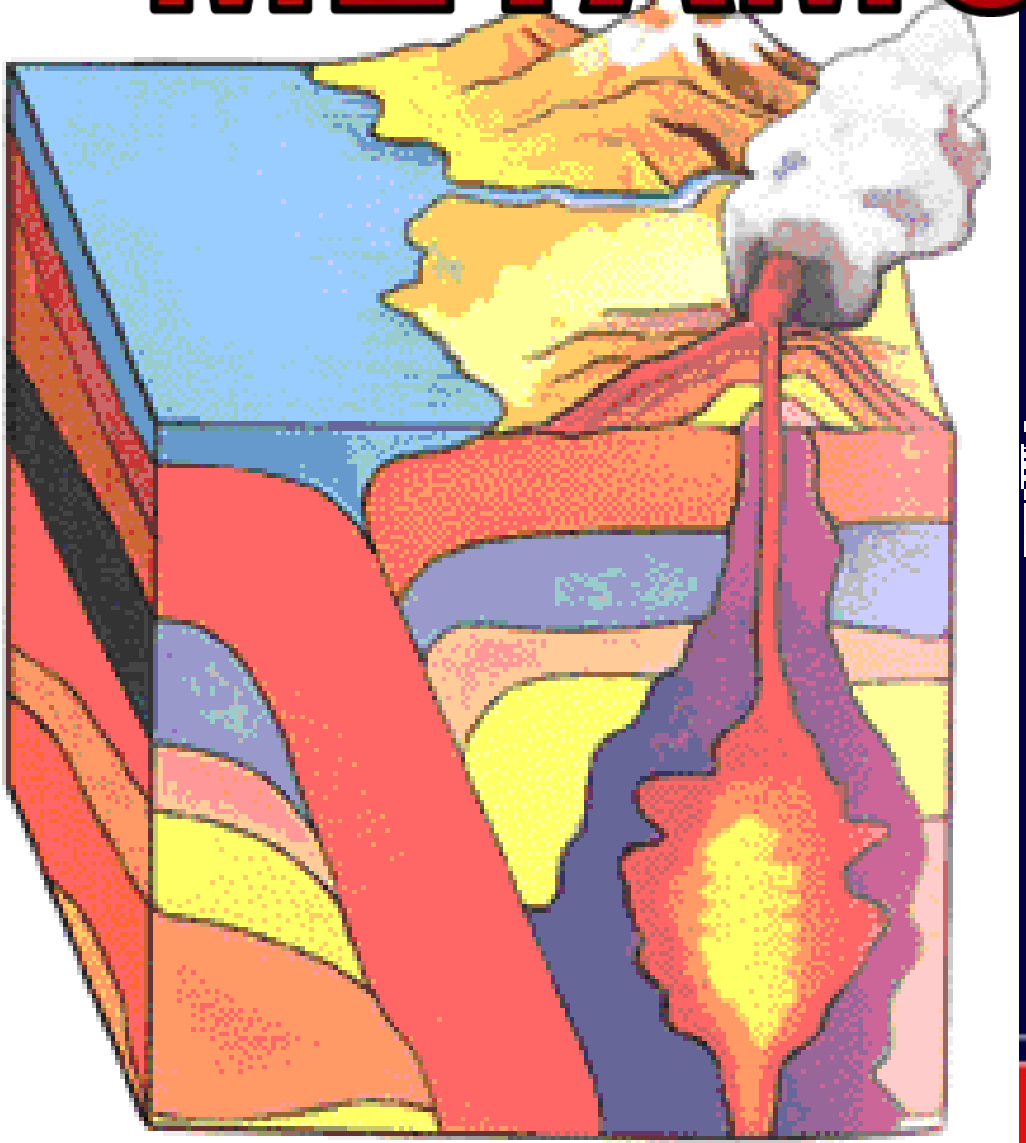
A. Dirt
B. Lava
C. Magma
D. Obsidian

2

Answer

The answer is B. Extrusive rocks form OUTSIDE of the volcano so therefor the hot molten rock would be lava.

METAMORPHIC



END

METAMORPHIC

- Rocks formed by heat and pressure.

CHAPTER

END

3

Formation of Metamorphic Rocks

- Rocks that have changed because of changes in temperature and pressure (heat & pressure) or the presence of hot watery fluids are called **metamorphic rocks**.

