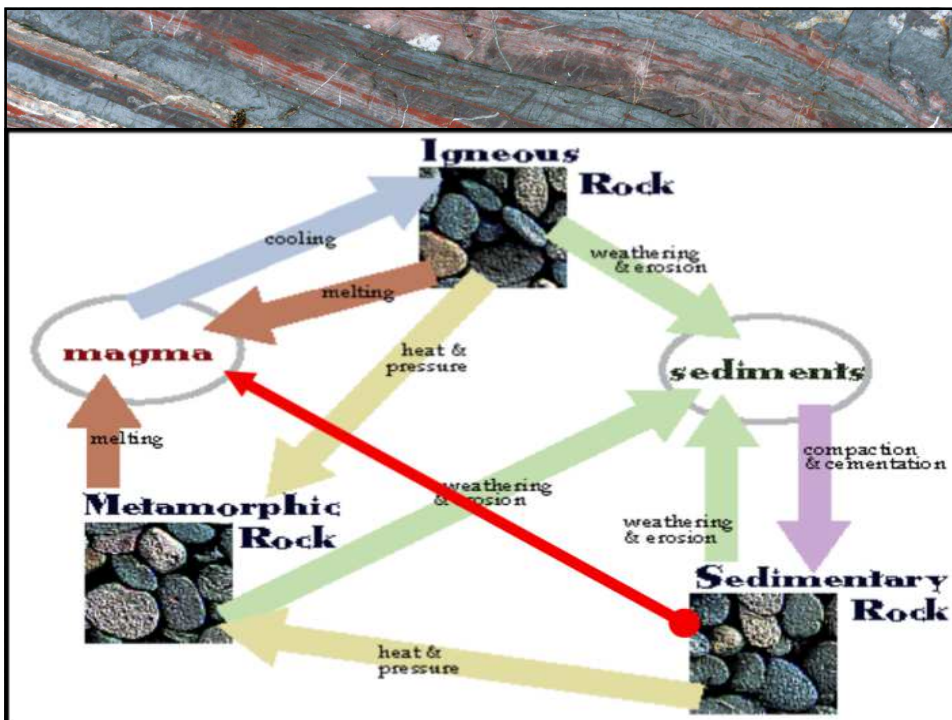
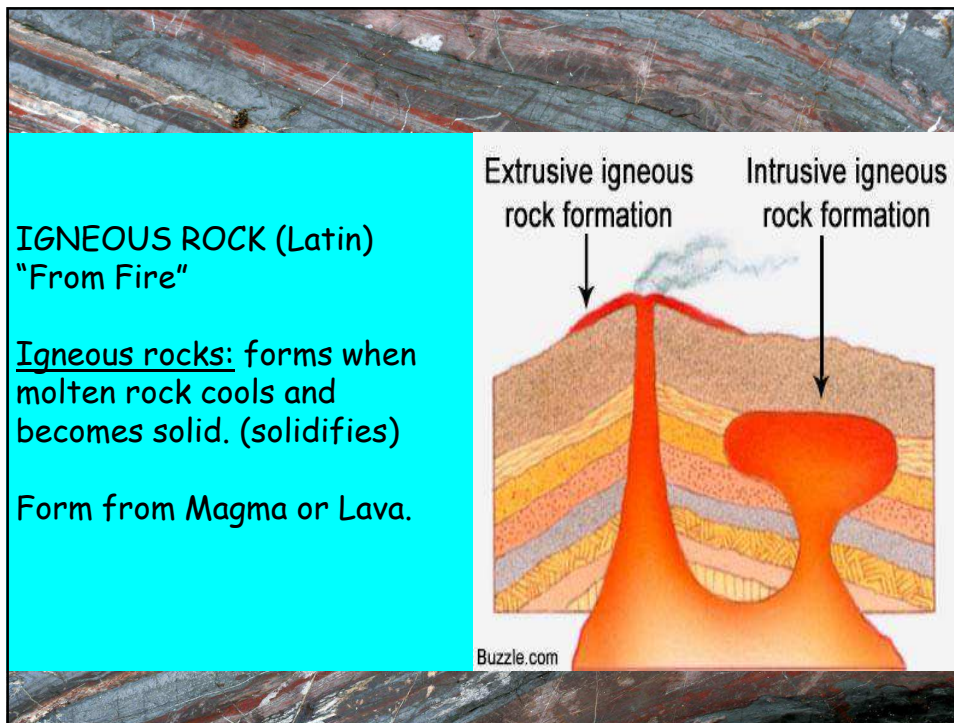


Rock- is a naturally formed solid that is usually made up of one or more types of minerals.

