

# **MINERALS AND ROCKS**

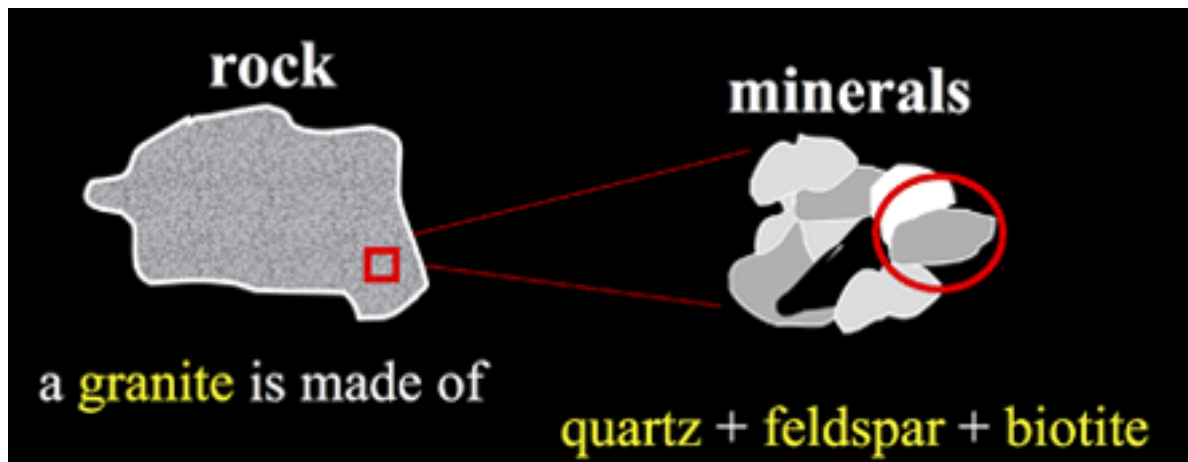
GEOG201 / 2024 Fall



UNIVERSITY OF  
**South Carolina**

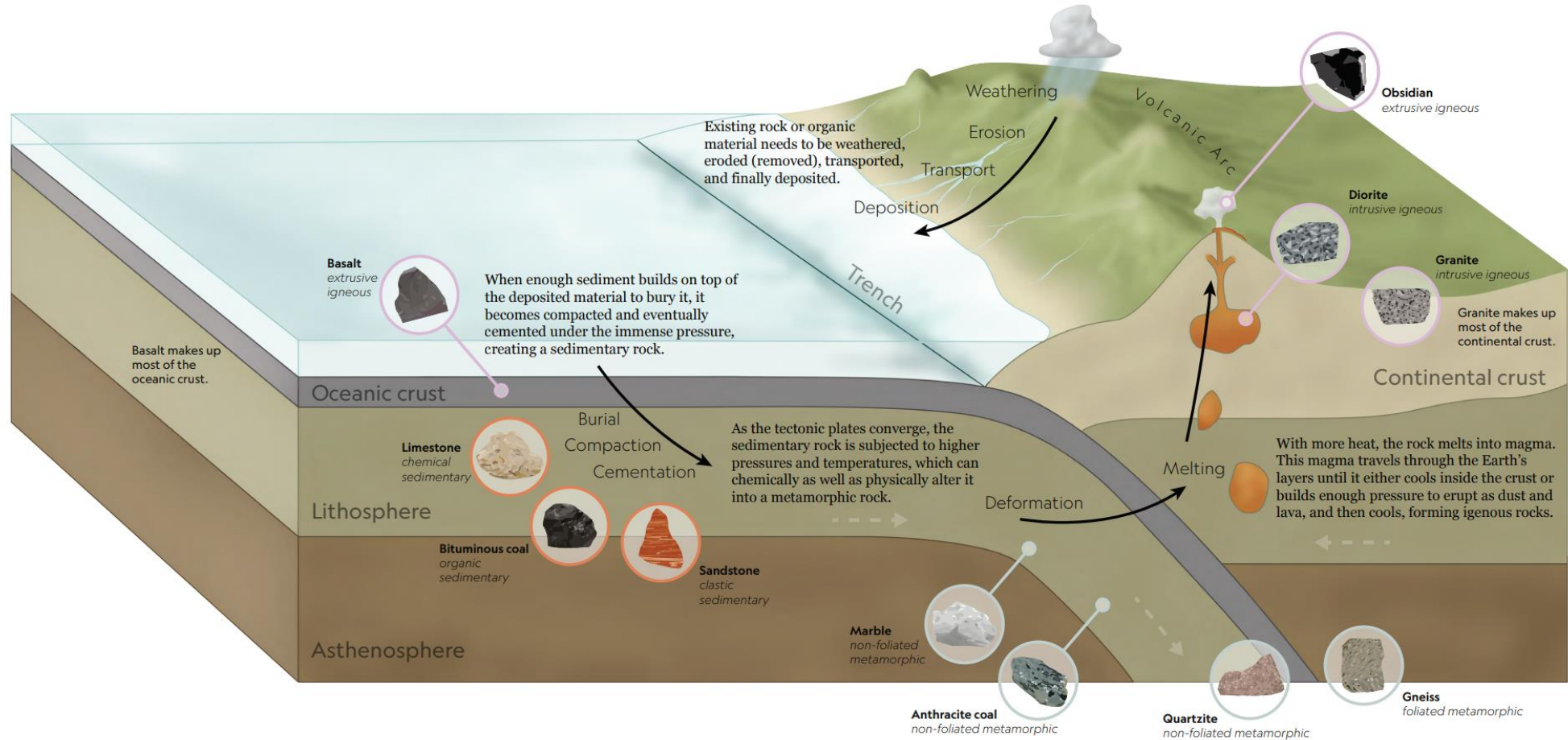
# MINERALS AND ROCKS

- Part 1: Mineralogy
  - **Color**, **Streak**, Luster, Crystal form, Cleavage/Fracture, Specific gravity, **Hardness**, Magnetism, etc.
- Part 2: Petrology
  - Igneous rocks, Sedimentary rocks, Metamorphic rocks



# THE ROCK CYCLE

The rock cycle is a series of processes that transform one rock type into another. These processes create three main types of rocks: sedimentary, metamorphic, and igneous.



