Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Guided Notes: Geologic Time

**Rocks Record Earth History**

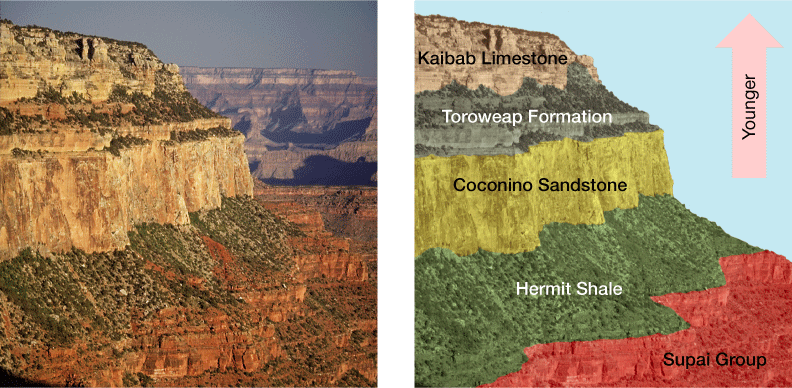
* Rocks record geological events and changing life forms of the past.
* We have learned that Earth is much older than anyone had previously imagined and that its surface and interior have been changed by the same geological processes that continue today.

**A Brief History of Geology**

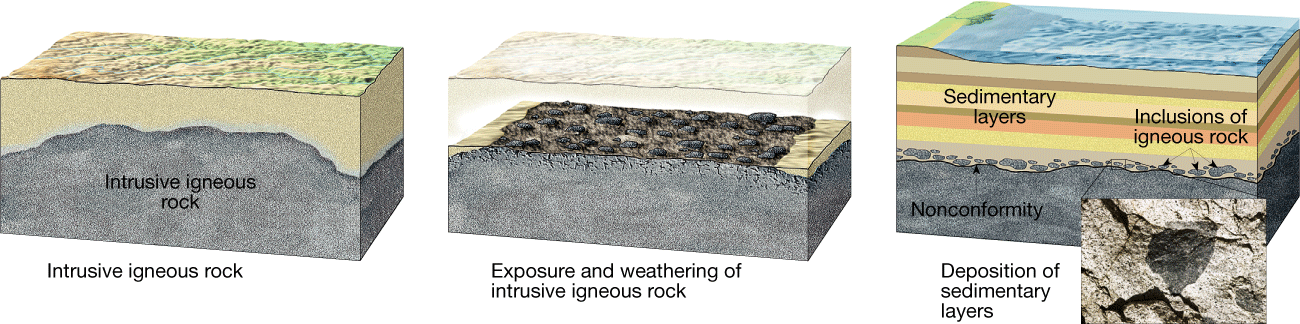
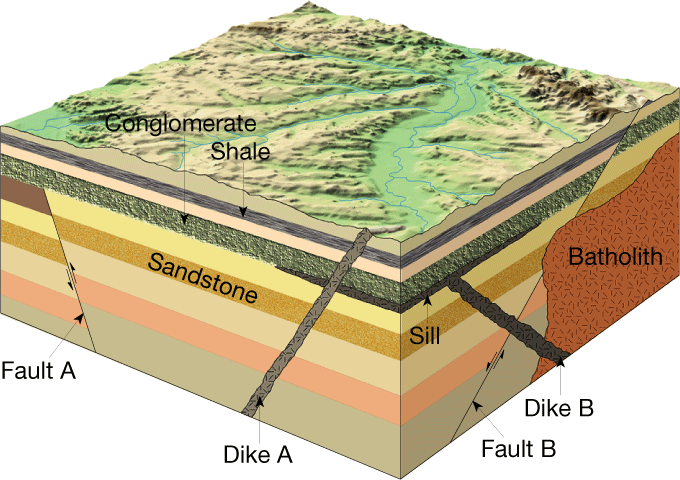
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** means that the forces and processes that we observe today have been at work for a very long time

