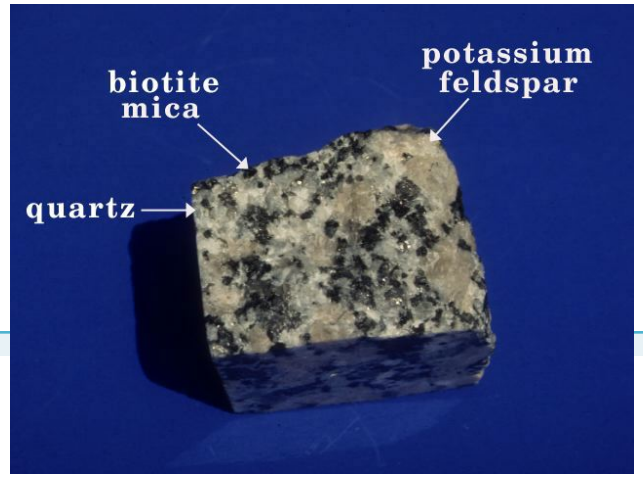
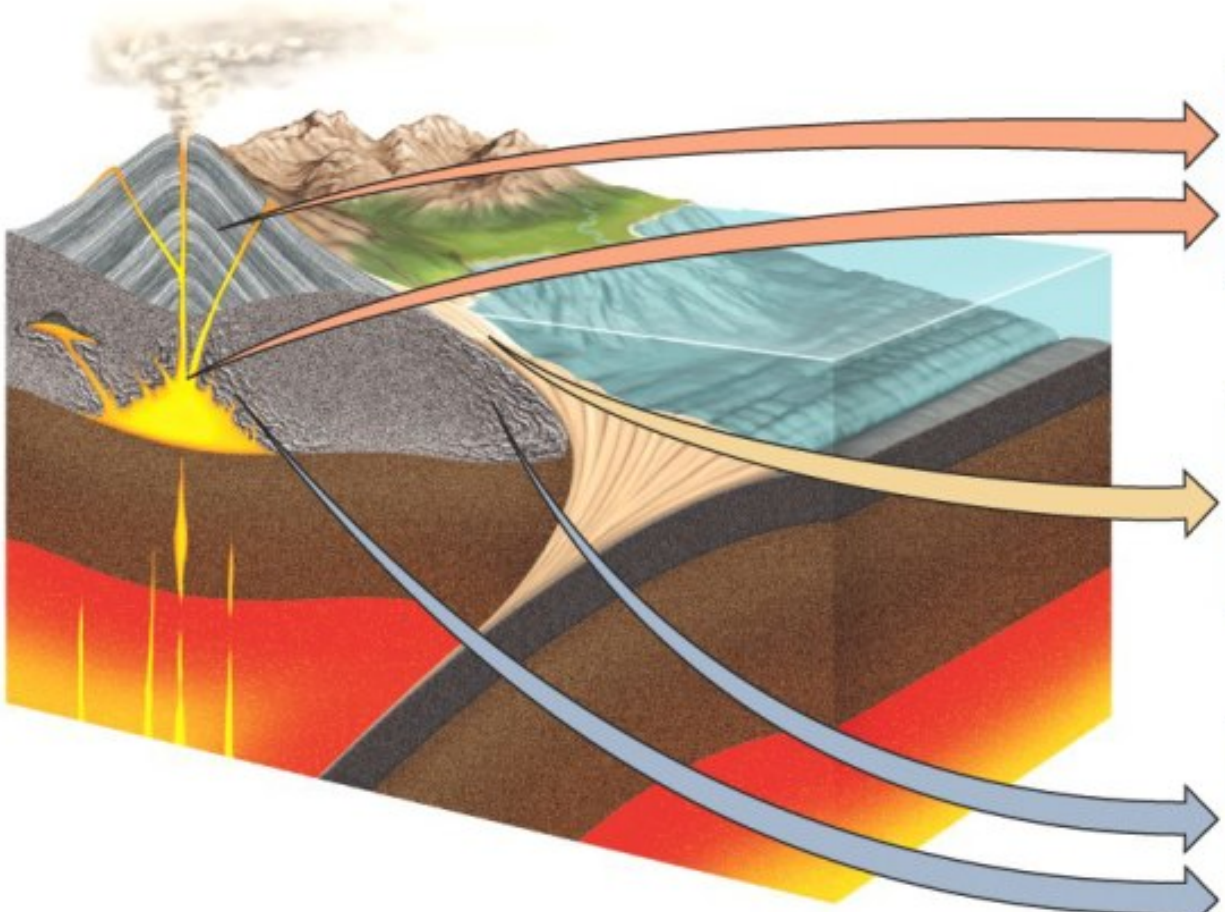
WHAT ARE ROCKS?



Definition: Naturally formed solid that is usually made up of one or more types of minerals	**Picture:** 
Example: (Rocks) Igneous- "fire formed" Sedimentary- "layers" Metamorphic- "changed"	**Non-Example (minerals)** Living wood Animals

