

# Welcome!!!!

Today we will begin a new unit! **The Earth's History!!!!**

*Today you will be able to:*

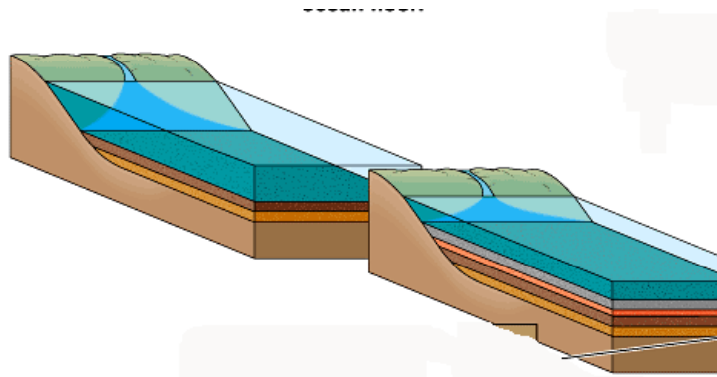
*Utilize the SEVEN rules of rock age identification to describe the geologic age of this rock sequence!*



# Let's Begin With a Review:

## How are Sedimentary Rocks formed?

1. Large rocks are \_\_\_\_\_ to form smaller rocks.
2. The smaller rocks are \_\_\_\_\_ downstream by the process of \_\_\_\_\_.
3. As large and angular rocks are carried downstream they become \_\_\_\_\_ and \_\_\_\_\_.
4. The higher the river's \_\_\_\_\_ the large and more sediment it can carry.
5. Once the river reaches a larger body of water the velocity of the river \_\_\_\_\_.
6. When river velocity decreases, the sediments it was carrying are \_\_\_\_\_ onto the bottom of the larger body of water.
7. \_\_\_\_\_ and \_\_\_\_\_ cement the sediments to form Sedimentary Rocks!
8. Sedimentary rocks are formed in \_\_\_\_\_ environments.



Police use clues to help piece together the past.



Now we are going  
to be detectives!!!!!!

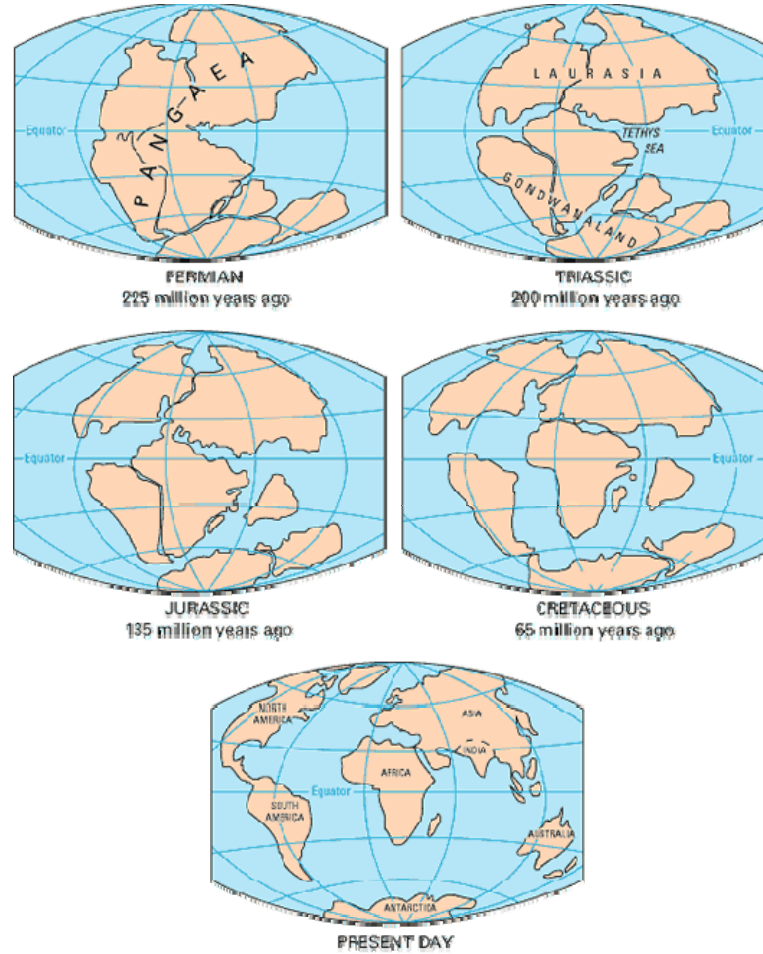
What rules can we follow in order to figure out the sequence of rocks?

