



IQRA NATIONAL UNIVERSITY

ENGINEERING GEOLOGY

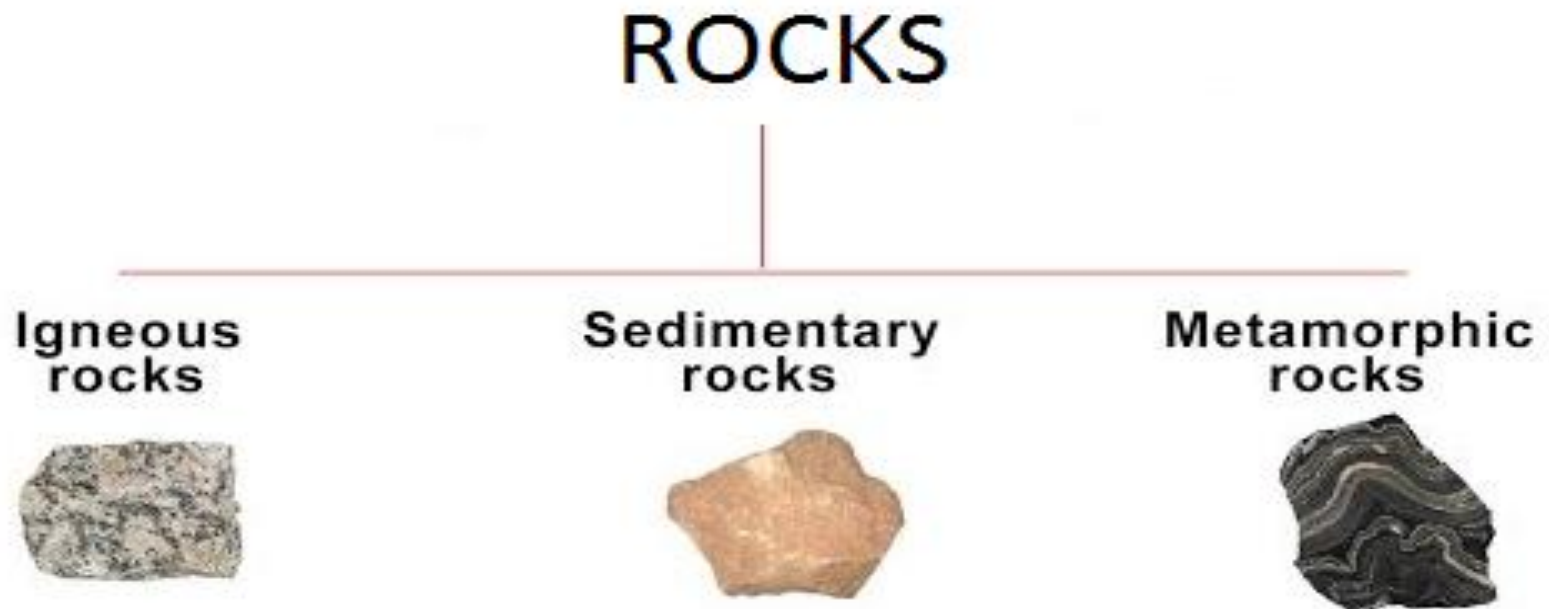
Lecture 03

Classification of Rocks, Rock Cycle

PREPARED BY ENGR. IMTIAZ KHAN LECTURER CED ,INU PESH

ROCKS

Rocks are classified into three categories;



What is igneous rock?

Igneous – fire

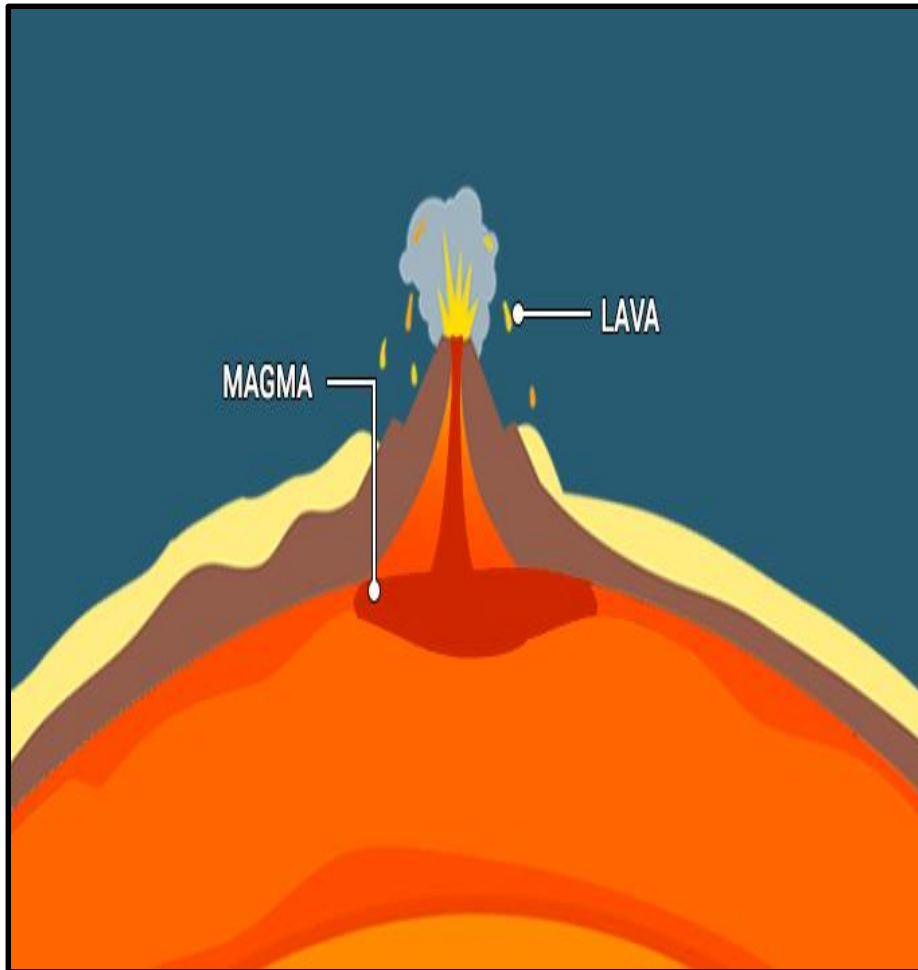
Rock Resulting or produced from fire.