## Rock Subtypes

### Sedimentary

|  |  |   |
|--|--|---|
| <b>Clastic</b><br>Made of pre-existing rock and mineral grains | <b>Organic</b><br>Formed from carbon-rich, biological material | <b>Chemical</b><br>Formed by precipitation from chemical weathering |
|--|--|---|

### Metamorphic

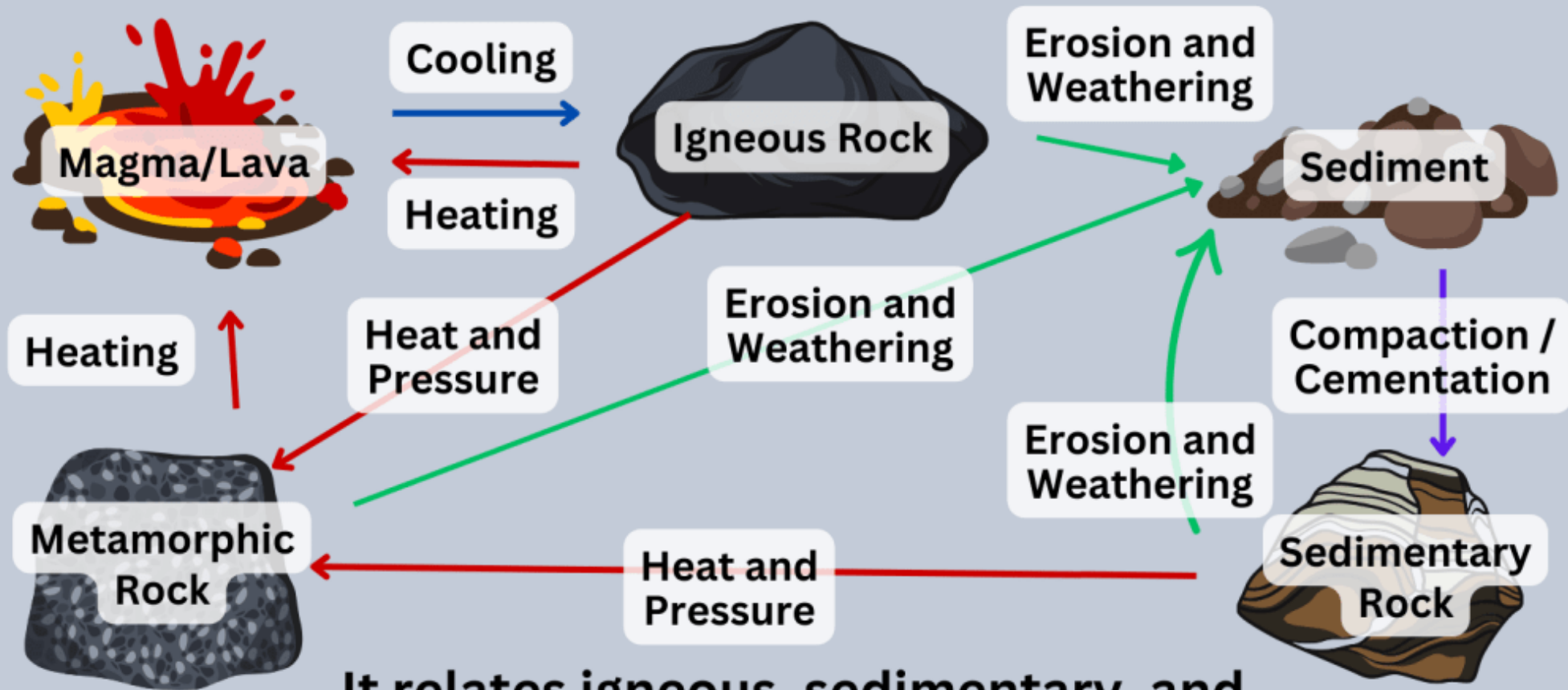
|                                  |                                    |
|----------------------------------|------------------------------------|
| <b>Foliated</b><br>Multi-layered | <b>Non-foliated</b><br>Non-layered |
|----------------------------------|------------------------------------|