**Relative Dating—Key Principles**

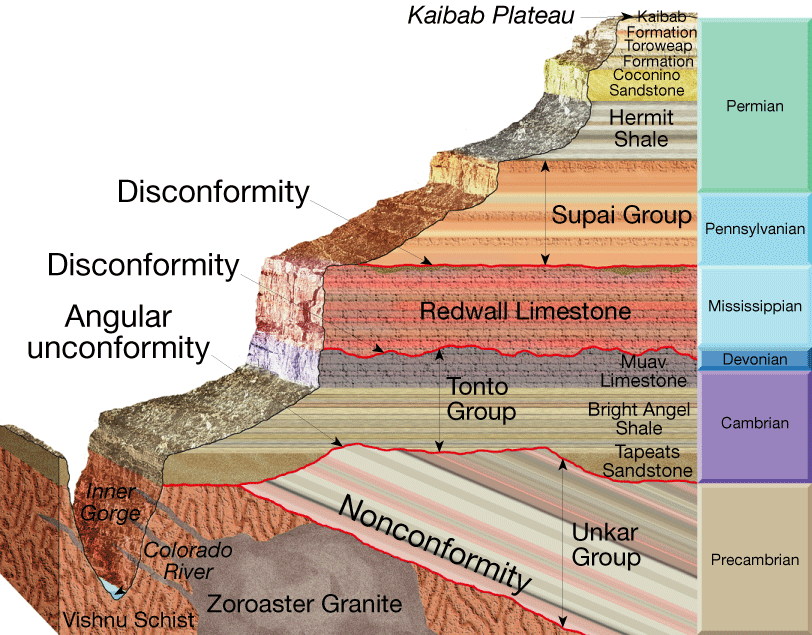
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** tells us the sequence in which events occurred, not how long ago they occurred
* Law of Superposition
  + The **law of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** states that in an undeformed sequence of sedimentary rocks, each bed is older than the one above it and younger than the one below it.



* The **principle of original \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** means that layers of sediment are generally deposited in a horizontal position.
* The **principle of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** **relationships** states that when a fault cuts through rock layers, or when magma intrudes other rocks and crystallizes, we can assume that the fault or intrusion is younger than the rocks affected.
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** are rocks contained within other rocks.
* Rocks containing inclusions are younger than the inclusions they contain.



* Unconformities
  + An **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** represents a long period during which deposition stopped, erosion removed previously formed rocks, and then deposition resumed.
  + An **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** unconformity indicates that during the pause in deposition, a period of deformation (folding or tilting) and erosion occurred
* A **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is when the erosional surface separates older metamorphic or intrusive igneous rocks from younger sedimentary rocks.
* A **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is when two sedimentary rock layers are separated by an erosional surface.



**Correlation of Rock Layers**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is establishing the equivalence of rocks of similar age in different areas.

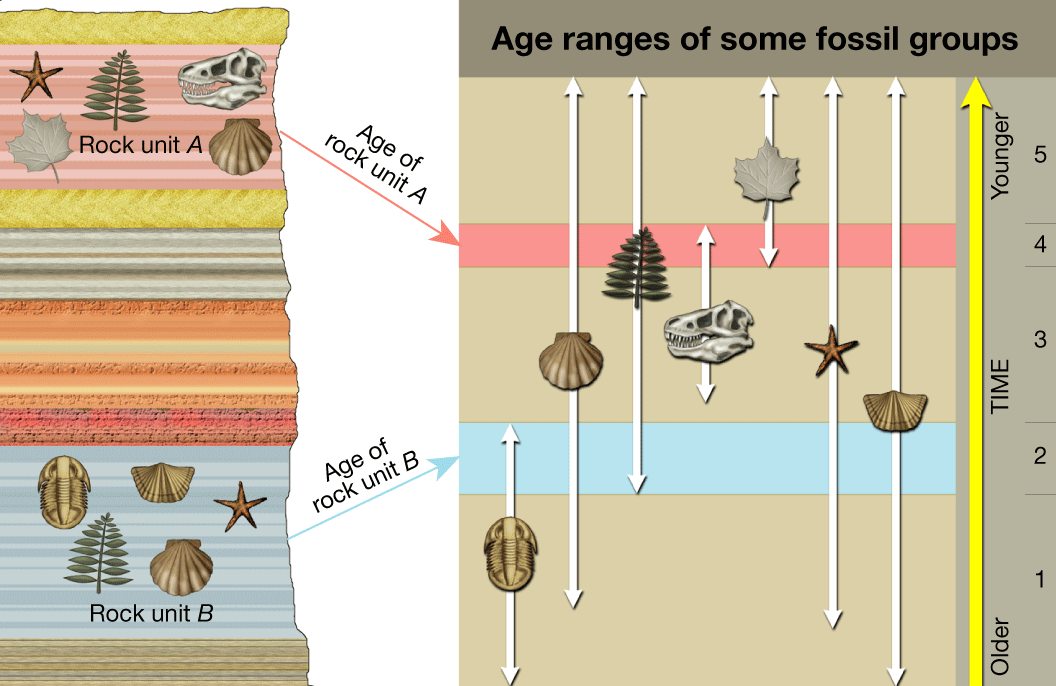
**Fossil Formation**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** are the remains or traces of prehistoric life. They are important components of sediment and sedimentary rocks.
* The type of fossil that is formed is determined by the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** under which an organism died and how it was buried
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** Remains
  + Some remains of organisms—such as teeth, bones, and shells—may not have been altered, or may have changed hardly at all over time.
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** Remains
  + The remains of an organism are likely to be changed over time.
  + Fossils often become petrified or turned to stone.
  + Molds and casts are another common type of fossil
  + Carbonization is particularly effective in preserving leaves and delicate animals. It occurs when an organism is buried under fine sediment
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** Evidence
  + Trace fossils are indirect evidence of prehistoric life.
  + Conditions Favoring Preservation
  + Two conditions are important for preservation: rapid burial and the possession of hard parts.