Igneous rocks are formed through the cooling and solidification of magma (or lava).

MAGMA : Melted material inside earth crust.

LAVA : Magma erupt to the surface of earth.

MAGMA & LAVA



Igneous rock

Classified in two categories;

INTRUSIVE

EXTRUSIVE

INTRUSIVE ROCKS

Intrusive rocks form from magma underground, often relatively deep in the Earth.

Cools slowly

Large crystal forms

INTRUSIVE ROCKS

Any crystal bigger than 1mm signify that the rock is intrusive

INTRUSIVE = BIG CRYSTALS



granite

INTRUSIVE = BIG CRYSTALS



pegmatite

EXTRUSIVE ROCKS

Extrusive rocks form from lava at the surface of the Earth.

Fast cooling (in contact with air)

Small or no crystals

May be vesicular (air bubbles)

EXTRUSIVE ROCKS

EXTRUSIVE = SMALL/NO CRYSTALS



Basalt

EXTRUSIVE = SMALL/NO CRYSTALS



obsidian

EXTRUSIVE ROCKS

EXTRUSIVE = MAY BE VESICULAR



scoria

SEDIMENTARY ROCKS

Sediments are fragments of rocks that are broken down as a result of weathering (wind , water, ice , gravity etc)

Sedimentary rocks are types of rock that are formed by the accumulation or deposition of small particles and subsequent cementation of mineral or organic particles on the floor of oceans or other bodies of water at the Earth's surface.

SEDIMENTS ARE CLASSIFIED ACCORDING TO THEIR SIZE.



CLAY



SILT



SAND



PEBBLE



COBBLE



BOULDER

TYPES OF SEDIMENTARY ROCKS

CLASTIC SEDIMENTARY ROCKS






ORGANIC /CRYSTALLINE SEDIMENTARY ROCKS

CLASTIC SEDIMENTARY ROCKS

Compacted sediments

Classified by size

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	

CLASTIC SEDIMENTARY ROCKS

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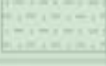



Conglomerate

CLASTIC SEDIMENTARY ROCKS

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Breccia

CLASTIC SEDIMENTARY ROCKS



Sandstone



siltstone



shale

ORGANIC /CRYSTALLINE SEDIMENTARY ROCKS

Evaporates & Precipitates

Biological matter

ORGANIC /CRYSTALLINE SEDIMENTARY ROCKS



- forms from sea water.
- H₂O evaporates salt stay behind in form of crystals.
- Those crystals is actually the rock salt

**Crystalline:
Evaporites and
Precipitates**



ORGANIC /CRYSTALLINE SEDIMENTARY ROCKS



coal

**Bioclastic:
Compacted
Organic matter**



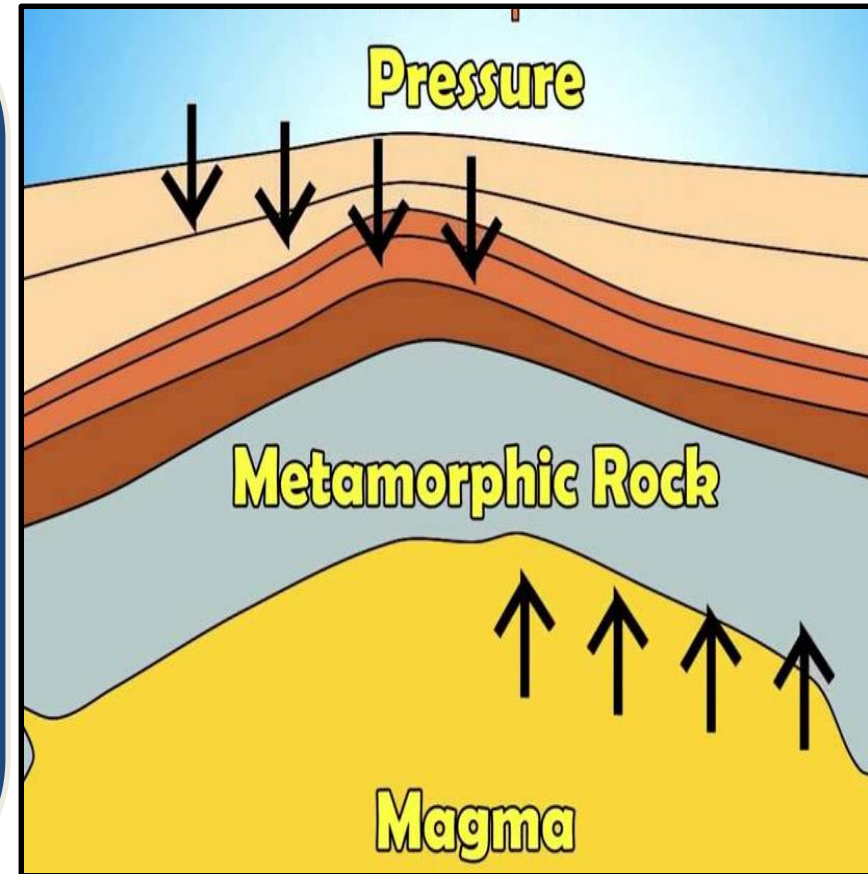
coquina stone

Sedimentary rocks are the only type of rocks that may contain fossils, or evidence of past life.