### Igneous

|   |   |
|---|---|
| <b>Intrusive</b><br>Formed inside the Earth | <b>Extrusive</b><br>Formed at Earth's surface |
|---|---|

# The Rock Cycle

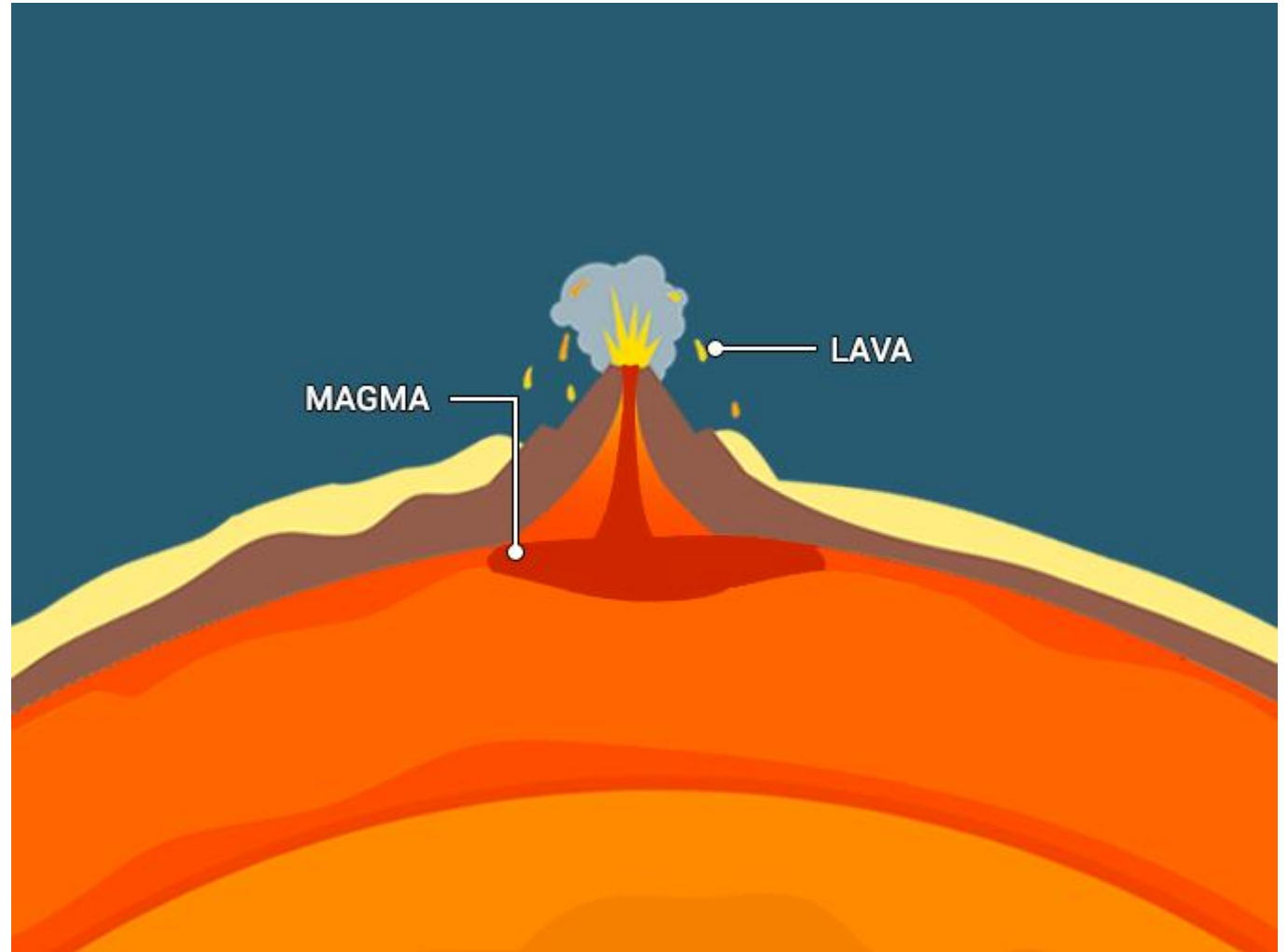
The rock cycle is a continuous process that forms, alters, and reforms rocks.