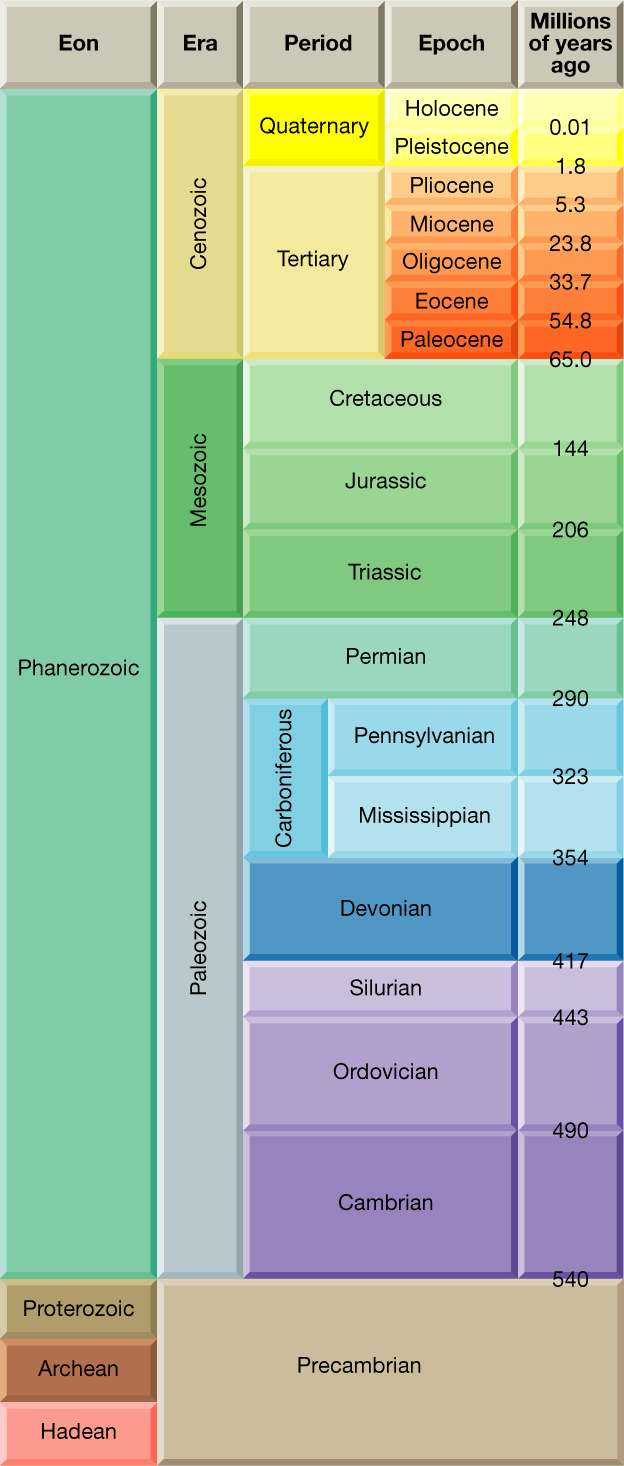
**Fossils and Correlation**

* The principle of fossil succession states that fossil organisms succeed one another in a definite and determinable **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**. Therefore, any **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** can be recognized by its fossil content
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** **fossils** are widespread geographically, are limited to a short span of geologic time, and occur in large numbers
* Fossils can also be used to interpret and describe ancient environments.



**Structure of the Time Scale**

* Based on their interpretations of the rock record, geologists have divided Earth’s 4.56-billion-year history into units that represent specific amounts of time. Taken together, these time spans make up the **geologic time scale**
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** represent the greatest expanses of time.
  + Eons are divided into **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
  + Each era is subdivided into **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
  + Finally, periods are divided into smaller units called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* There are three eras within the Phanerozoic eon:
  + the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**, which means “ancient life,”
  + the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**, which means “middle life,” and the
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**, which means “recent life.”
* Each period within an era is characterized by somewhat less profound **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** in life forms as compared with the changes that occur during an era



* The periods of the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** era are divided into still smaller units called epochs, during which even less profound changes in life forms occur.