METAMORPHIC ROCKS

Metamorphic rocks arise from the transformation of existing rock types, in a process called metamorphism, which means "change in form". The original rock is subjected to heat and pressure, causing profound physical or chemical change. The protolith may be a sedimentary, igneous, or existing metamorphic rock.



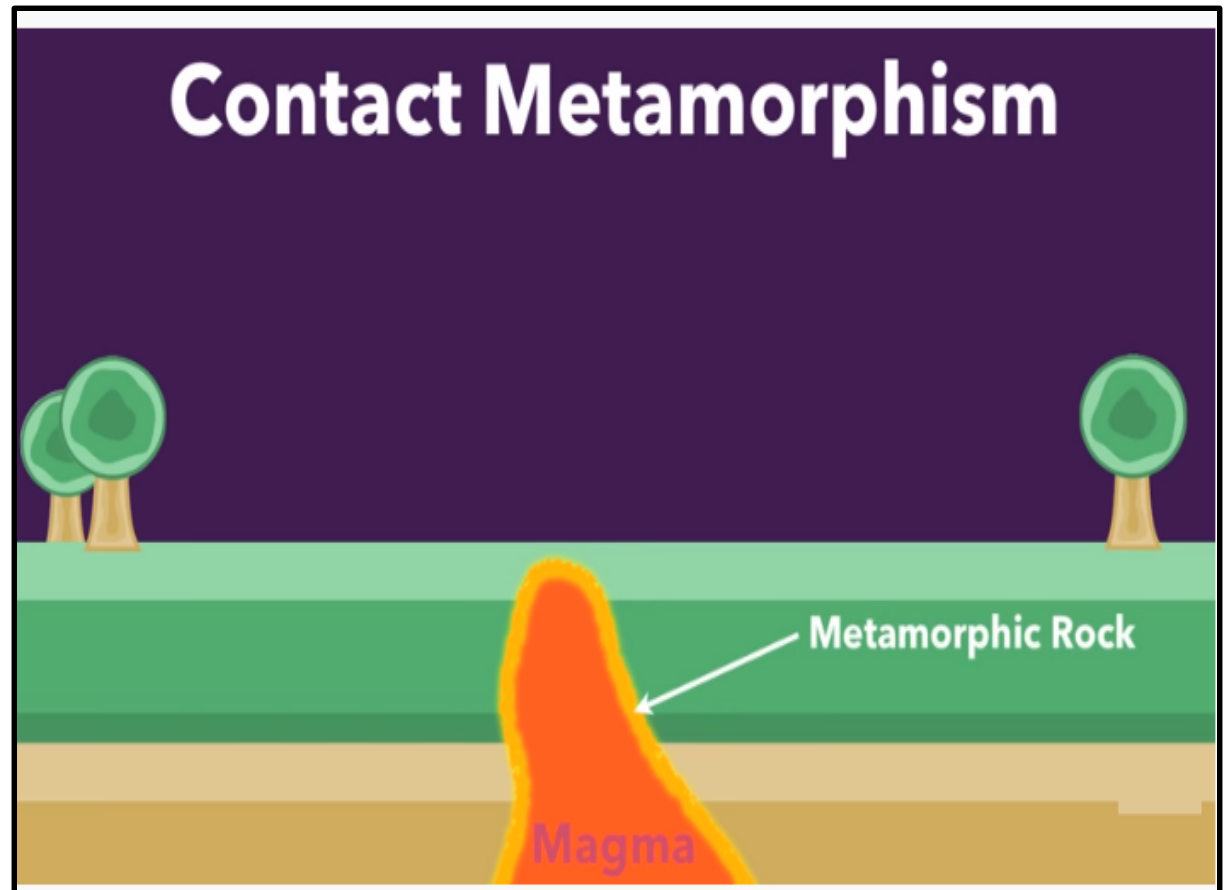
Types of AMETAMORPHIC ROCKS

Contact metamorphism

Regional metamorphism

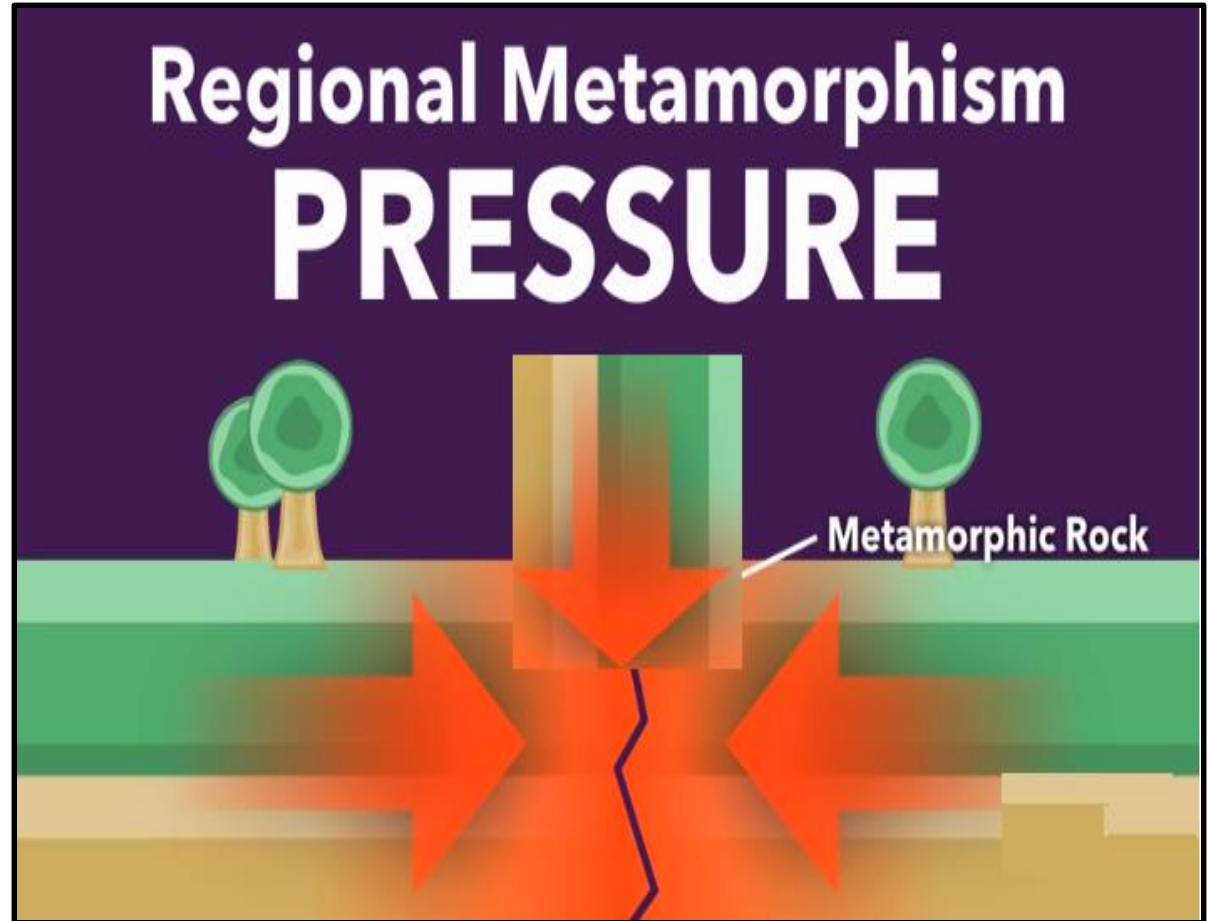
CONTACT METAMORPHISM

Rock formed due to heat.

