

## Earth's History Review Sheet

### Sequence of Events

**Uniformitarianism**– “The present is the key to the past”

**Relative Age**– “This layer is older than that layer”

**Absolute Age**– This layer was deposited 105 million years ago.

**Original Horizontality**– Sediments are deposited in horizontal layers parallel to the earth's surface.

**Superposition**– The oldest layer is on the bottom and the youngest is on top.

**Intrusions and Extrusions**– An intrusion or extrusion is always younger than the rock it cuts through. Look for regions of contact metamorphism to determine the sequence of events.

**Faults, joints, folds, and tilts**– All deformation is younger than the rocks that are deformed.

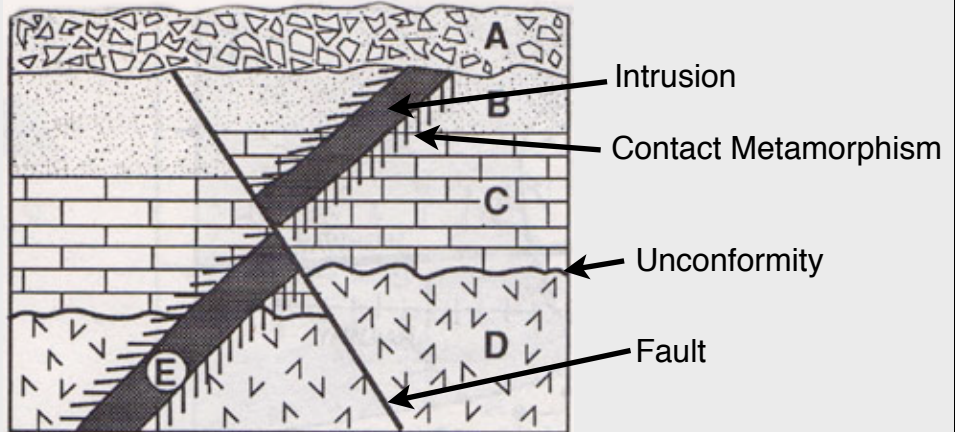
**Fragments**– All fragments in a rock are older than the rock in which they appear.

**Unconformity**– A buried erosional surface. Implies that **uplift, weathering and erosion, and subsidence (or submergence)** have occurred.

Note: If a layer **has not been overturned**, you may assume the oldest rock is on the bottom and the youngest is on top.

#### **Sequence of Events:**

1. Formation of granite
2. Uplifting and erosion of granite
3. Subsidence of the granite (unconformity)
4. Deposition of limestone and sandstone
5. Formation of basalt
6. Faulting of all the rock layers
7. Uplifting and erosion of sandstone and basalt
8. Deposition of glacial till



### Correlation

The process of matching rocks and events in one location with rocks and events in another location in order to determine the geologic history of the region.

**Walking the outcrop**– Tracing a rock layer from one location to another by observing characteristics like color texture and sequence.

**Index Fossils**– Fossils of organisms that lived over a wide geographic area but for a relatively short period of time. These are used to match up different rock layers.

**Volcanic Time Markers**– Layers of ash resulting from a volcanic eruption that can be used in the same way as index fossils.

## Geologic Time

Geologic time is broken into two **eons**. The **precambrian** eon represents about 80% of the history of the earth. The **phanerozoic** eon is more modern times and represents the explosion of diverse life on earth.

**Eons** are divided into **eras**, which are divided into **periods**, which are divided into **epochs**. This time scale is an example of relative dating.

The centerfold lists the biological and geological history of the earth (pages 8 and 9 of the ESRTs). The type and distribution of fossils gives us information about the properties of the past environment in that location.

The Generalized Bedrock map of New York State details the specific ages of the bedrock in different regions of New York State (page 3 of the ESRTs).

## Radioactive Decay

Radioactive isotopes decay at a predictable rate. They decay into another element over a period of time called a **half-life**. Each isotope has a unique half-life. For example, it takes 5,700 years for half of a sample of C-14 to decay into N-14. Then each 5,700 years thereafter, the amount of C-14 will decrease by half, and the amount of the N-14 will increase.

Radioactive Decay Data

RADIOACTIVE ISOTOPE	DISINTEGRATION	HALF-LIFE (years)
Carbon-14	$C^{14} \rightarrow N^{14}$	$5.7 \times 10^3$
Potassium-40	$K^{40} \rightarrow Ar^{40}$ $K^{40} \rightarrow Ca^{40}$	$1.3 \times 10^9$
Uranium-238	$U^{238} \rightarrow Pb^{206}$	$4.5 \times 10^9$
Rubidium-87	$Rb^{87} \rightarrow Sr^{87}$	$4.9 \times 10^{10}$

