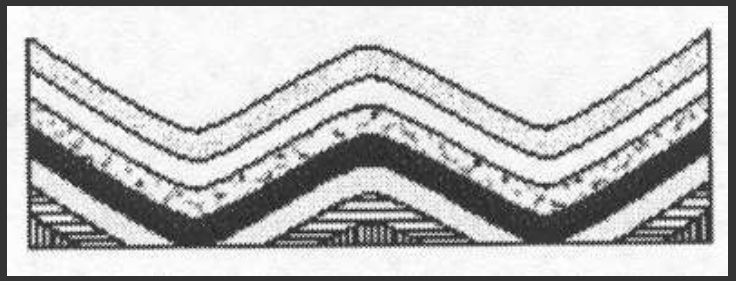
Historical Geology

- Historical Geology involves the study and interpretation of past events in Earth's geological history.
- This exercise will focus on the ability to establish the chronological sequence of geological events over time.
- Several principles and laws are used to interpret a geological cross-section. These include;

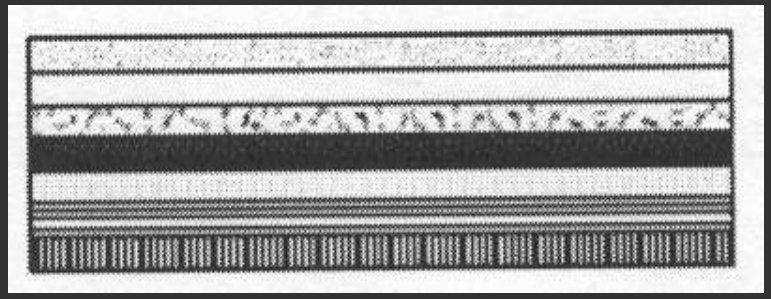
1) Original horizontality
2) Superposition
3) Uniformitarianism
4) Igneous Activity
5) Unconformities
6) Faulting and folding
7) Included fragments
8) Cross-cutting
9) Correlation
10) Contact Metamorphism

1) Principal of Original Horizontality

- states that most layers of sediment are deposited in a horizontal position. If rock layers are folded or inclined, then the layers must have been moved into that position by crustal disturbances.
- A folded rock sequence is a secondary feature caused by compressional forces.

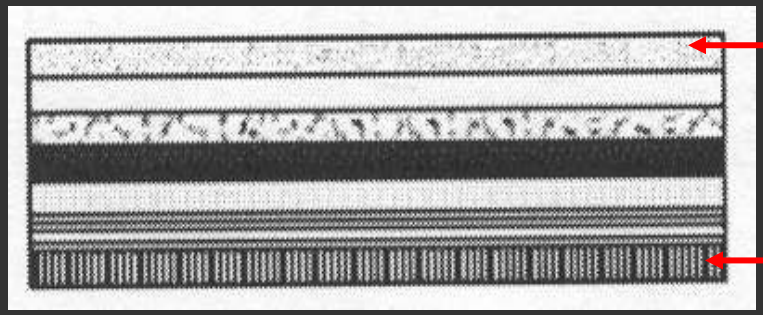


- The layers were originally deposited horizontally.



2) Law of Superposition

- states that in any undisturbed sequence of sedimentary rocks, a sedimentary layer is older than layers above it and younger than the layers below it.
- The youngest is always at the top.



3) Uniformitarianism

- States that the physical, chemical, and biological laws that operate today to shape Earth also operated in the past.
- This statement included two concepts;

1) the geologic processes at work today were also active in the past.
2) the present physical features of Earth were formed by these same processes, at work over long periods of time.

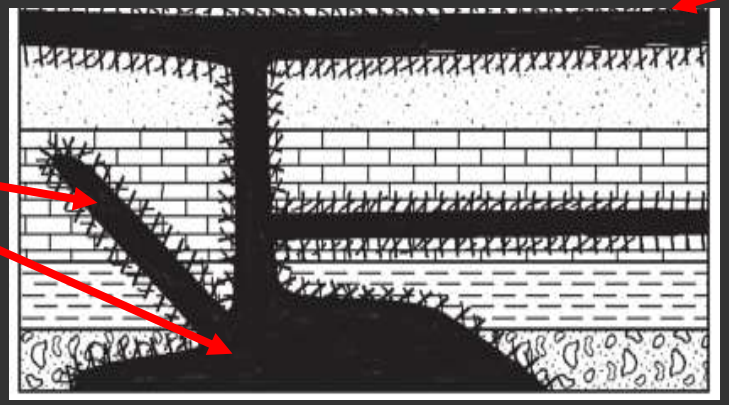
- ***"the present is the key to the past."***

4) Igneous Activity

- Igneous rock units is seen in cross-sections as: 1) intrusions and 2) extrusions.