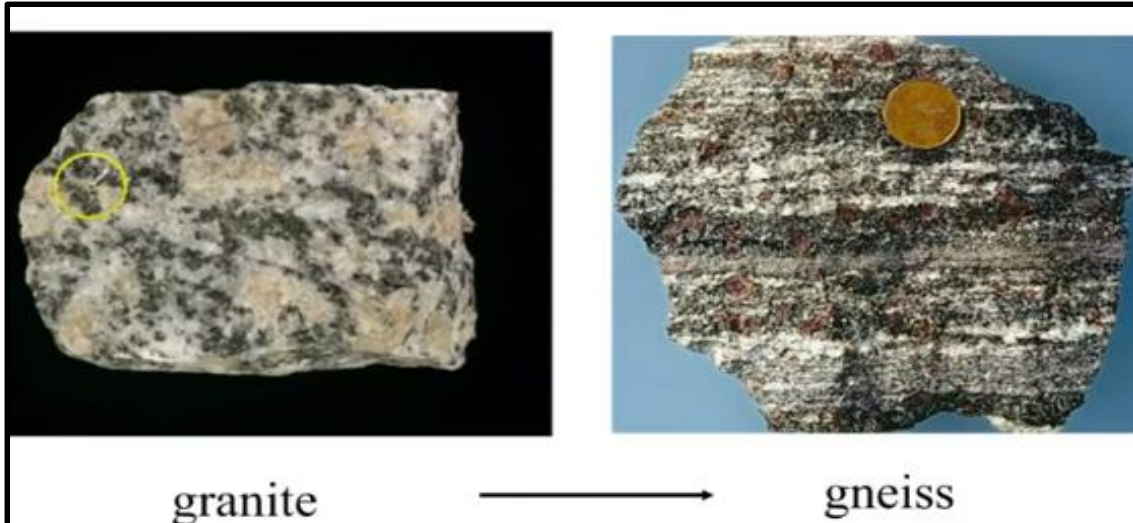


REGIONAL METAMORPHISM

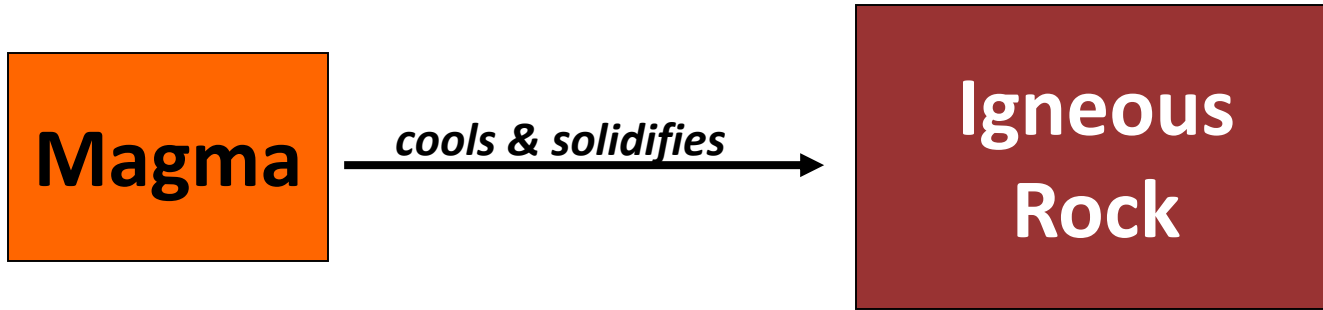
due to



