

History of Geology

- Science is the investigation of ideas. Throughout history, scientific ideas change as new evidence is discovered regarding scientific models and theories.
- These changing ideas were demonstrated throughout geologic history. One notable change that formed the framework for geologist is the movement from **Catastrophic** ideas to one of uniformity, hence the birth of the principle of **Uniformitarianism**.

Doctrine of Catastrophism

- During the 17th and 18th centuries the doctrine of Catastrophism influenced people's thinking about Earth. Catastrophists thought that Earth's physical features (mountains, canyons, and almost all landforms) formed by sudden spectacular events (catastrophes) produced by unknowable causes that no longer operate and can not be explained by nature.
- These ideas attempted to fit the rate of change of Earth processes into a relatively young aged Earth. These scientist thought Earth was millions and not Billions of years old.

Principle of Uniformitarianism

- One idea that helped scientist better understand the processes acting on Earth is the idea of **Uniformitarianism**. This idea was first recognized by a Scottish Geologist named James Hutton.
- After years of studying land forms and rocks, Hutton came to the conclusion that, “*the present is the key to the past.*” and “*that, the physical, chemical, 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.

Question:

How would the ideas of Catastrophism and Uniformitarianism explain the formation of the Grand Canyon.



Catastrophist:

- Sudden event
- Unknowable causes
- Unexplained
- Short period of time

Question:

How would the ideas of Catastrophism and Uniformitarianism explain the formation of the Grand Canyon.



Uniformitarianist:

- Gradual change
- Uniform processes
- Long period of time

Sample Problem

With the aid of a specific example, explain how uniformitarianism can be used to understand past catastrophic events. (2%)

The principle of uniformitarianism states that processes that acted on Earth in the past, are still acting upon Earth today. Catastrophic events which occur in the present time, for example, landslides and earthquakes, are caused by the same processes as in the past. Plate tectonics are responsible for the cause of present day earthquakes and are thought to be responsible for earthquakes in the past.