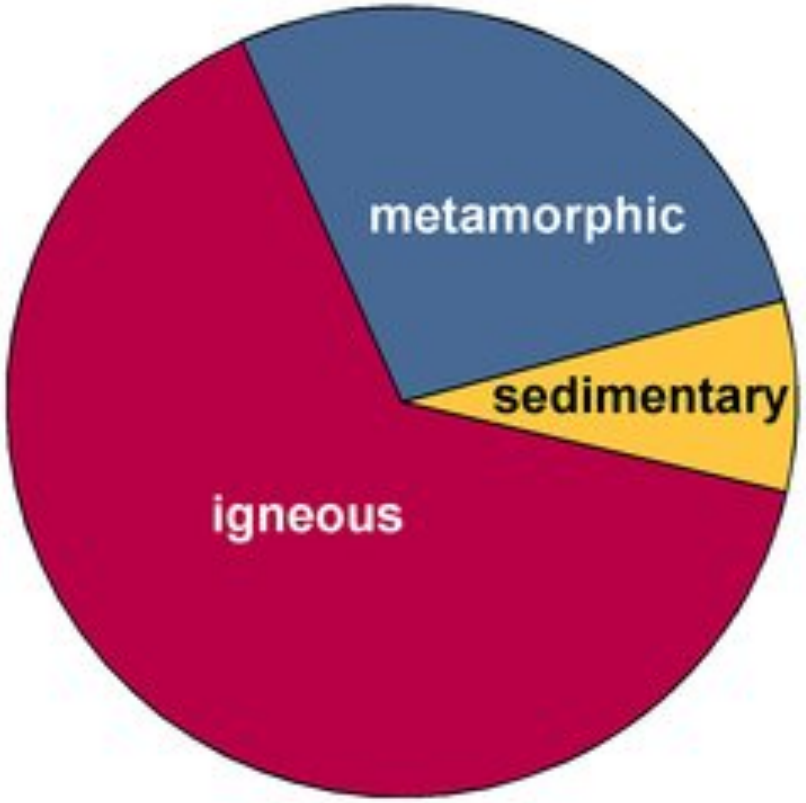
3 MAJOR ROCK GROUPS



Type of rock and source material	Rock-forming process	Example
IGNEOUS Melting of rocks in hot, deep crust and upper mantle	Crystallization (solidification of magma or lava)	 Coarsely crystallized granite
SEDIMENTARY Weathering and erosion of rocks exposed at surface	Deposition, burial, and lithification	 Bedded sandstone
METAMORPHIC Rocks under high temperatures and pressures in deep crust and upper mantle	Recrystallization in solid state of new minerals	 Gneiss

EARTH'S CRUST IS MADE UP OF ROCKS!

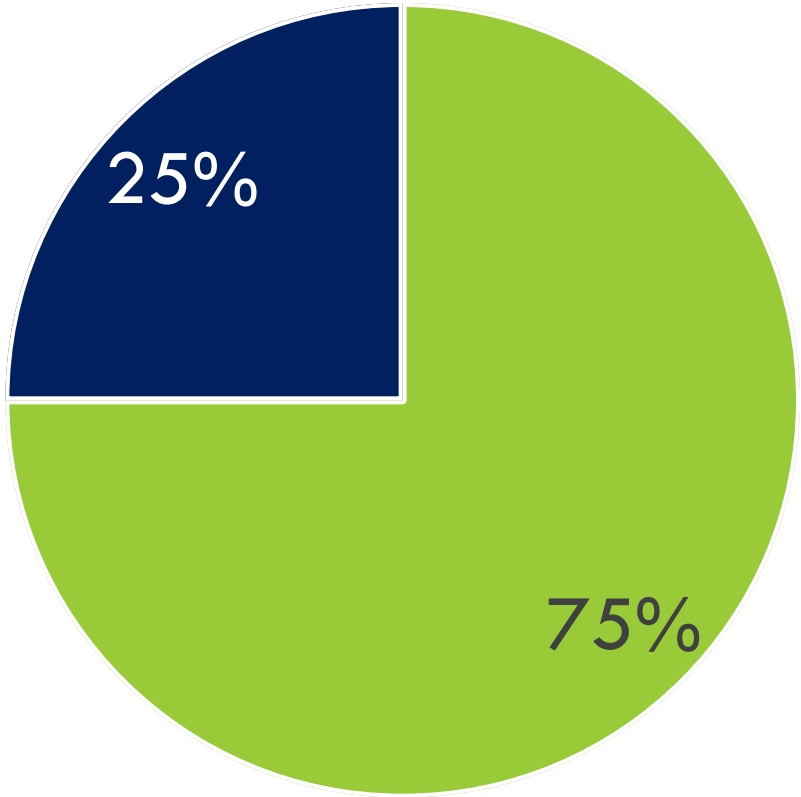
Entire Crust



95% igneous/Metamorphic

5% Sedimentary

Surface of Crust

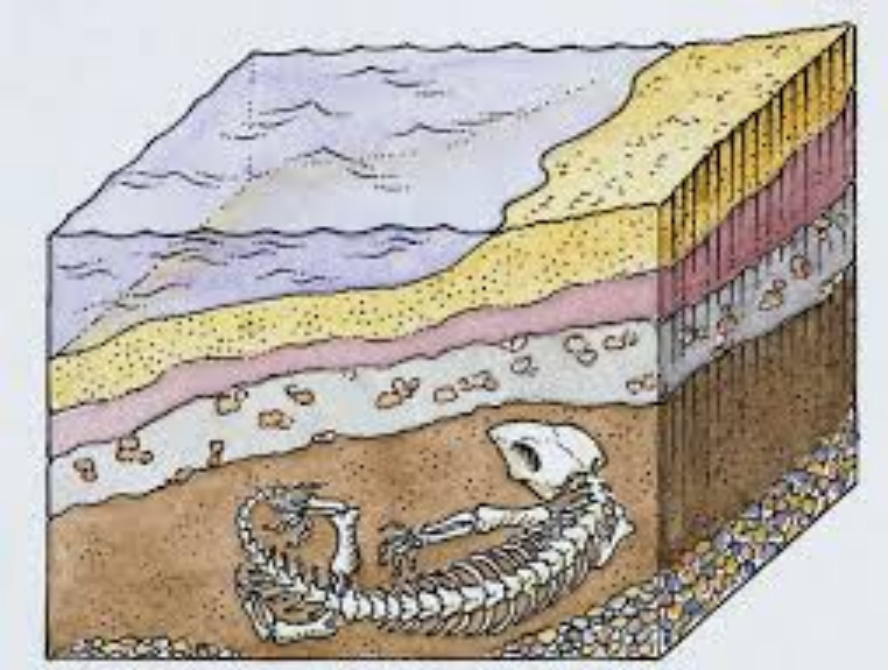


1. Observations?
2. Which rock type is the most common in the crust?
3. Which rock type is the most common on the crust's surface? Why?

WHY ARE ROCKS IMPORTANT

They tell us about our past!