1) Intrusion – igneous rock units, plutonic in nature, which cut across other rock units.

2) Extrusion – igneous rock units which flow on to the surface, called lava flows.

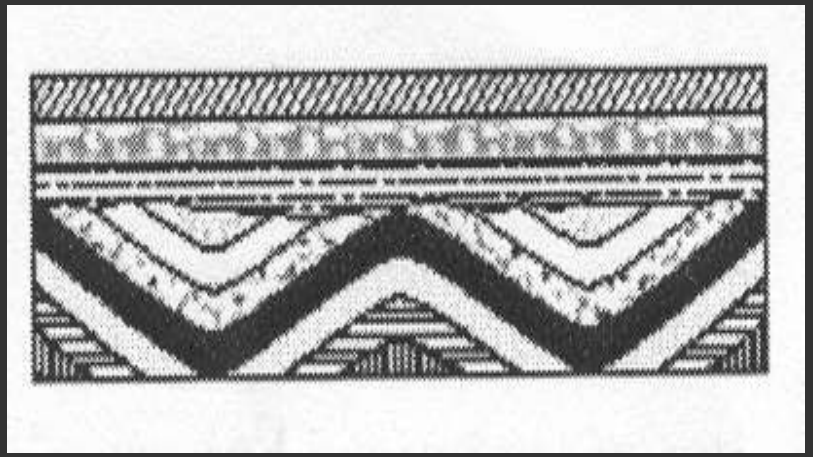


5) Unconformities

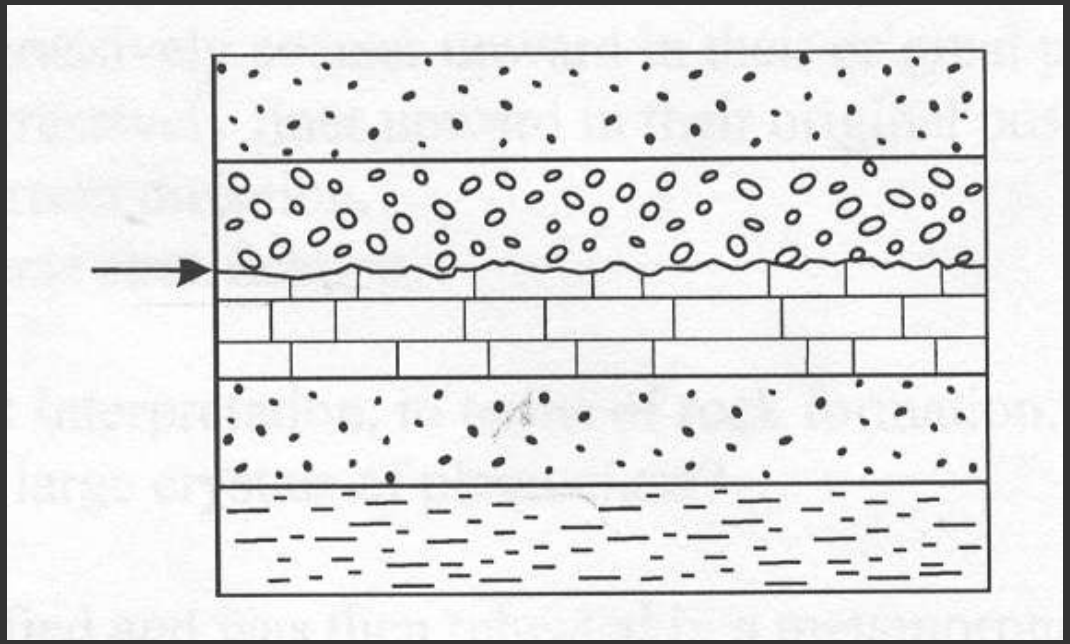
- Process of formation involves, land above sea level becoming eroded and then sinking where more sediment is deposited over the erosional surface.
- Places in the rock record where layers or units of rock are missing and they represent gaps in geologic time. In general, it represents a buried erosional surface.