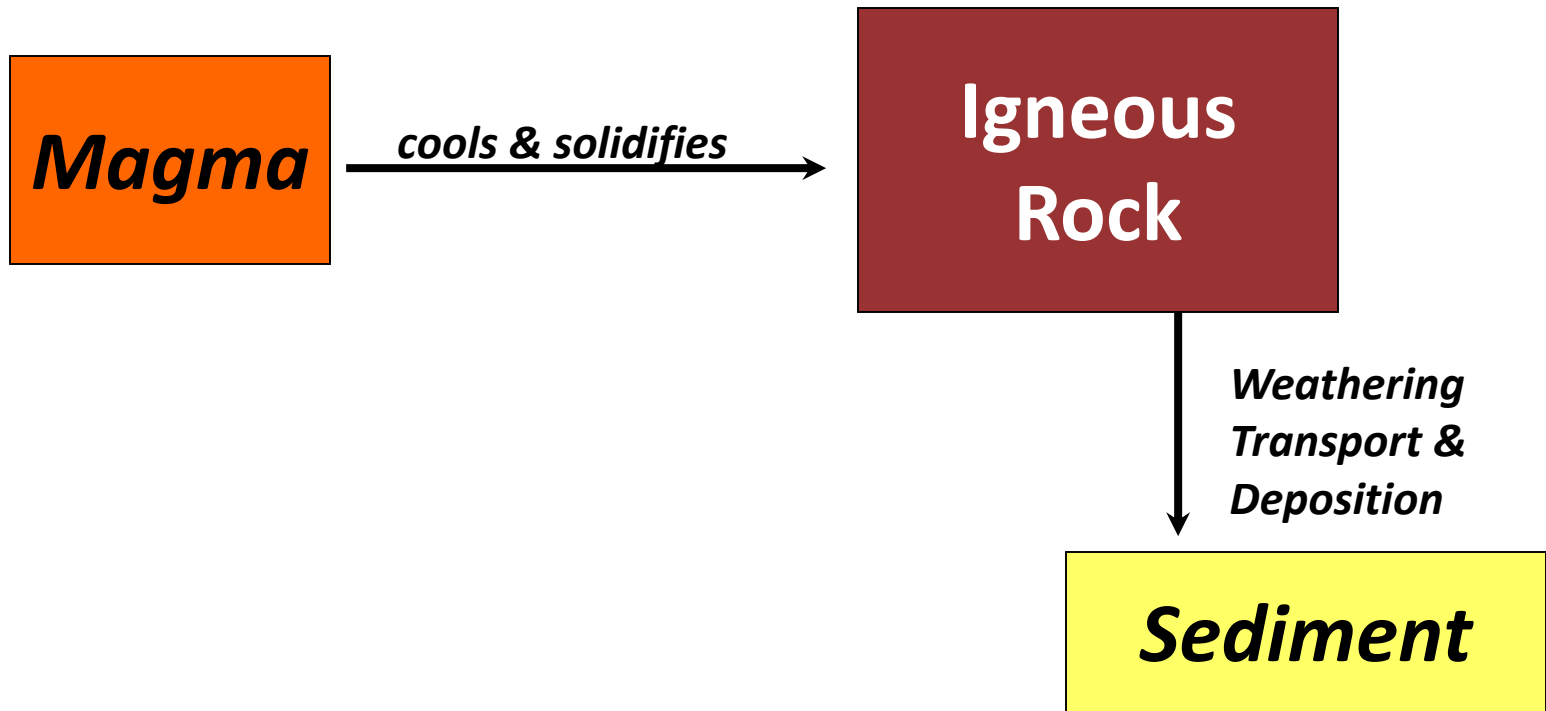
METAMORPHIC ROCKS EXAMPLES



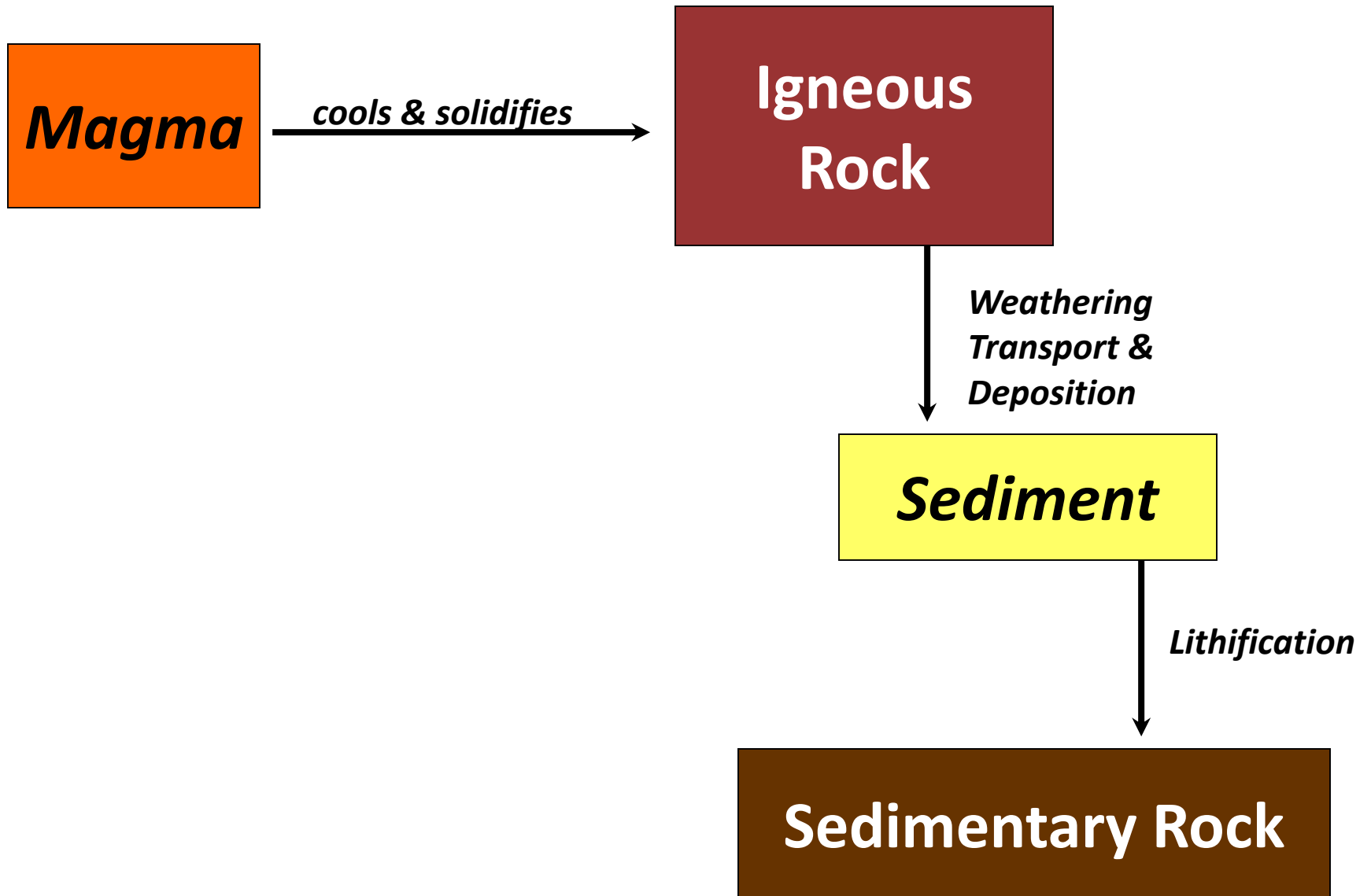
The Rock Cycle