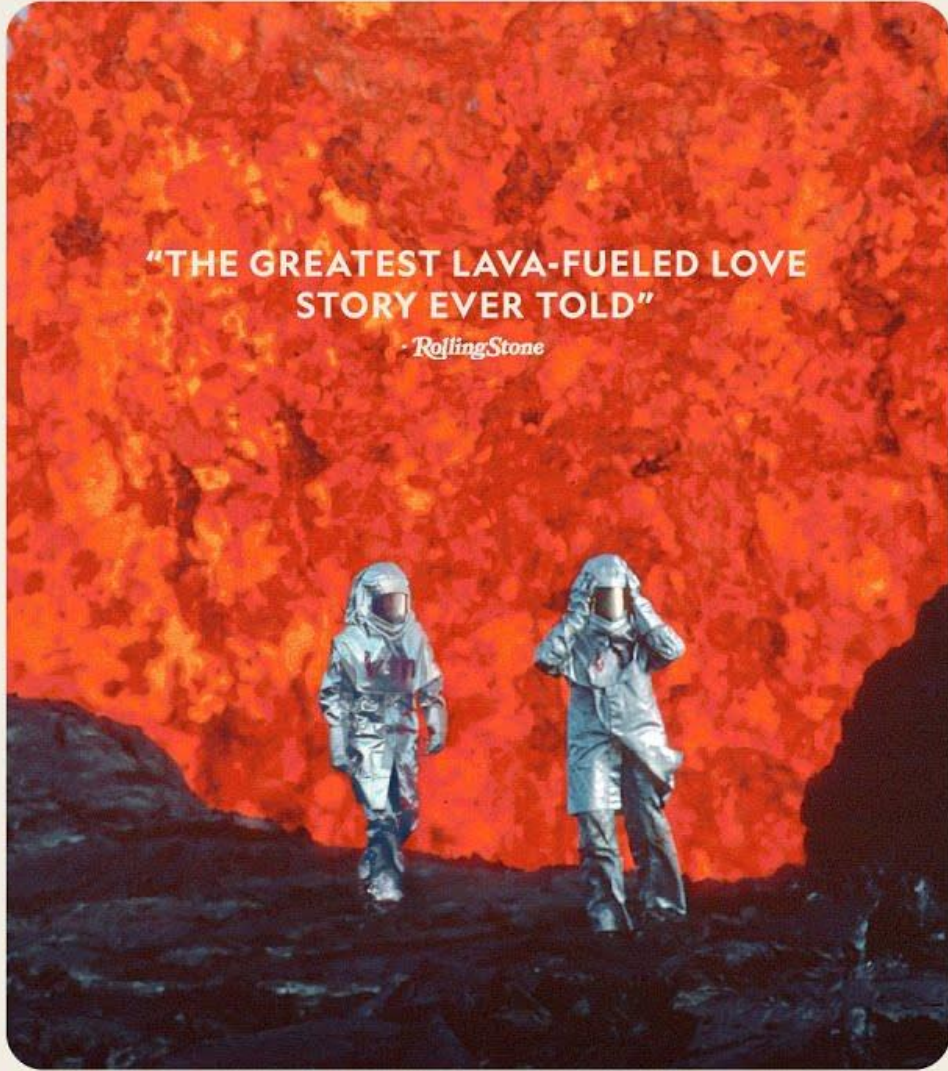


It relates igneous, sedimentary, and metamorphic rocks to each other.