## **RULE #1: Uniformitarianism**

- The process we see occurring today most likely occurred in the past
- “The Present is the Key to the Past!”

# Example of Uniformitarianism

- Continental Drift



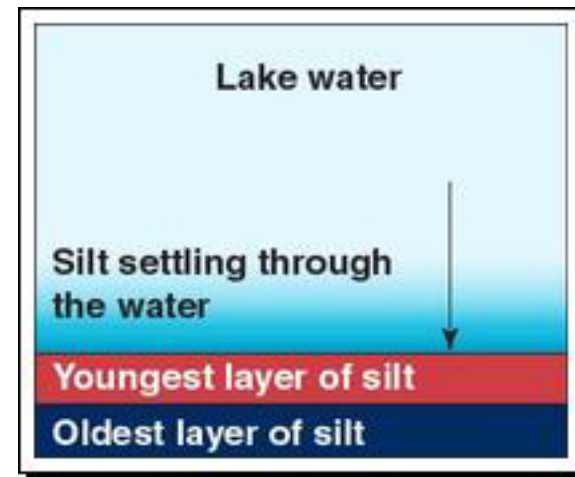
What rules can we follow in order to figure out the sequence of rocks?

## **RULE #2: Superposition**

-Originally, sedimentary rocks at the bottom are the oldest and deposited first

# Example of Superposition

- Deposition of sediments and creation of Sedimentary Rocks





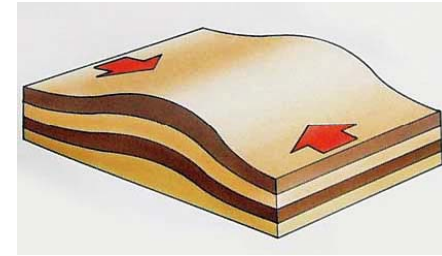
What rules can we follow in order to figure out the sequence of rocks?

## **RULE #3: Original Horizontality**

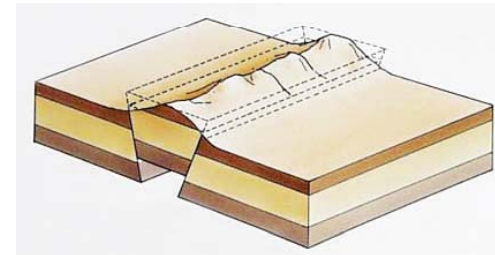
- A rock is always older than the process that changes it.
- Remember, a Sedimentary rock which has been eroded, folded, faulted or intruded must have been horizontally created first!