3

Heat and Pressure

- Rocks beneath Earth's surface are under great pressure from rock layers above them.
- Temperature also increases with depth in Earth.
- In some places, the heat and pressure are just right to cause rocks to melt and magma to form.
- In other areas where melting doesn't occur, some mineral grains can change by dissolving and recrystallizing—especially in the presence of fluids.

3

Classifying Metamorphic Rocks

- Metamorphic rocks form from igneous, sedimentary, or other metamorphic rocks.
- Heat, pressure, and hot fluids trigger the changes.
- Each resulting rock can be classified according to its composition and texture.

3

Foliated Rocks

- When mineral grains line up in parallel layers, the metamorphic rock is said to have a foliated texture.
- Two examples of foliated rocks are slate and gneiss.

Slate

- Slate forms from the sedimentary rock shale.

3

Nonfoliated Rocks

- In some metamorphic rocks, layering does not occur.
- The mineral grains grow and rearrange, but they don't form layers.
- This process produces a **nonfoliated** texture.

3

Question 1

What type of rocks can form from any type of rock?

A. igneous
B. sedimentary
C. metamorphic
D. All of the above

3

Answer

The answer is D. All rocks can take the form of another rock if given the proper conditions and time.

3

Question 2

Name the metamorphic rock texture in which mineral grains line up in parallel layers.

A. foliated
B. nonfoliated
C. sedimentary
D. volcanic

3

Answer

The answer is A. Slate is a foliated metamorphic rock formed from shale.

3

Question 3

Which of these processes do rocks need to go through to be changed into a metamorphic rock?

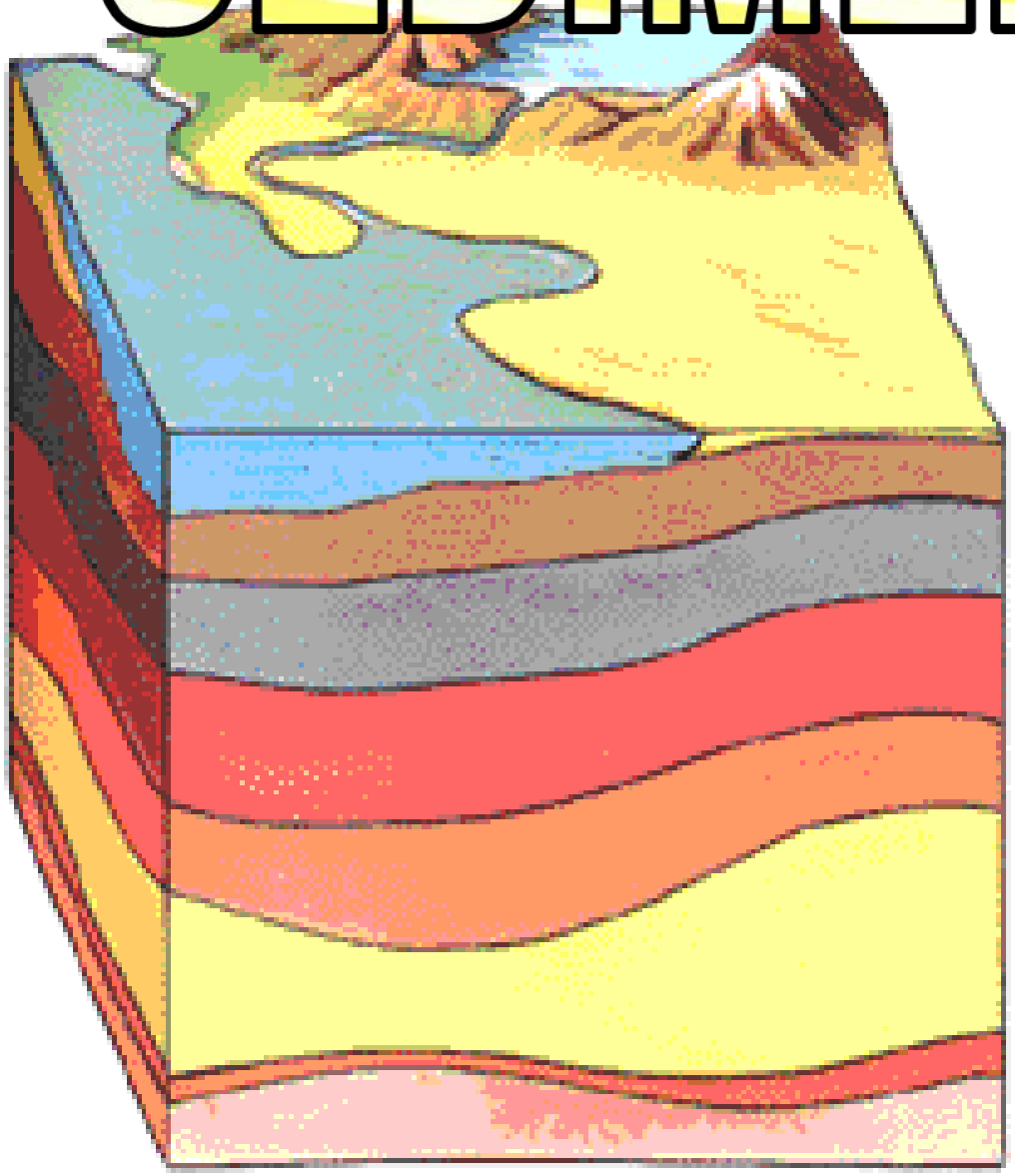
A. Heat & Density
B. Heat & Pressure
C. Heat
D. Pressure