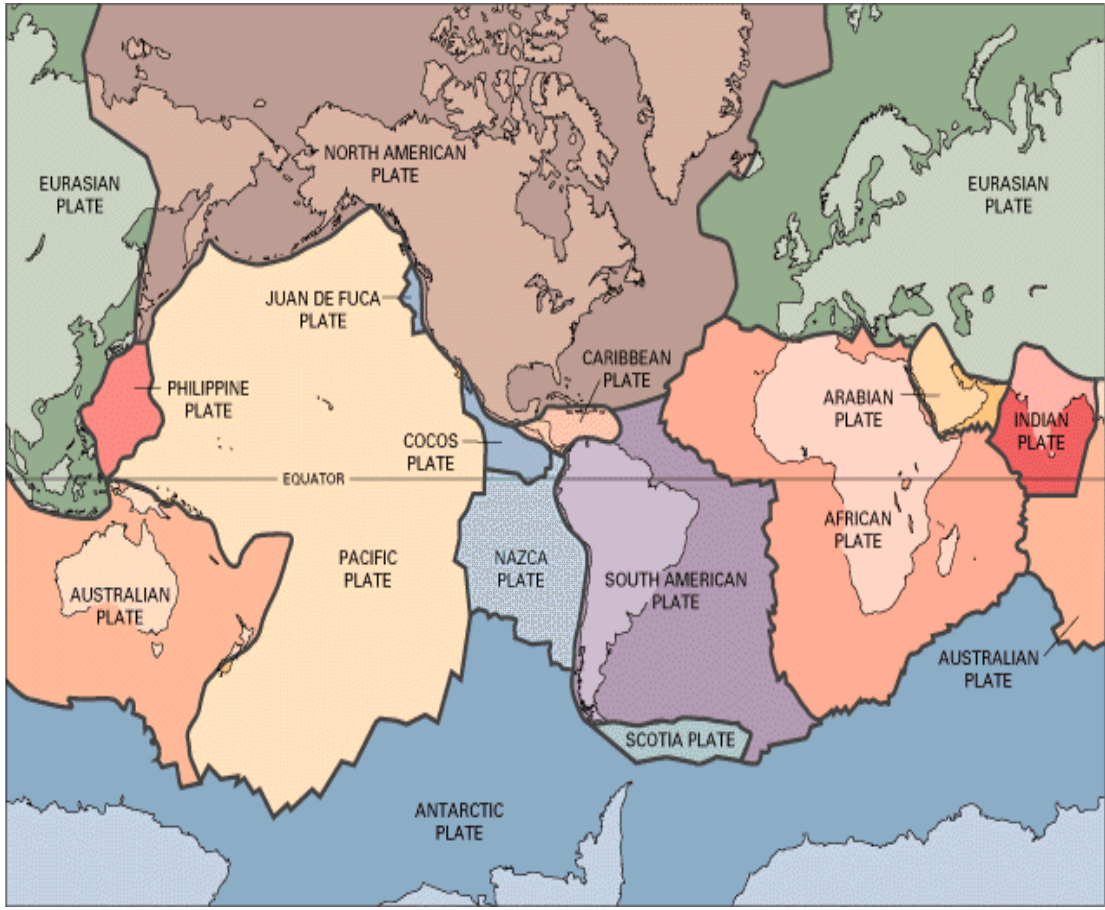
By studying how our planet worked in the past, we can better understand how it is working today!



DYNAMIC EARTH

1. Earth is not static- It's moving and shifting around all the time
2. Plate tectonics- plates constantly shifting on the mantle
3. Erosion and weathering
4. Volcanism- building new land

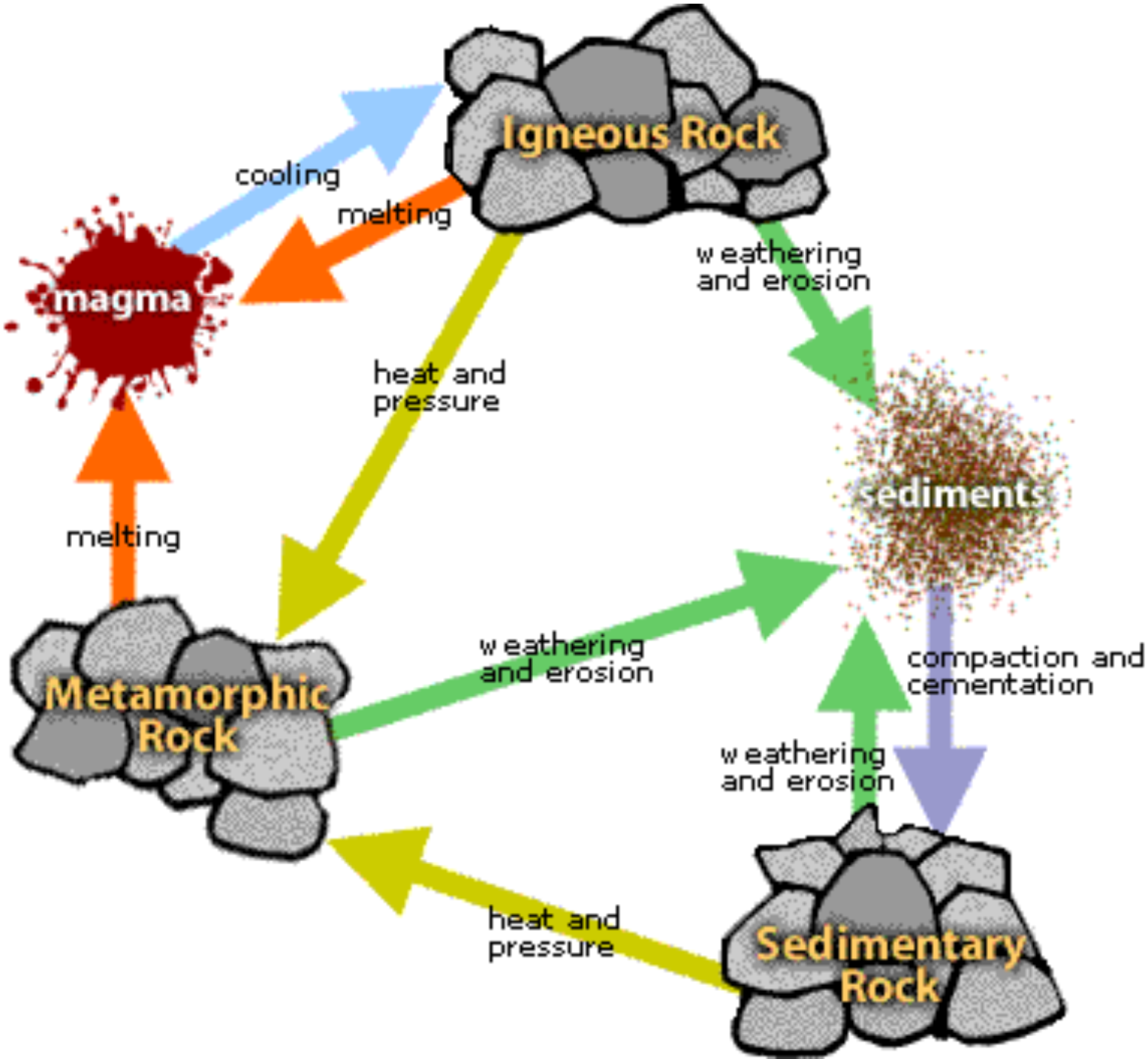
All of these contribute to the rock cycle and the creation of rocks