Scientists use the term magma for molten rock that is underground and lava for molten rock that breaks through the Earth's surface.

How are magma and lava related? Magma is composed of molten rock and is stored in the Earth's crust. Lava is magma that reaches the surface of our planet through a volcano vent.





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STORY EVER TOLD"

*Rolling Stone*



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South Carolina

# Intrusive Igneous Rocks V.S Extrusive Igneous Rocks

## Intrusive Igneous Rocks

- Formation:** Form from magma that cools slowly beneath the Earth's surface.
- Texture:** Coarse-grained (large crystals).
- Examples:** Granite, Diorite.
- Cooling Rate:** Slow cooling allows for large crystal growth.
- Location:** Found in underground formations.

## Extrusive Igneous Rocks

- Formation:** Form from lava that cools quickly at the Earth's surface.
- Texture:** Fine-grained (small crystals) or glassy (no crystals).
- Examples:** Basalt, Rhyolite.
- Cooling Rate:** Rapid cooling prevents large crystals from forming.
- Location:** Found on the Earth's surface, often as lava flows or volcanic ash.

# Code of Hammurabi

1755–1750 BC



## Basalt stone

### Extrusive Igneous Rocks

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Color: Typically dark gray to black

Streak: The streak of basalt, when scratched on a surface, is generally gray.

Luster: Basalt exhibits a dull to vitreous luster, with some samples appearing slightly glassy if fine-grained.

Crystal form: Basalt often has a fine-grained or aphanitic texture, meaning its crystals are too small to see with the naked eye.



# He Shi Bi

283 BC



## Nephrite Metamorphic Rock

**Color:** Nephrite is typically found in shades of green, from pale to dark, but it can also appear in white, yellow, brown, or black depending on mineral impurities.

**Luster:** It has a waxy to silky luster, giving it a soft, smooth appearance when polished.

**Cleavage/Fracture:** It lacks distinct cleavage and usually has a splintery or uneven fracture.

**Uses:** Due to its toughness and beauty, nephrite has been used for centuries in carving tools, ornaments, jewelry, and ceremonial objects.

## Plymouth Rock



## Granite Intrusive Igneous rock

**Color:** Granite varies in color, commonly found in shades of white, gray, pink, or red, depending on the proportions of its minerals.

**Texture:** It is coarse-grained, meaning the individual crystals are large enough to be seen with the naked eye.

**Cleavage/Fracture:** Granite has poor cleavage but fractures in an irregular pattern, often with a conchoidal or uneven fracture.