3

Answer

The answer is B. A rock has to go through intense heat & pressure to be changed into a metamorphic rock.

SEDIMENTARY



END

SEDIMENTARY

- layers of sediment cemented and compacted together

- Caused by weathering and erosion.

4

Formation of Sedimentary Rocks

- **Sediments** are loose materials such as rock fragments, mineral grains, and bits of shell that have been moved by wind, water, ice, or gravity.
- Sediments come from already-existing rocks that are weathered and eroded.
- **Sedimentary rock** forms when sediments are pressed and cemented together, or when minerals form from solutions.

4

Weathering and Erosion

- When rock is exposed to air, water, or ice, it breaks down chemically and mechanically.
- This process, which breaks rocks into smaller pieces, is called weathering.
- These pieces are classified by size.
- The movement of weathered material is called erosion.

- SEDIMENTS
- ARE MADE BY:

- WEATHERING
- AND
- EROSION

WEATHERING

- to break down or break apart rock into smaller pieces

CHAPTER RESOURCES

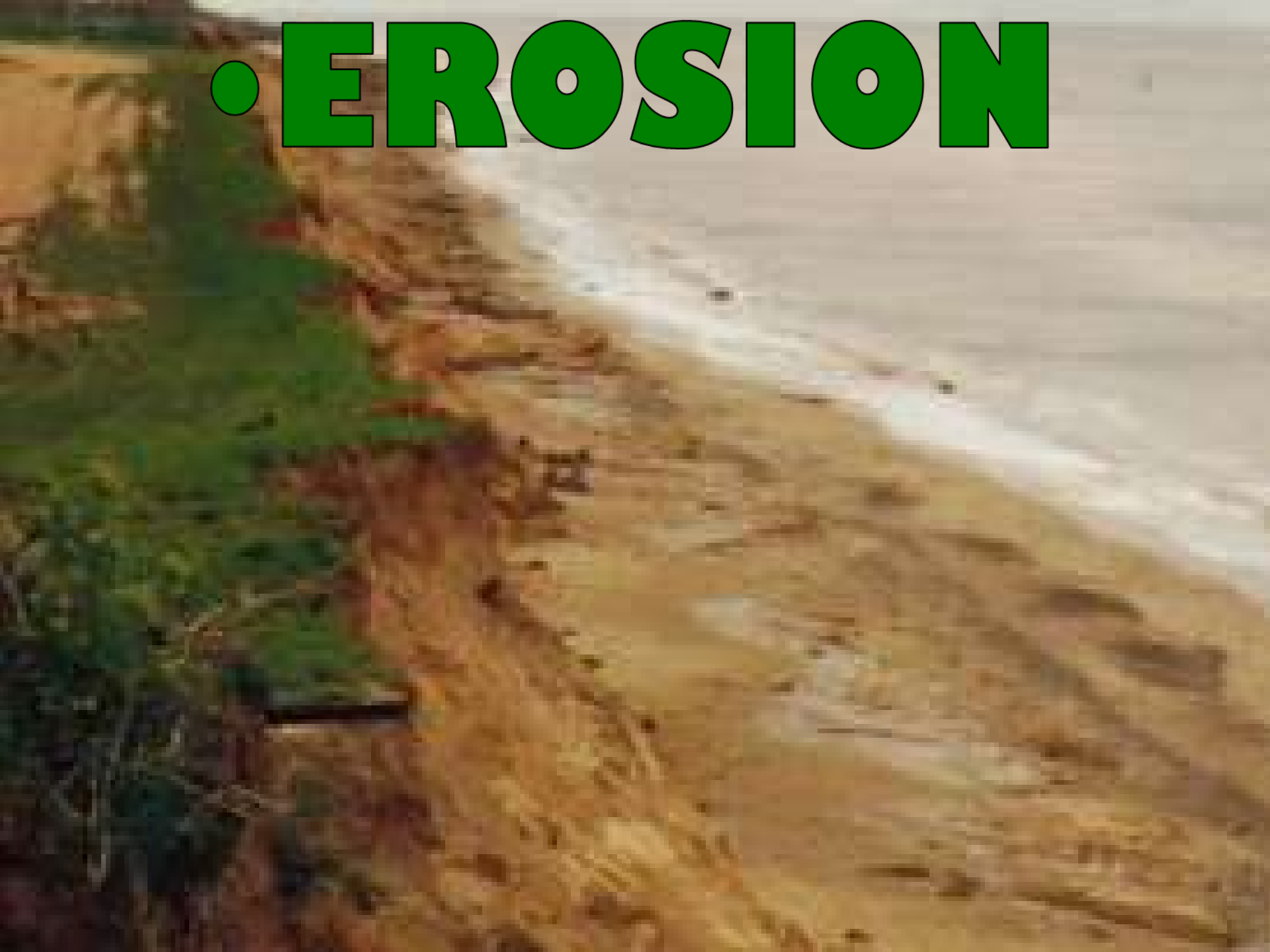
END

•WEATHERING


•WEATHERING

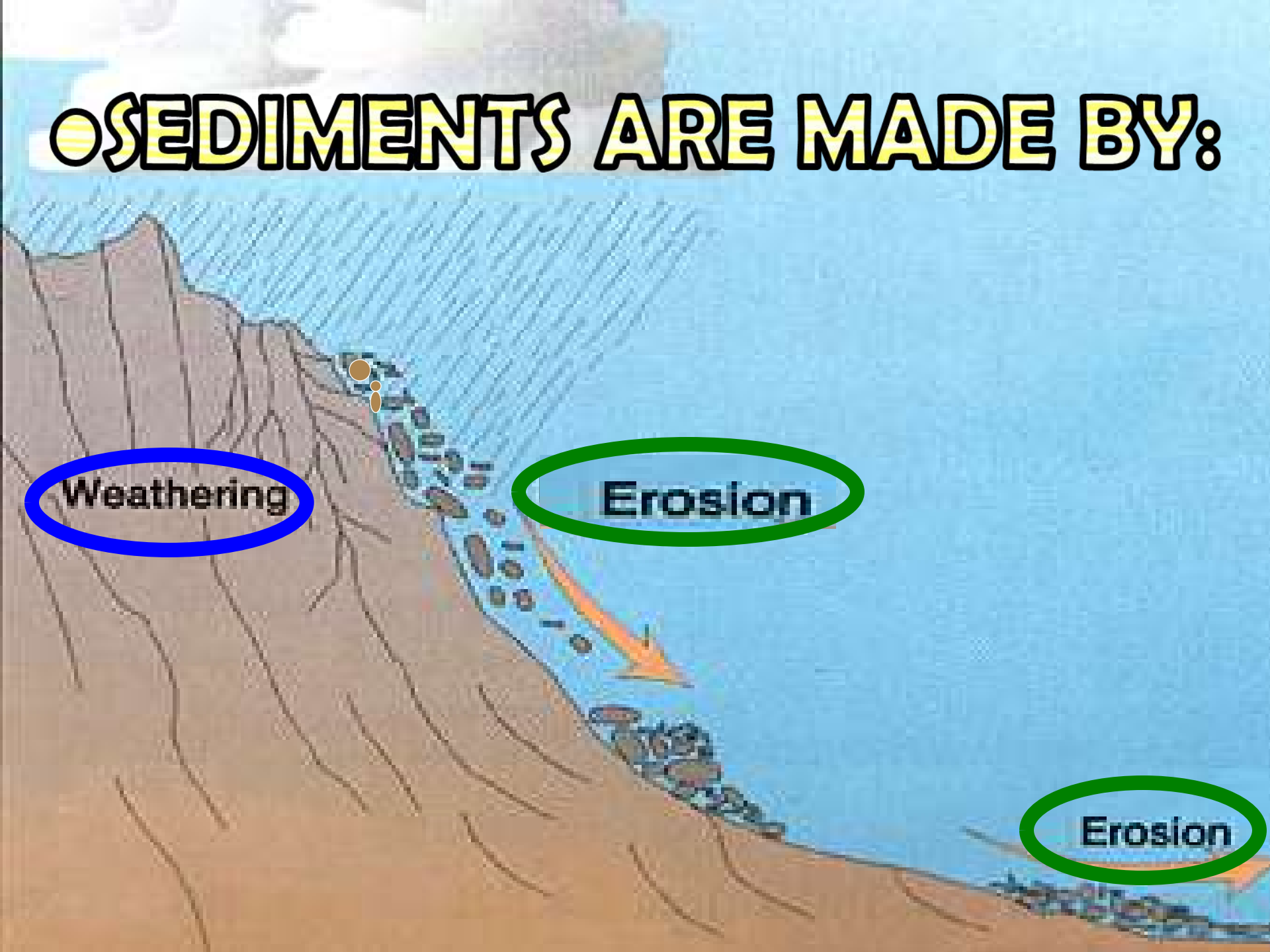
•EROSION

- to break down and carry away pieces of sediment


•EROSION


•EROSION

SEDIMENTS ARE MADE BY:



4

Compaction

- Where sediments are deposited, layer upon layer builds up.
- Pressure from the upper layers pushes down on the lower layers.
- If the sediments are small, they can stick together and form solid rock. This process is called **compaction**.

4

Cementation

- If sediments are large, like sand and pebbles, pressure alone can't make then stick together.
- Large sediments have to be cemented together.