ROCK CYCLE

It's a cycle so we can

Start anywhere!

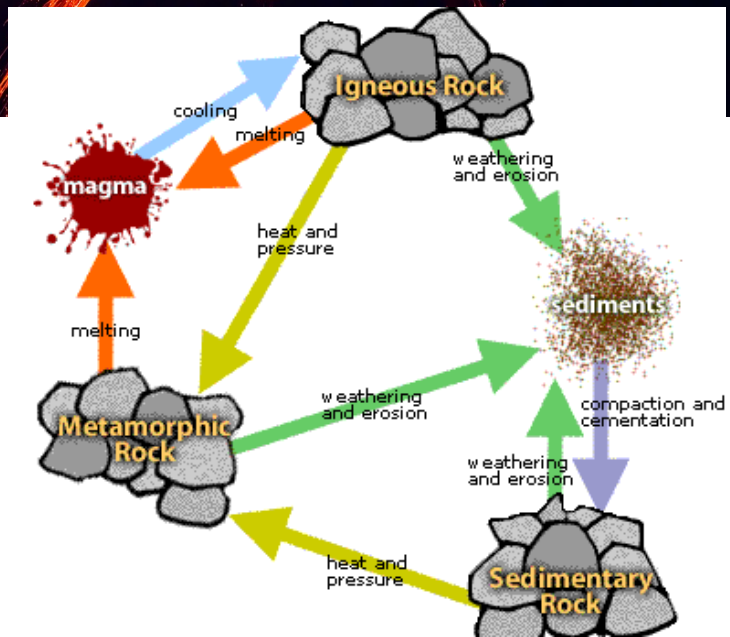


ROCK MELTS THEN COOLS

When molten rock cools on the surface of the crust (lava) or below it in the mantle (magma), igneous rocks form

Igneous means “fire formed”

➢Move to Igneous Rock



IGNEOUS ROCK

CONGRATULATIONS YOU ARE NOW AN IGNEOUS ROCK!

Igneous rocks form when an already existing rock melts due to high heat and turns into magma or lava. When that lava or magma cools, you get new minerals that form, and it turns into an igneous rock! It is the speed of cooling that determines whether or not you get crystals - slow cooling under the surface = larger crystals.. Rapid cooling when magma is ejected onto the surface - no crystals - looks like glass

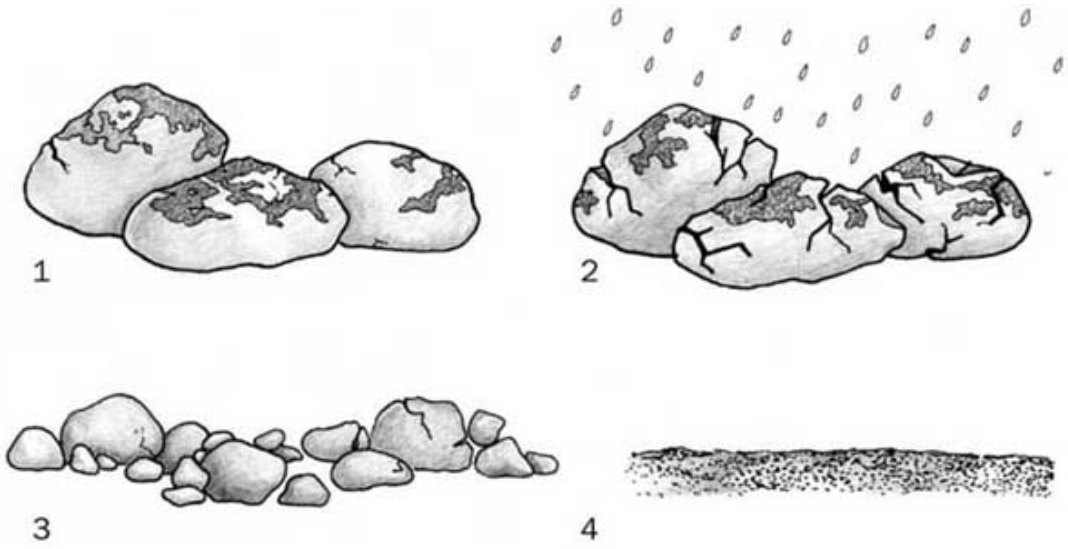
➢ **Move to Weathering**

WEATHERING (BREAK INTO MESS)

Any time an already existing rock goes through weathering it starts the process of becoming a sedimentary rock.