Three types of unconformity:

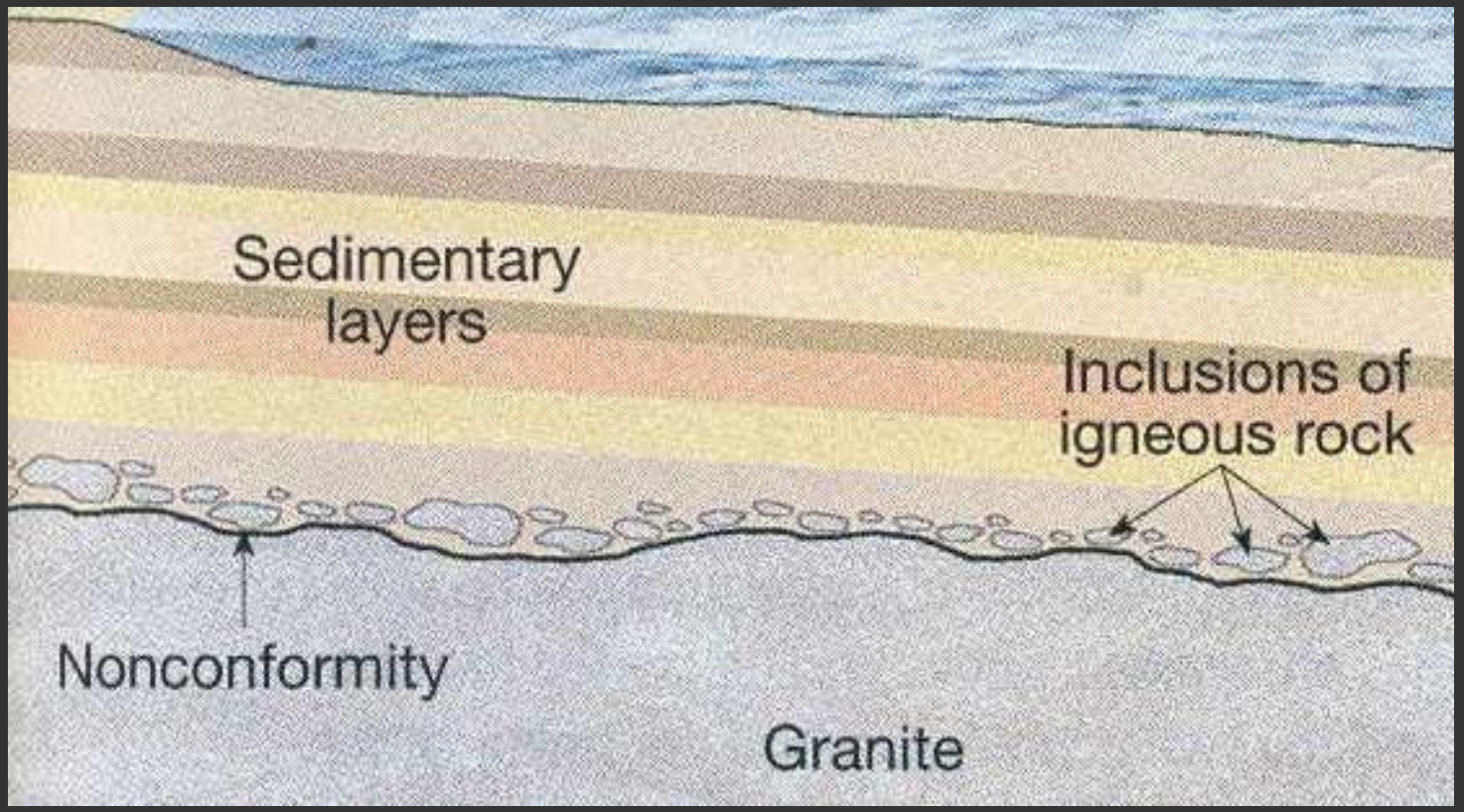
1) Angular Unconformity



2) Disconformity

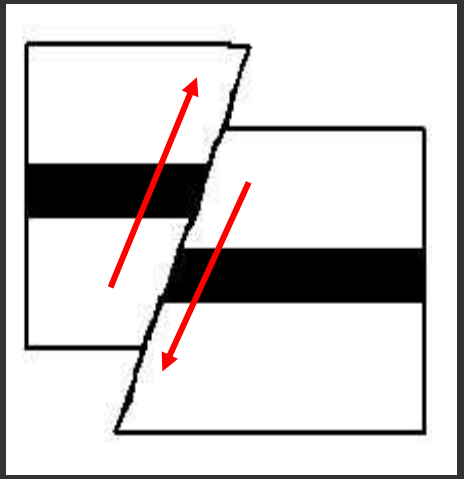


3) Nonconformity

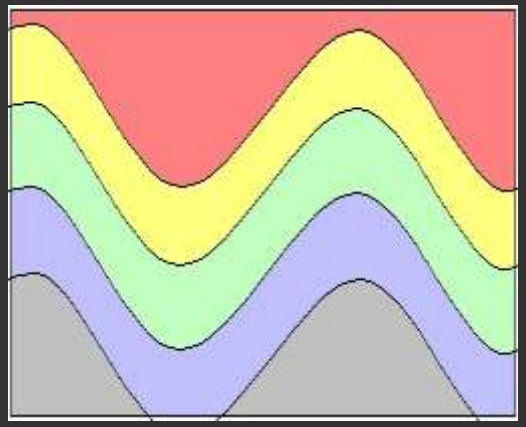


6) Faulting and Folding

1) Faulting – Movement of rock units along a crack in the rock.