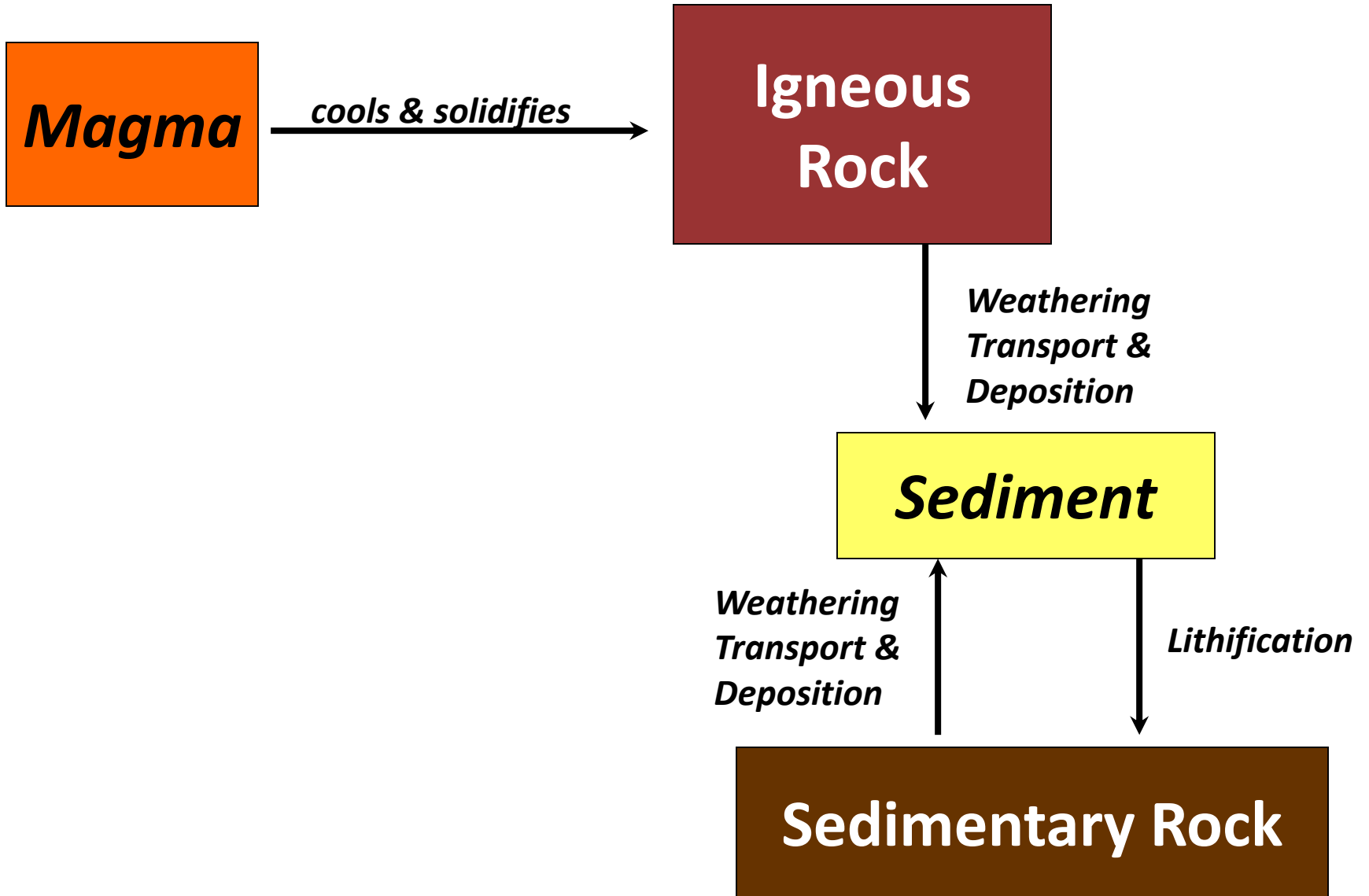
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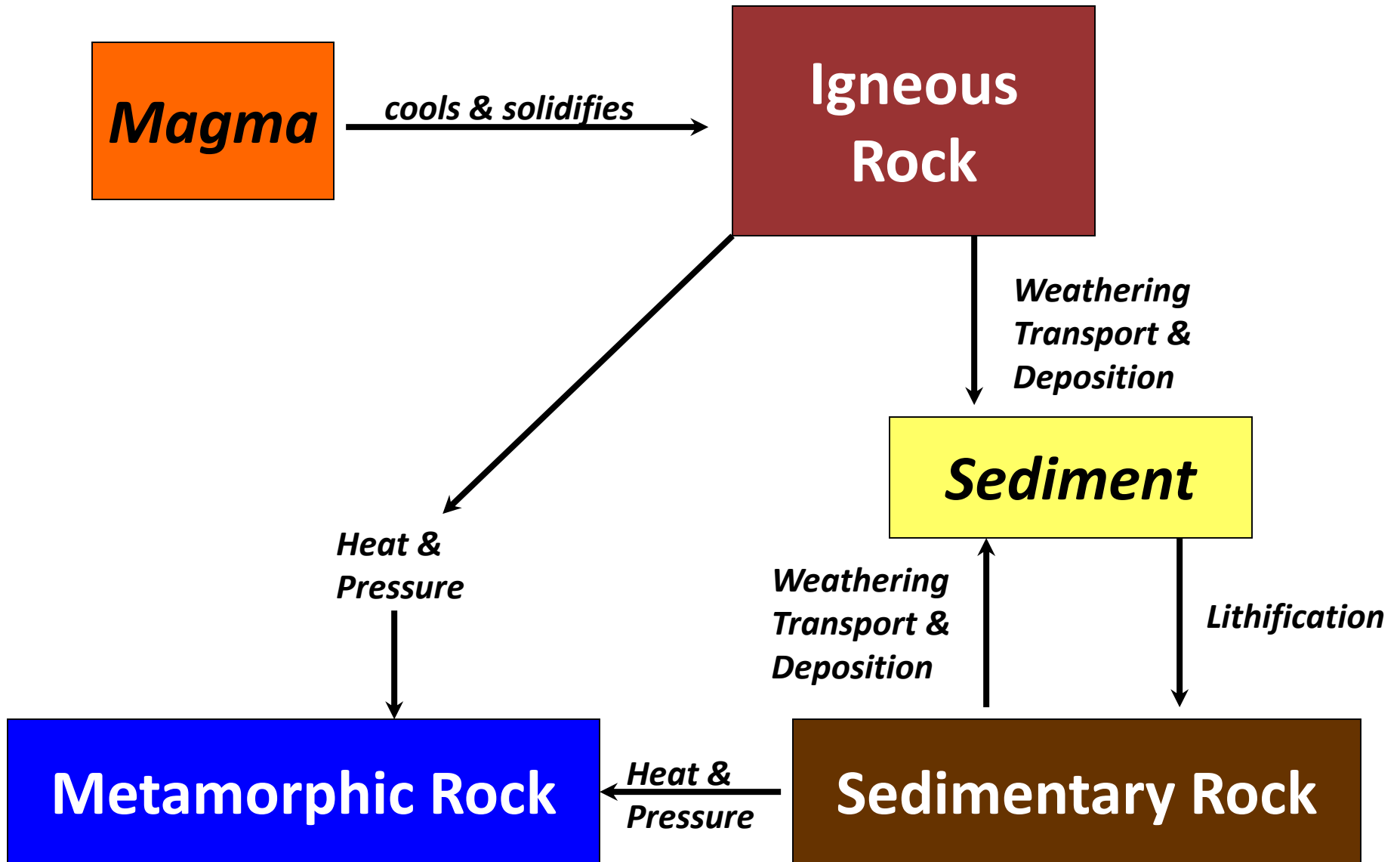
The Rock Cycle