# Example of Original Horizontality

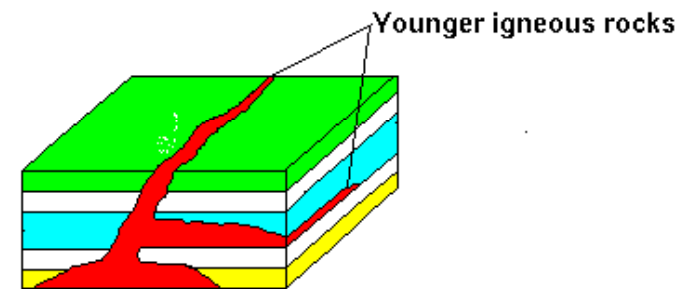
- Folding



- Faulting



- Intrusions/Extrusions



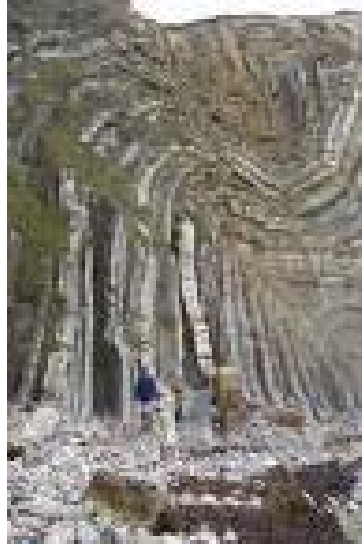
What rules can we follow in order to figure out the sequence of rocks?

**RULE #4: Erosion, Folds, Faults, Intrusions and Extrusions are always younger than the rock it effects.**

- Again, a rock is always older than the process that changes it.

# Example of Younger Folding, Faulting and Intrusion/Extrusions

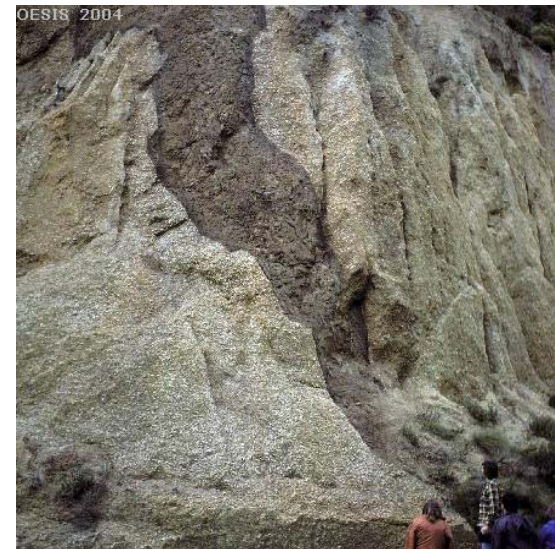
- Folding



- Faulting



- Intrusions/Extrusions



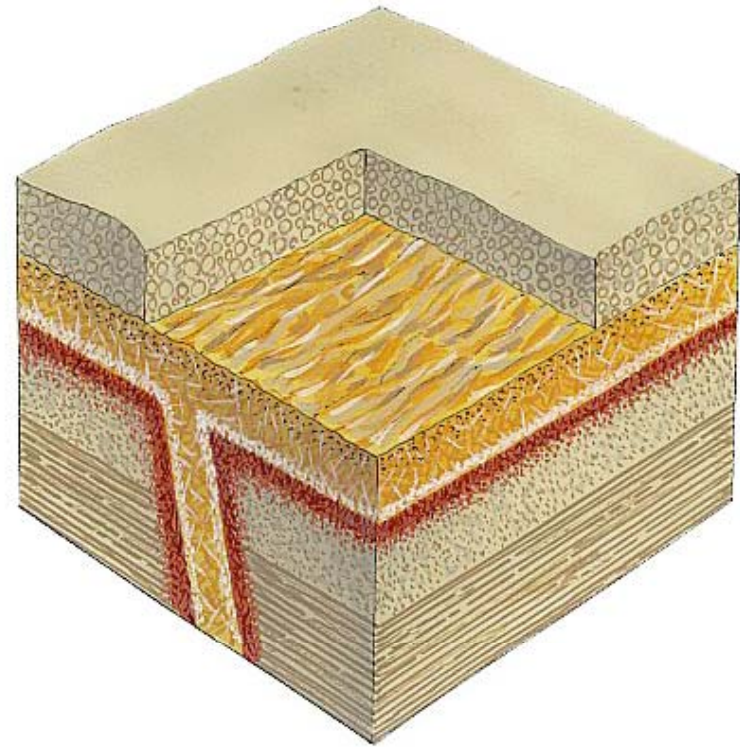
What rules can we follow in order to figure out the sequence of rocks?

## **RULE #5: Contact Metamorphism**

- If Contact Metamorphism forms on the bedrock around the intrusion, the intrusion is younger than the rock (the rock is older).
- If Contact Metamorphism **does not** form on the bedrock around the intrusion, the intrusion is older than the rock (the rock is younger).