- As water moves through soil and rock, it picks up materials released from minerals during weathering.
- The resulting solution of water and dissolved materials moves through open spaces between sediments.

4

Cementation

- **Cementation** occurs when minerals such as quartz, calcite, and hematite are deposited between the pieces of sediment.
- These minerals, acting as natural cements, hold the sediment together like glue, making a detrital sedimentary rock.

1

The Rock Cycle

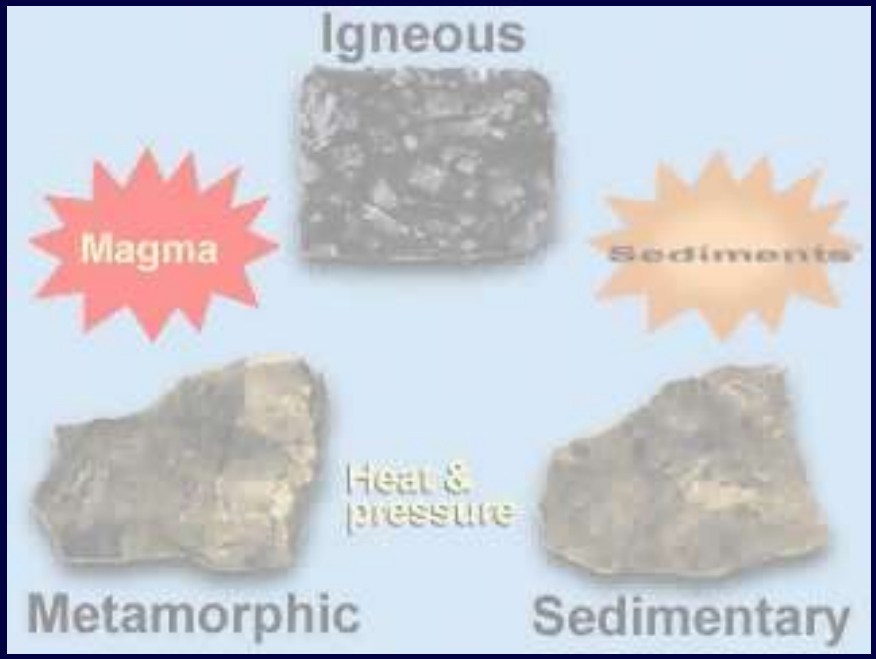
- To show how rocks slowly change through time, scientists have created a model called the rock

- It illustrates the processes that create and change rocks.

1

The Rock Cycle

- The rock cycle shows the three types of rock—igneous, metamorphic, and sedimentary—and the processes that form them.



Click image to view movie.