Three types of rocks:

1. Igneous
2. Sedimentary
3. Metamorphic

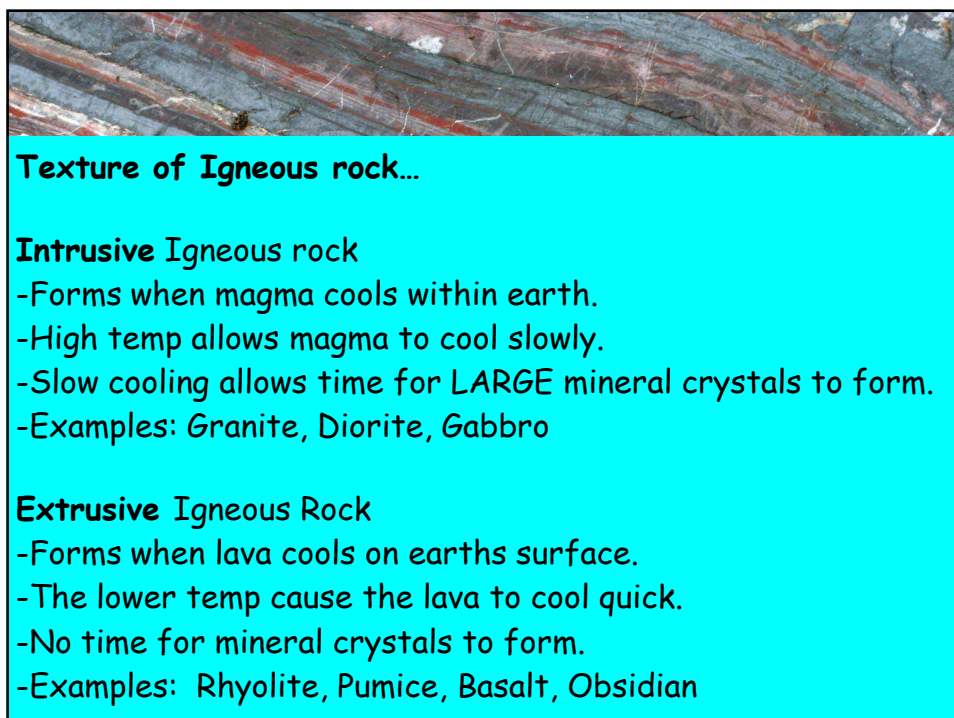




IGNEOUS ROCK (Latin)
"From Fire"

Igneous rocks: forms when molten rock cools and becomes solid. (solidifies)

Form from Magma or Lava.



Texture of Igneous rock...

Intrusive Igneous rock

- Forms when magma cools within earth.
- High temp allows magma to cool slowly.
- Slow cooling allows time for **LARGE** mineral crystals to form.
- Examples: Granite, Diorite, Gabbro

Extrusive Igneous Rock

- Forms when lava cools on earth's surface.
- The lower temp cause the lava to cool quick.
- No time for mineral crystals to form.
- Examples: Rhyolite, Pumice, Basalt, Obsidian

Which picture intrusive and extrusive rock?
How do you know?
How could this be?


Extrusive igneous rock formation Intrusive igneous rock formation

Buzzle.com

Intrusive
Granite

Extrusive
Basalt

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Composition of Igneous Rock

SILICA- a compound of silicon and oxygen. SiO_2


Felsic Magma - Thick magma, high in SILICA.
 -Contains very little calcium, iron or magnesium.
 -Typically LIGHTER in color and less dense.

Mafic Magma - Thin magma, low in SILICA.
 -Contains lots of iron, calcium and magnesium.
 -Typically DARKER in color and denser.




Sedimentary Rock- rocks that form when sediments become pressed or cemented together or when sediments precipitate out of solution.

Sediments- Materials that settle out of water or air. These can be loose pieces of rock, minerals, plant and animal remains.