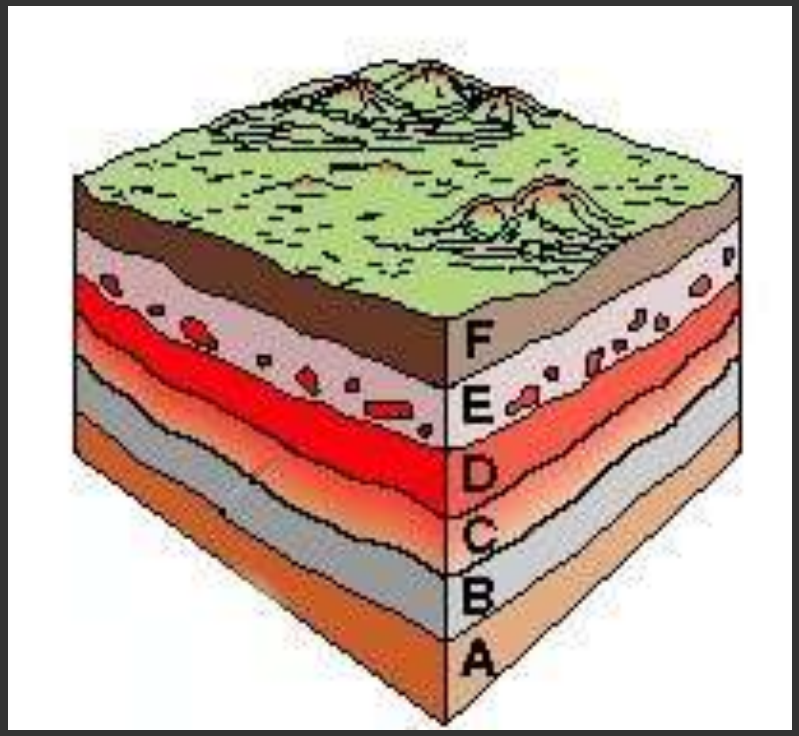


2) Folding – Bending of rock units caused by compressional forces.



7) Included Fragments

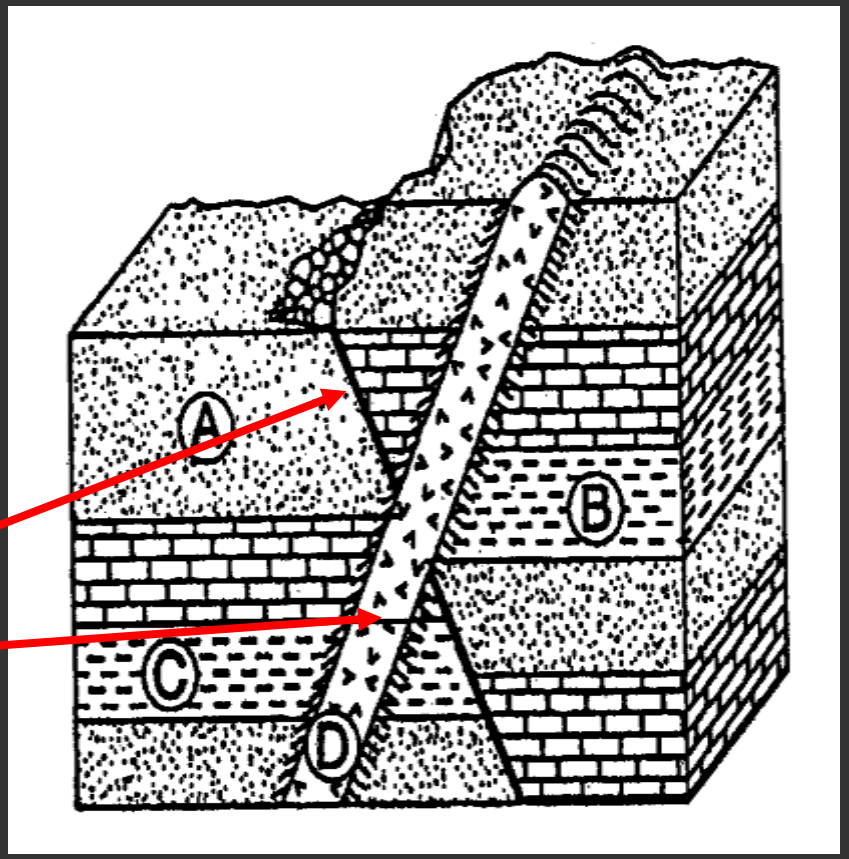
- states that pieces of one rock found in another rock must be older than the rock in which they are found.