·IGNEOUS

·COOL ·MELT

·WEATHERING /CEMENTING

·METAMORPHIC

·HEAT / PRESSURE

·SEDIMENTARY

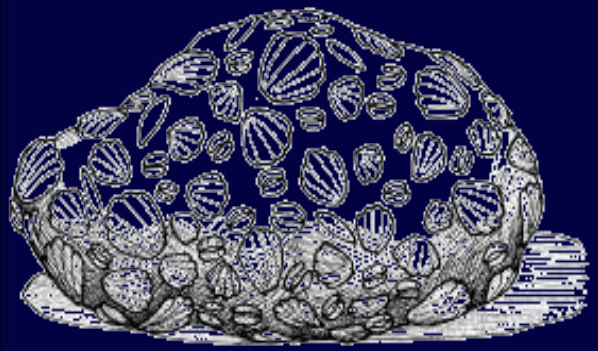
CHAPTER RESOURCES

END

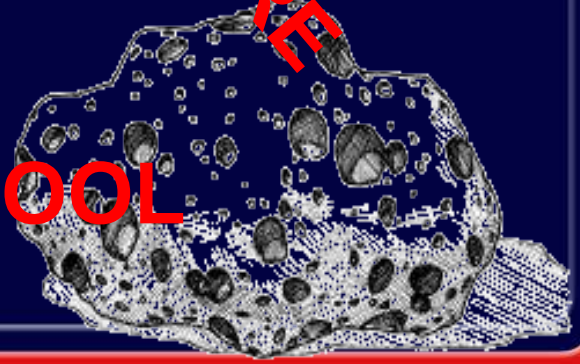
•METAMORPHIC

•HEAT AND PRESSURE

•WEATHERING/ CEMENTING



•MELT AND COOL



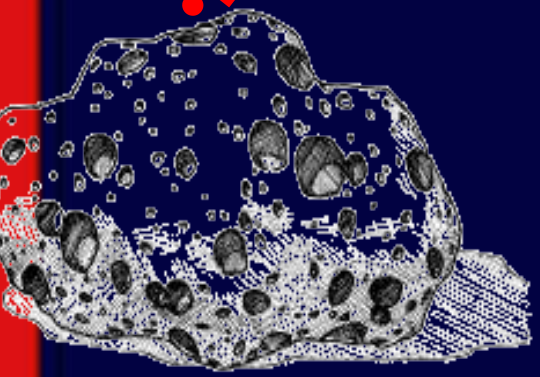
•SEDIMENTARY

•IGNEOUS

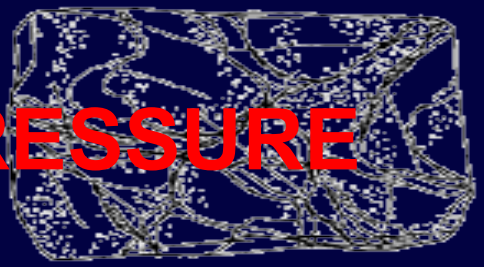
•SEDIMENTARY

•MELT AND COOL

•WEATHERING/ CEMENTING



•HEAT AND PRESSURE



•IGNEOUS

•METAMORPHIC

1

The Rock Cycle

- Rocks change by many processes.
- For example, a sedimentary rock can change by heat and pressure to form a metamorphic rock.
- The metamorphic rock then can melt and later cool to form an igneous rock.

1

The Rock Cycle

- The igneous rock then could be broken into fragments by weathering and erode away.
- The fragments might later compact and cement together to form another sedimentary rock. Any given rock can change into any of the three major rock types. A rock even can transform into another rock of the same type.

1

Matter and the Rock Cycle

- The rock cycle shows how rock can be weathered to small rock and mineral grains.
- This material then can be eroded and carried away by wind, water, or ice.
- This illustrates the principle of conservation of matter.
- The changes that take place in the rock cycle never destroy or create matter.
- The elements are just redistributed in other forms.

1

Question 1

Which of these is a rock?

A. feldspar
B. granite
C. mica
D. quartz

1

Answer

The answer is B. Rocks are mixtures of minerals. Granite is a mixture of feldspar, mica, quartz and other minerals.

1

Question 2

Weathering and erosion of igneous rocks produces material that can become _____ rock.

A. magma
B. metamorphic
C. more igneous
D. sedimentary

1

Answer

The answer is D. Sediments from the weathering of igneous rock form sedimentary rock through compaction and cementation.

1

Question 3

Which is formed by cooling magma?

A. garnet
B. igneous
C. metamorphic
D. sedimentary

1

Answer

The answer is B. Igneous rock is formed from cooling magma. Garnet is a mineral found in multiple rock types.