Conglomerate



How do they form?

- From rock particles cementing together:
 - Gravel, Sand, Silt/Clay

Examples:

Sorting Sediments by Size

Fast-moving water can move large particles of sediment. As the water slows, the sediment particles settle from it by size.

1 Water in a lake usually moves fastest near the shore or where a river enters. In deeper areas, water moves slower.

2 Gravel settles near the shore. Rock containing large sediment particles, such as gravel, is known as conglomerate.

3 Sand is carried farther from shore. Rock that forms from sand-sized particles is known as sandstone.

4 Silt and clay are carried into deep water. Rock that forms from silt- and clay-sized particles is known as shale.

READING VISUALS Is shale more likely to form near the shore or near the middle of a big lake or ocean?

Four common steps in this formation:

1. WEATHERING AND EROSION: Break it apart.
2. TRANSPORTATION: Move it along.
3. DEPOSITION: Stop moving man.
4. COMPACTION AND CEMENTATION: Squeeze and glue it.


Weathering and Erosion

Transport

Deposition

Burial, Compaction, and Lithification


● From plants or shells cementing together:
Examples:
 -Coal, Limestone. **FOSSILS** found in these commonly.




1 The shells get cemented together into limestone as some of their minerals dissolve and re-form.

2 Individual shells become harder to see as minerals in the limestone continue to dissolve and re-form.

3 Over time, what was once loose sediment becomes limestone with no recognizable shells.




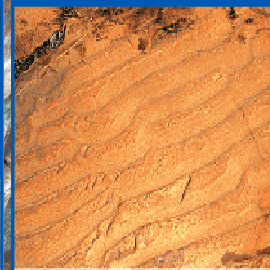

The dark layer in these rocks is coal.



Here, you can see fossils of ancient plants preserved in coal.

Sedimentary rocks show the action of wind and water. They tell us the story about past environments.

Example: Cross Beds- Wind or water movement.
Ripple Marks- Water movement commonly.
Mud Cracks- Dried up lake bed.

Crossbeds	Ripples	Mud Cracks
		
<p>The tilted layers in these sandstone rocks are called crossbeds. The layers were once moving sand dunes.</p>	<p>The surface of this sand stone preserves ancient sand ripples.</p>	<p>As wet silt and clay dry out, cracks develop on the surface of the sediment.</p>

Metamorphic Rock

Metamorphism- Process by which existing rock is changed by heat/pressure or both!

The beginning rock can be:

- Igneous
- Sedimentary
- Metamorphic

How Rocks Change

Because pressure and temperature increase with depth, rocks change when they are buried deeper in the crust.

- 1 Shale is a sedimentary rock that forms near the surface. It can be buried deeper as blocks of the crust push together.
- 2 Shale changes to **slate** as pressure causes the minerals to line up in layers. Mica starts to grow as recrystallization begins.
- 3 Slate changes to **phyllite** (FHL-r) deeper in the crust, where the temperature and pressure are higher. Phyllite is shiny because more mica has grown.
- 4 At even higher temperature and pressure, phyllite changes to **schist**. As recrystallization increases, completely new types of minerals replace older ones.
- 5 Deep within the crust, schist changes to **gneiss** (rys). During recrystallization, light and dark minerals separate into bands. Changes are so great that all traces of the original shale are gone.

Recrystallization- Pressure and heat breaking atoms bonds and minerals recrystallize.


Metamorphic changes occur in different areas.

- **Contact Metamorphism**- Small areas.
 - Cause Magma
- **Regional Metamorphism**- Large areas.
 - Cause Plate

Contact Metamorphism

Shale	
Slate	
Shale	
Limestone	Marble
Quartz Sandstone	Quartzite
Shale	Hornfels



Magma



Metamorphic Rocks develop bands of minerals.
Foliation- arrangement of minerals in flat or wavy bands.

Foliated Rocks: when mineral grains line-up in parallel bands it is said that it has a "foliated texture".

Examples:
 slate, phyllite, schist and gneiss


Non-Foliated Metamorphic Rocks: a metamorphic rock where no banding occurred. The grains change, grow, and rearrange but don't form bands.

Examples: quartzite, marble

(Sandstone = quartzite)
 (Limestone = marble)