

Earth Science

With

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Earth History

▶ Fossils:

- ▶ Any evidence of earlier life preserved in rock.
- ▶ The study of these fossils is called:

Paleontology

Formation of Fossils:

There are several ways in which fossils are created:

- 1) **Original Remains** – An animal dies, it decays, & the bones get encased into the bedrock.
- 2) **Replaced Remains** – Where the bones are replaced with minerals.

Formation of Fossils:

There are several ways in which fossils are created:

3) **Molds & Casts** – Mold: When an imprint remains in the rock (dinosaur footprint). Cast: IS when the mold is filled with something that then solidifies into minerals.

4) **Trace Fossils** – Any impressions left in the rock by an animal, like footprints, tracks where we can track where they went.

Relative Time:

- ▶ Relative Time vs. Absolute Time:
 - Relative Time – Placing events into a sequence or order of events.
 - Absolute Time – Marking each event with a specific date or time.

Relative Time:

- ✦ Rock Correlation: - Placing events in order according to the rock layer record.
 - ✦ Matching rock characteristics.
 - ✦ Using Index Fossils
- ✦ Index Fossils: The remains of animals that lived and died within a particular time segment of earth's history.

Relative Time:

✦ 4 Characteristics of Index Fossils:

- 1) They are easily recognizable (unique).
- 2) They are abundant.
- 3) They are Widespread.
- 4) Since they only lived for a specific time period, they will only be found in a few rock layers.

Relative Time:

- ▶ Principal of superposition – For an undisturbed sequence of sedimentary strata (layers), the oldest layer is the one on the bottom.

Relative Time:

✦ Principle of Cross-Cutting

Relationships: - An igneous intrusion is *always* younger than the rock layers it cuts across.

✦ Embedded Fragments – Rocks that are embedded in another rock must be older than the rock in which they are contained.

Relative Time:

▶ Gaps in Relative Time:

- **Unconformity:** Indicates where layers of rock are missing in the strata sequence.
- **Angular unconformity:** When younger flat strata are deposited on tilted layers resulting from uplift.

Absolute Time:

Absolute time is measured in several ways:

- 1) Historical Methods
- 2) Radioactivity
- 3) Half-Life
- 4) Radiometric Dating

Absolute Time:

Historical Methods:

- 1) Estimating rates of erosion & sedimentation.

Problem: Such rates are not constant!

- 2) Counting Tree Rings.

Still used today for in many areas of science!

- 3) Counting Varves (a yearly deposited sediment).

Deposits in glacial lakes during last ice age.

Absolute Time:

Radioactivity:

- 1) Radioactive Decay – When isotopes emit or capture tiny particles which then change the atomic number of the isotope and it becomes an isotope of a different element.

Problem: Radiation given off is harmful!!

That's it