The breaking down of already existing rocks through physical means (like running water) or chemical reactions turning them into sediment. This is the first process that takes place to create sedimentary rocks

➢Move to Erosion

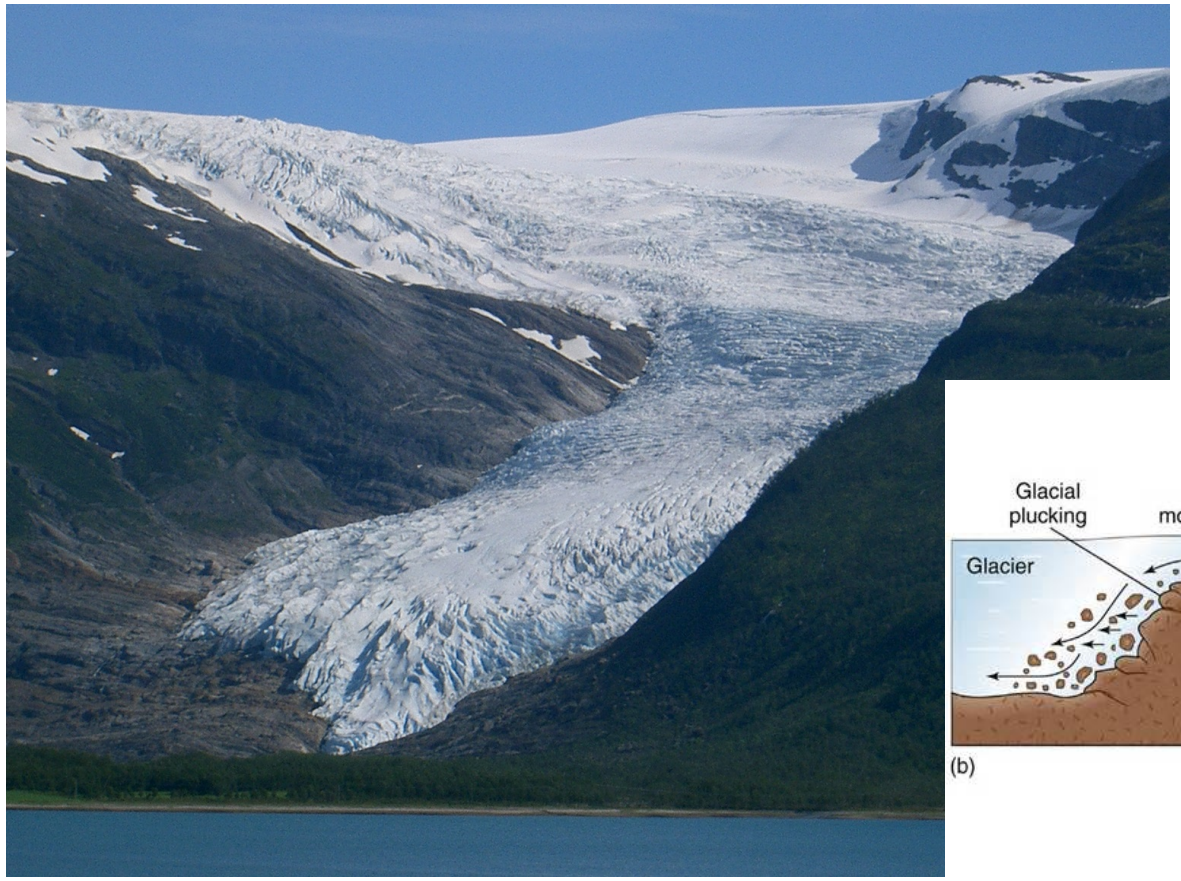


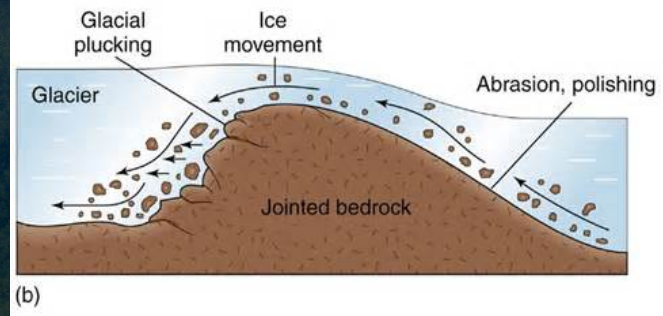
EROSION WEATHERING

Over millions and millions of years, the grand canyon was carved by the flow of water (Colorado river) breaking up the rock, and depositing the sediments down stream.