## Rock of Gibraltar



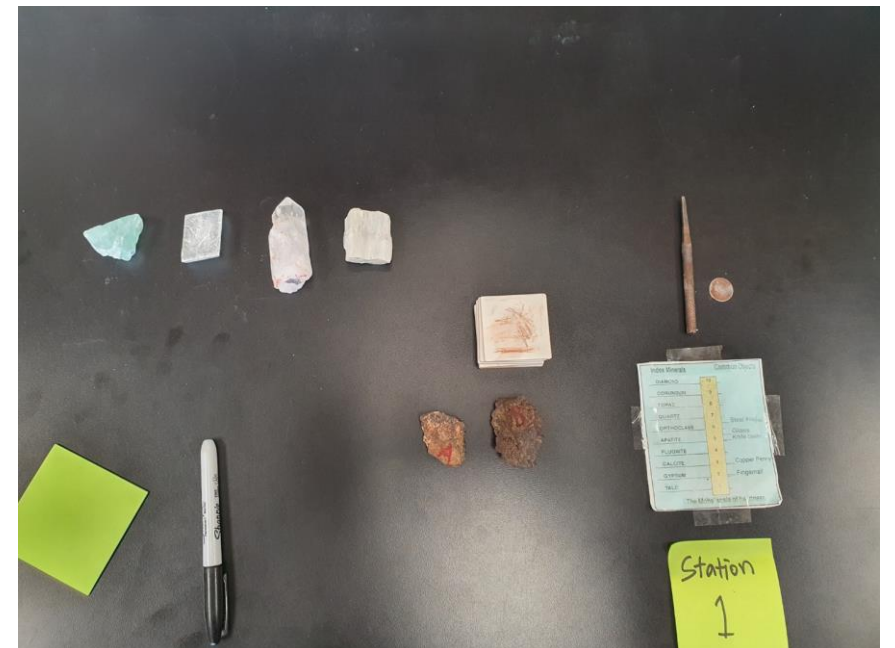
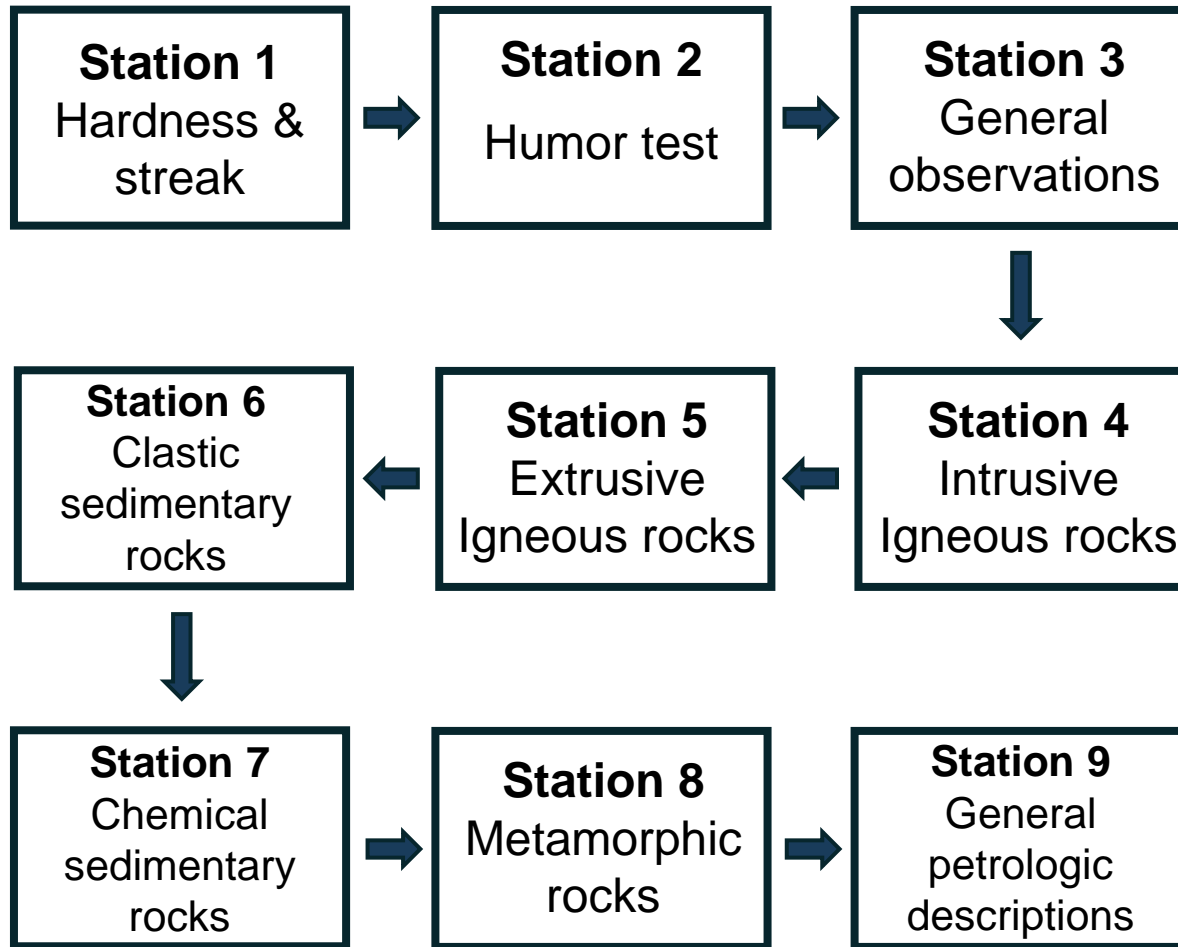
### **limestone sedimentary rock**

Hardness: Limestone is relatively soft, with a hardness of 3 to 4 on the Mohs scale, making it easy to carve and shape.

Texture: It can be fine-grained (micritic) or coarse-grained (sparitic), depending on the size of the particles or fossils it contains.

Cleavage/Fracture: Limestone has no cleavage but fractures easily in a conchoidal or uneven manner.

# TODAY'S LAB



# TODAY'S LAB

- Biogeography Lab (204)
- Group activity
  - 3 or 4 people will work together as a team
- Cautions
  - Be careful not to destroy lab materials
  - Put the rocks in the right place after observation
  - Don't kidnap the rocks!
- We have a quiz today
  - 10 questions related to today's activity (30 min)