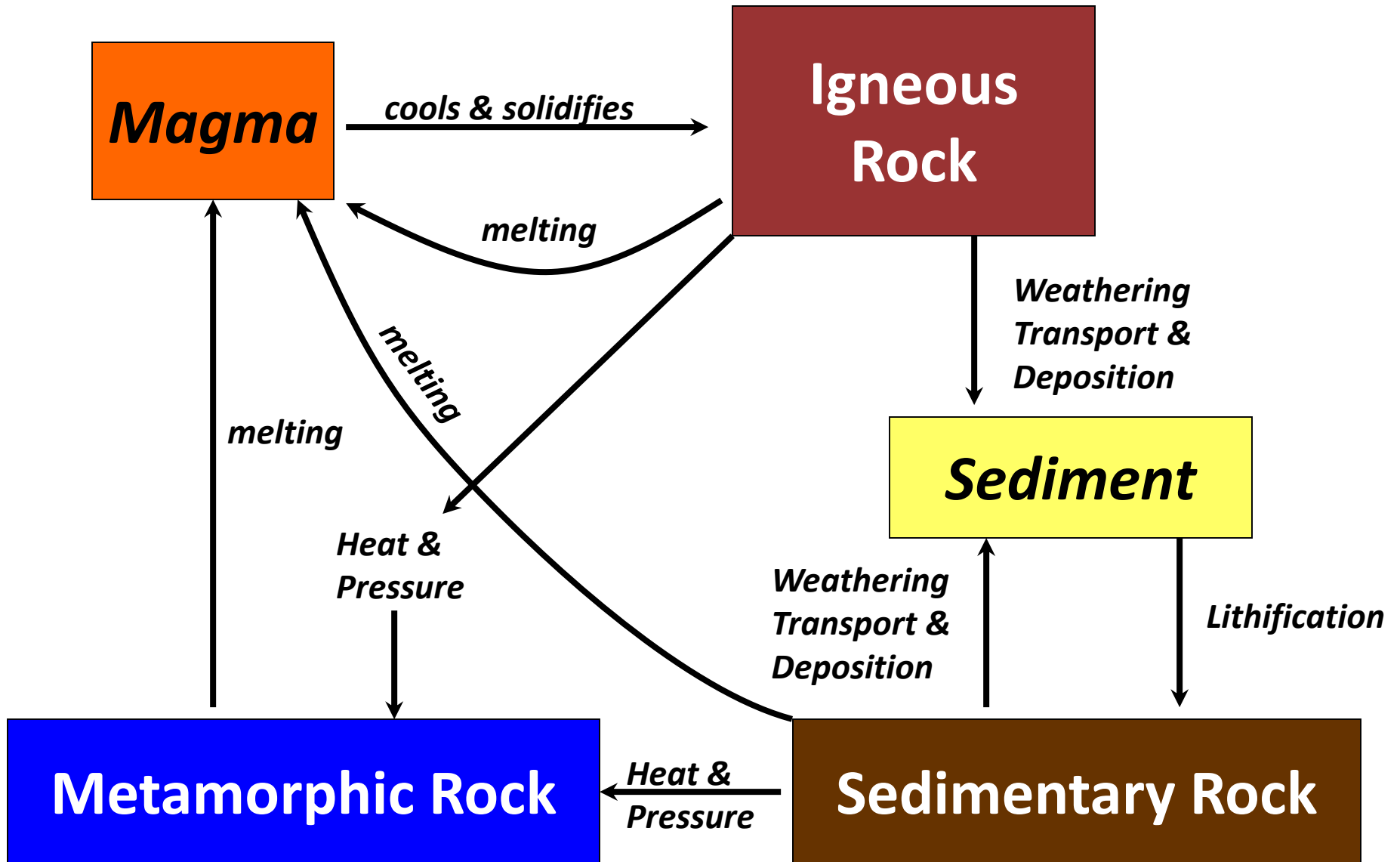
The Rock Cycle



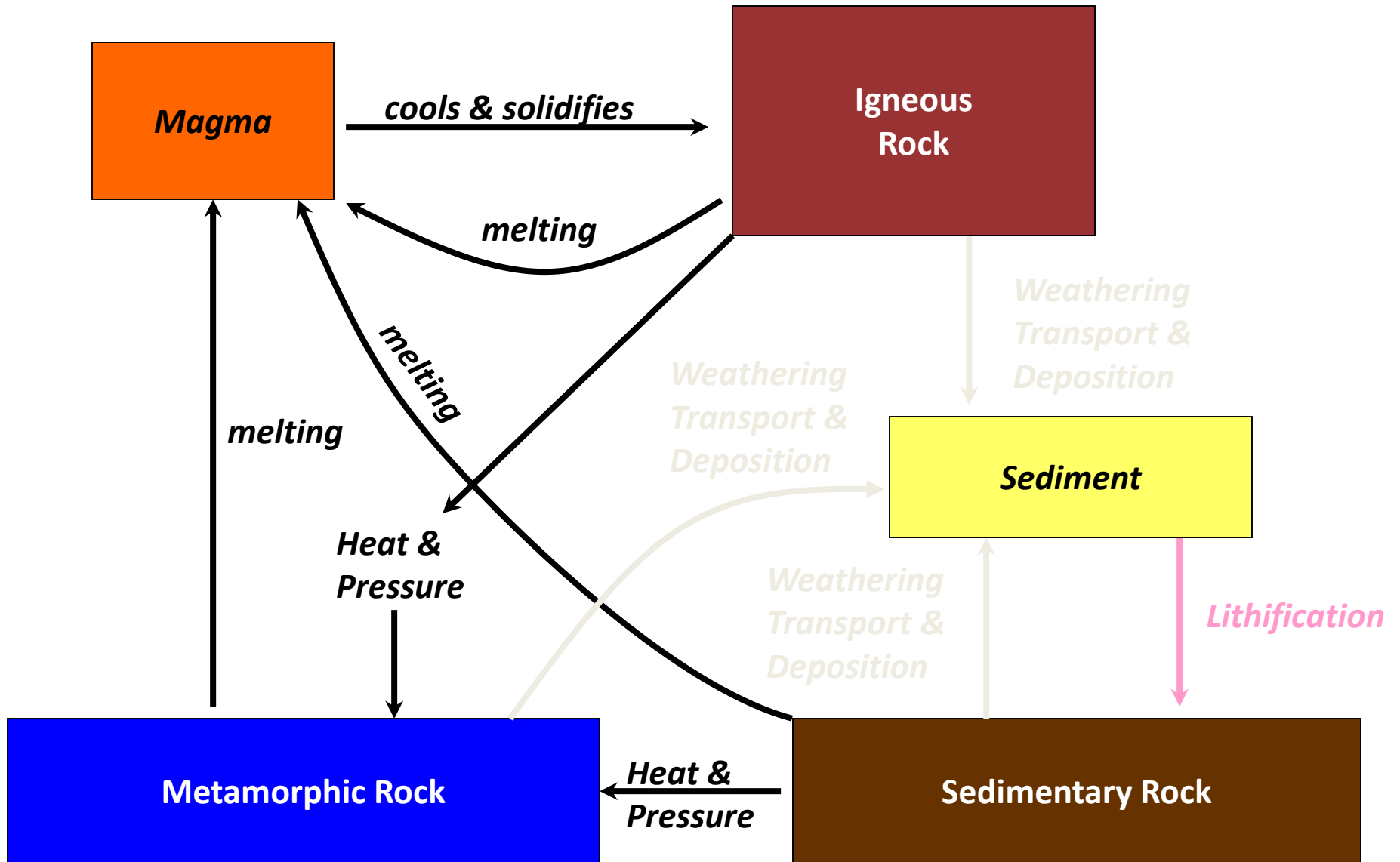
The Rock Cycle



The Rock Cycle



The Rock Cycle





ASSIGNMENT NO :1

Identify & Collect at least three rocks of each categories
(Igneous , sedimentary and metamorphic).

Name and characterize (properties) it in enclosed box.

Time limit for the mentioned Assignment ends after 10 days from today.

END OF THE LECTURE