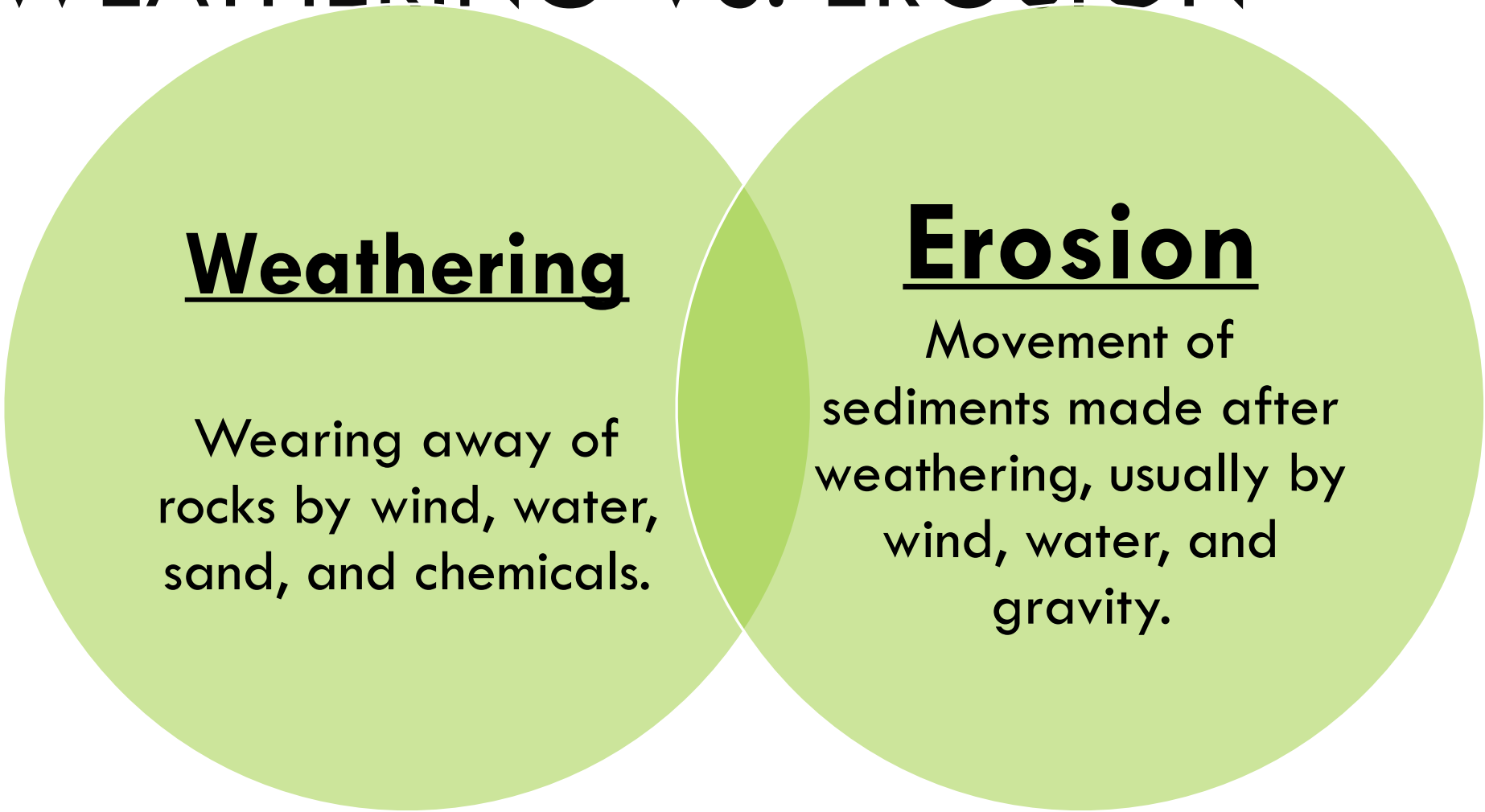
EROSION AND WEATHERING

Glaciers, pulled by gravity, and scrapes the ground moving sediments and depositing them further down a slope.





WEATHERING VS. EROSION



EROSION (CLEAN UP)

After a rock gets weathered and turned into sediment, erosion moves the sediment somewhere else. The movement of sediment by moving wind, water, ice, or gravity. When these materials are deposited or dropped in new places, it is called deposition.

Agents of erosion

Wind Water Ice gravity

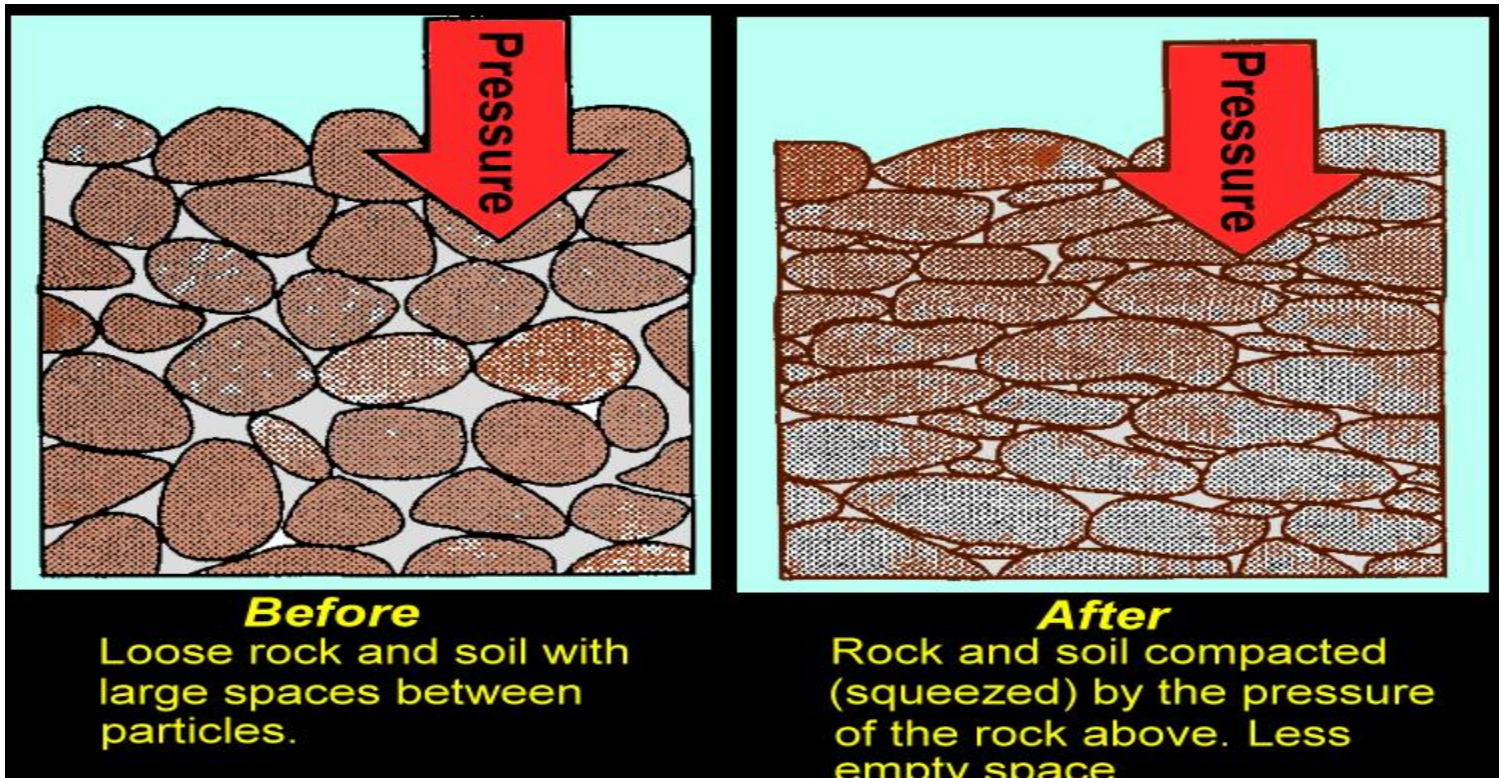
➢ **Move to Sediment**

SEDIMENT

Broken down rock that is now in smaller pieces that is carried by water or wind and deposited on the surface of the land or the bottom of a body of water, and may in time turn into rock