# Example of Contact Metamorphism

- The intrusion has a red zone around it. This is contact Metamorphism. (The rock is older, the intrusion is younger.)
- The intrusion continued to the surface creating an extrusion.
- Sediment was then deposited on top of the extrusion and does not have contact metamorphism. (The rock is younger and the extrusion is older.)



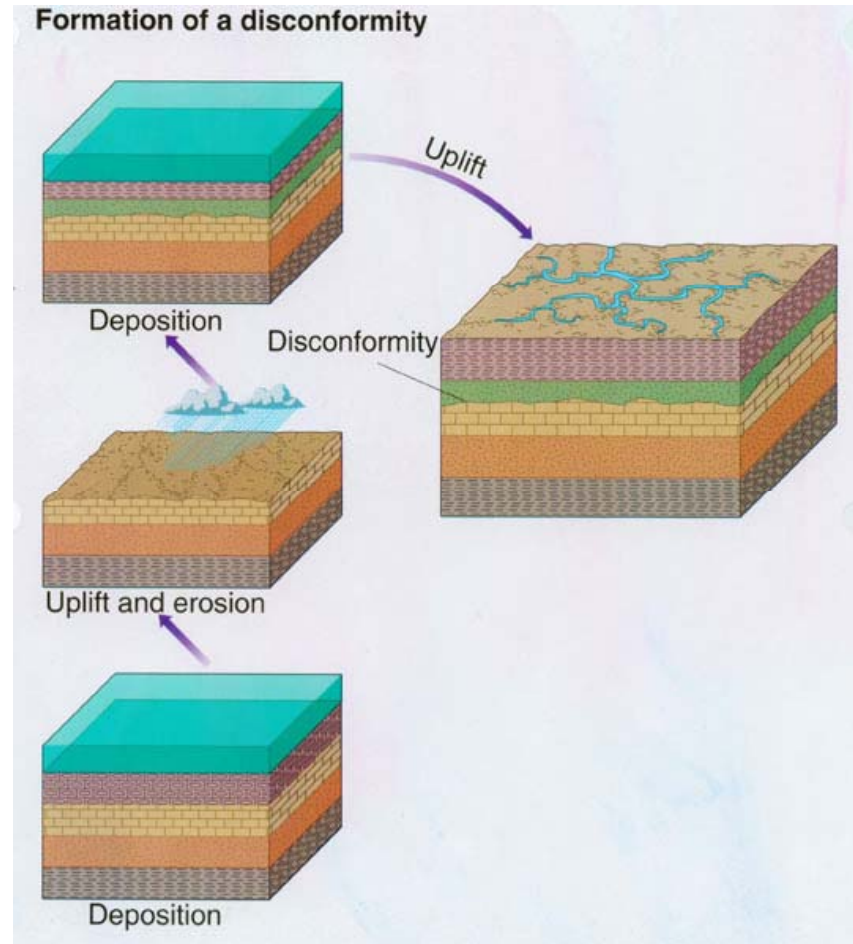
What rules can we follow in order to figure out the sequence of rocks?

## **RULE #6: Unconformities**

- When erosion occurs, a part of the rock record has been lost.
- A surface which has been eroded and then buried.

# Example of Contact Unconformities

- Sediments are deposited and form Sedimentary Rock.
- Uplift occurs exposing the bottom of the water body.
- Wind and flowing water erode the rock.
- A body of water forms over the area and more deposition.
- The erosion which occurred is buried and some of the old deposition is lost.





What rules can we follow in order to figure out the sequence of rocks?

## **RULE #7: Unable to tell**

- In the 'real world' sometimes we just can't tell which rock is older by these rules (we can use other methods which we will learn later)!
- You **will** be able to tell the age of the rock sequences I give you for assignments so don't even try to use this rule!

# Group Work

So what is the sequence of the of the rock record in the Grand Canyon?



# Group Work

To help, fill out the order of events for this sequence!