8) Law of Cross - Cutting

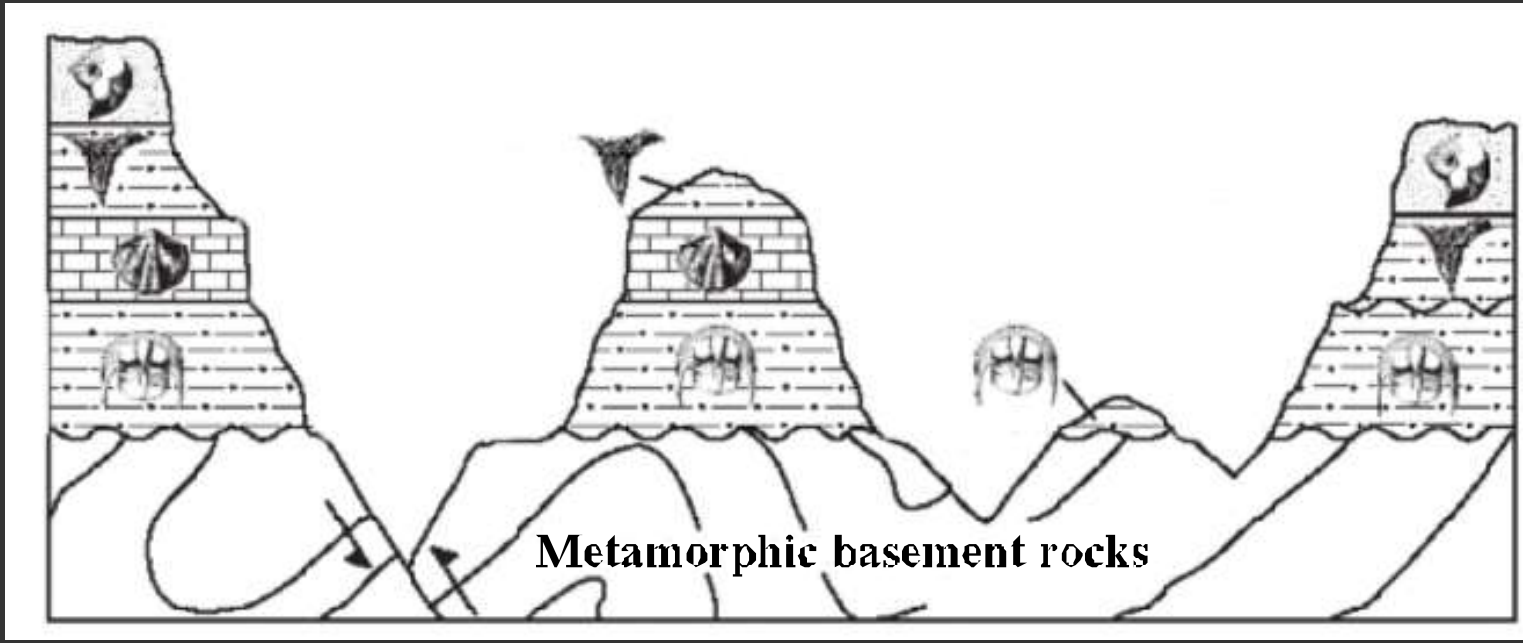
- states that an igneous rock is younger than the rocks it has intruded, or cuts across.
- Cross-cutting is seen by the fault and rock unit “D”.

Cross-cutting



9) Correlation

- is the matching up of rock layers from one area to another.
- Fossils are often used to correlate rock units.



10) Contact Metamorphism

- Changes in rock caused by the heat from a molten rock source that comes in contact with or is near by the rock being changed.

- Represented by “x-marks” in cross-section diagrams.

Contact Metamorphism