➢Move to compacting

COMPACTING



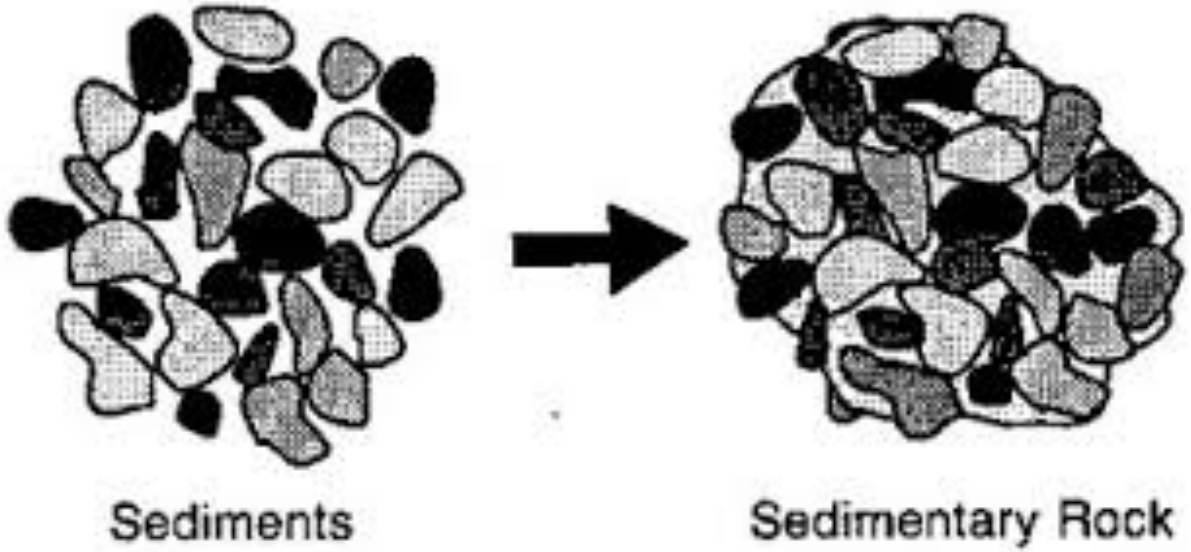
Sedimentary rock forms when pieces of older rocks, plants and other loose material get pressed or cemented together. Loose material is carried by water or wind and then settles out, forming layers. The lower layers of material get pressed into rock by the weight of the upper layers

➢ **Move to Cementing**

CEMENTING

Glues sediments together with clay, or by minerals like silica or calcite. When water mixes with sediments that were deposited and dries, it glues the sediment together to create a sedimentary rock

➢**Move to Sedimentary Rock**



SEDIMENTARY ROCK

Congratulations you are now a sedimentary rock!

Sedimentary rock forms when an already existing rock gets broken down through weathering. After a very long time, the sediments from the weathered rock get pressed together through compaction, or cemented together with substances like clay or mud to become a newly formed sedimentary rock.

➢ **Move to Heat and Pressure**

HEAT AND PRESSURE

Metamorphic rock forms when heat or pressure causes older rocks to change into new types of rocks. For example a rock can get buried deeper in the crust (through subduction) where pressure and temperature are much greater. The new conditions cause the structure of the rock to change and new minerals to grow in place of the original minerals. The rock becomes a metamorphic rock.

➢**Move to Metamorphic Rock**

METAMORPHIC ROCK

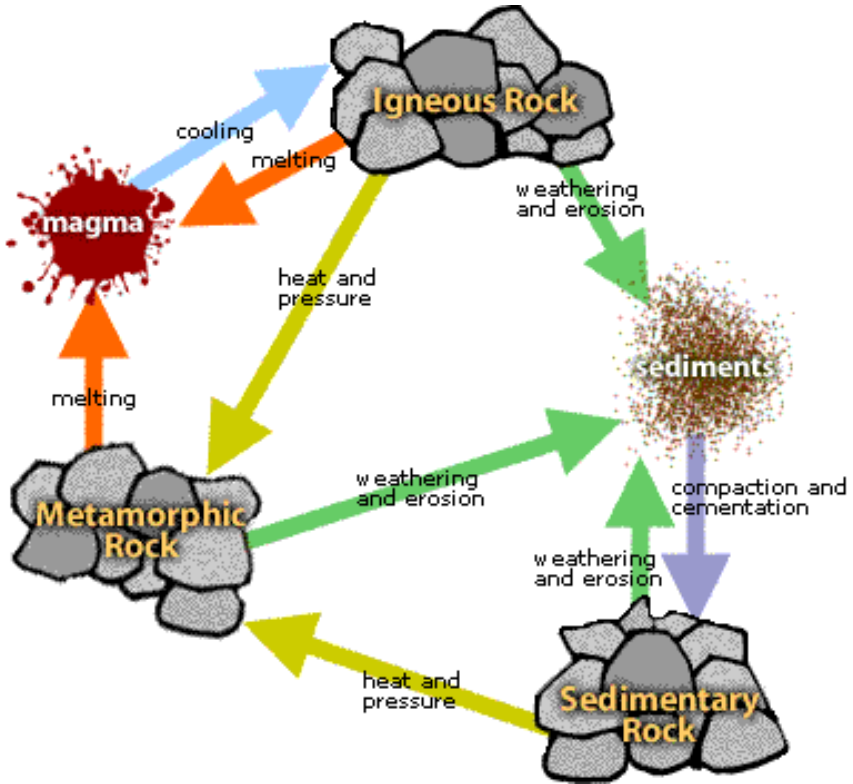
Congratulations you are now a Metamorphic Rock!

Metamorphic means “changed”. This means that any rock that undergoes a lot of heat and pressure changes into a new type of rock! We call these rocks metamorphic rocks!

