Lesson Outline

Lesson 1: Geologic Time

A. Evidence That Earth Has Changed

1. Layers of rock provide evidence of Earth’s changes.

a. Weathering breaks rocks exposed at Earth’s surface into smaller pieces called

sediment.

b. Rock layers form when sediment compresses over time.

c. The principle of superposition states that if rock layers have not been folded or

deformed, the oldest layers are on the bottom.

2. Other evidence of Earth’s past is provided by the preserved remains or evidence of

past living organisms, or fossils.

3. Radioactive decay is the process by which one element naturally changes into

another element.

a. The decay occurs when the nucleus of the atom ejects particles.

b. The original element, or parent element, changes into a new element called the

daughter element.

c. Each radioactive element has a unique half-life, which is the length of time it takes

for half of the atoms in a sample of the element to decay.

d. By comparing the amount of parent element to the amount of daughter element

in a sample, scientists can calculate the age of a sample.

B. The Geologic Time Scale

1. The geologic time scale is a visual record of Earth’s history, with the individual units

based on changes in the rocks and fossils.

a. The geologic time scale is drawn with the oldest rocks at the bottom and the

youngest rocks at the top.

b. Scientists divide Earth’s history into units of eons, eras, periods, and epochs.

c. The divisions in the geologic time scale are not all the same length, but they

mark places in the record where there are major changes in the types of fossils

present in the rocks.

d. The beginning of the Cambrian period is marked by an abrupt appearance

of complex life-forms, and the end of the Permian period is marked by a

catastrophic die-off of organisms.

2. Scientists estimate that Earth is approximately 4.6 billion years old.

a. Most changes on Earth, such as the erosion of a mountain range, have occurred

slowly.

b. Volcanoes and earthquakes can change Earth’s surface very quickly (or rapidly).