➢ **Move to Rock Melts then Cools**

THE ROCK CYCLE

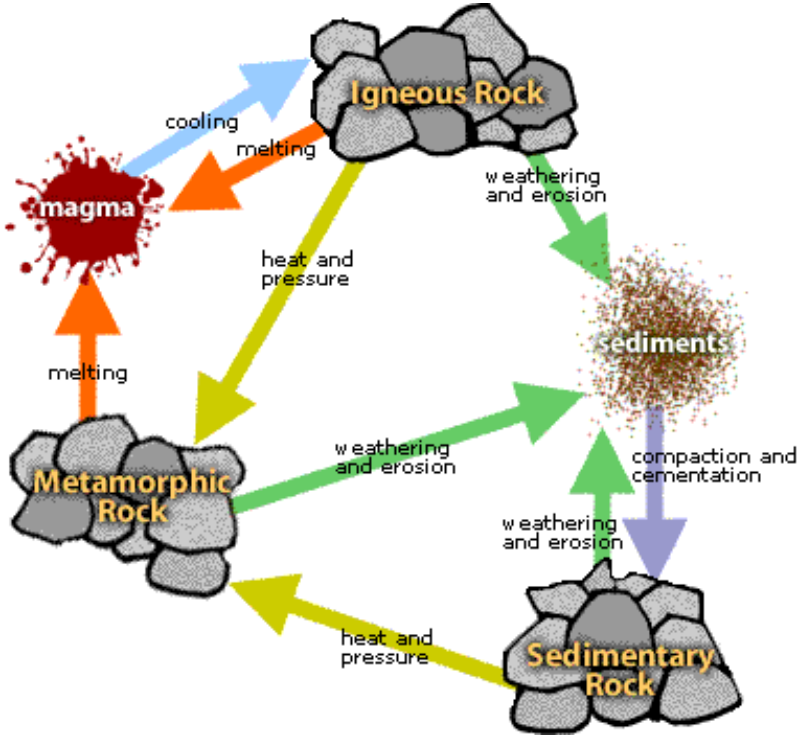
You are a rock, and you're on an adventure! THROUGH THE ROCK CYCLE! You know the adventure will take you millions of years, but you have to know your true destiny. What will you become? Who will you be when your adventure is over? Only time will tell.



EXIT TICKET

1. **If a sedimentary rock undergoes heat and pressure what will it become?**
2. **Magma cools under the surface, and a volcano erupts and lava cools on the surface near an ocean. What types of rocks will form?**
3. **Which type of rock forms through compaction and cementation?**
4. **Draw the rock cycle with arrows and label each arrow**

CREATE ROCK CYCLE FOLD



Title: Rock Cycle

Flap 1: Rock Melts then Cools
- Igneous Rock

Flap 2: Weathering

Flap 3: Erosion
- Sediment

Flap 4: Compacting

Flap 5: Cementing
- Sedimentary Rock

Flap 6: Heat and Pressure
- Metamorphic Rock

We will be making moving through the rock cycle and defining each of the arrows to explain how a rock changes from one to another type of rock

CREATE YOUR ROCK CYCLE FOLDABLE

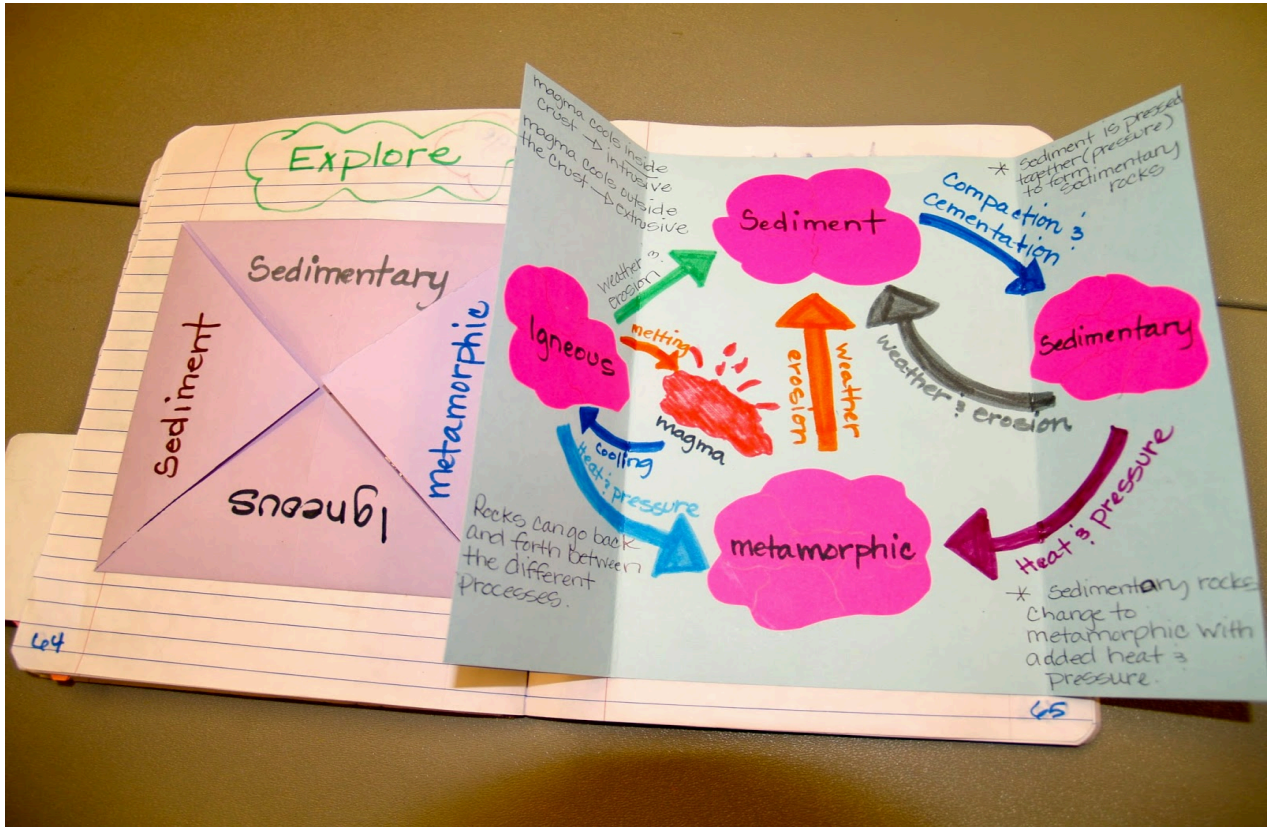
Create a foldable on the rock cycle.

Include

1. Igneous
2. Metamorphic
3. Sedimentary
4. Sediment
5. (process that they're made by with arrows)

Label arrows with: Erosion, weathering, compaction, cementation, heat pressure, cooling.

6. Description of how each rock changes into another rock



OUR JOURNEY THROUGH THE ROCK CYCLE