**Fossils**

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ study fossils and reconstruct the appearance of animals.
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - remains, imprints, or traces of prehistoric organisms
3. Fossils can form if the organism is quickly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by sediments.
4. Organisms with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are more likely to become fossils than organisms with soft parts.
5. Types of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. Fossils in which spaces inside are filled with minerals from groundwater are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **remains.**
7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ results when a thin film or carbon residue forms a silhouette of the original organism; carbonized plant material becomes \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ - cavity in rock left when the hard parts of an organism decay
9. If sediments wash into a mold, they can form a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the original organism.
10. Occasionally \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ remains are preserved in a material such as amber, ice, or tar.
11. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - evidence of an organism’s activities
12. Can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ left in mud or sand that became stone
13. Can be trails or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ made by worms and other animals
14. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - abundant, geographically widespread organisms that existed for relatively short periods of time
15. Fossils can reveal information about past land forms and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Relative Ages of Rocks**

1. **Principle of** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - process of reading undisturbed rock layers
2. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** rocks in the bottom layer
3. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** rocks in the top layer
4. How old something is in comparison with something else is its \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
5. The age of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ rocks can be determined by examining layer sequences.
6. The age of undisturbed rocks may have to be determined by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or other clues.
7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - gaps in rock layers
8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - unconformity – rock layers are tilted, and younger sediment layers are deposited horizontally on top of the eroded and tilted layers.
9. A layer of horizontal rock once exposed and eroded before younger rocks are formed over it is called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
10. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - sedimentary rock forms over eroded metamorphic or igneous rock.
11. The same rock layers can be found in different locations; fossils can be used to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ those rock layers.
12. Igneous \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ occur when magma flows into already existing rock where it cools and hardens.
13. Igneous \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ occur when lava flows onto the Earth’s surface and solidifies.

**Absolute Ages of Rocks**

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - age, in years, of a rock or other object; determined by properties of atoms
2. Unstable isotopes break down into other isotopes and particles in the process of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **decay**.
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - an isotope’s neutron breaks down into a proton and an electron with the electron leaving the atom as a beta particle; a new element forms due to proton gain.
4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - an isotope gives off two protons and two neutrons as an alpha particle; a new element forms.
5. The time it takes for half the atoms in an isotope to decay is the isotope’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
6. Calculating the absolute age of a rock using the ratio of parent isotope to daughter product and the half-life of the parent is called **radiometric** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ dating is used to date ancient rock millions of years ago.
8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ dating is used to date bones, wood, and charcoal up to 75,000 years old.
9. Earth is estimated to be about 4.5 billion years old; the oldest known rocks are about \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ years old.
10. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - Earth processes occurring today are similar to those that occurred in the past.

**Life and Geologic Time**

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ time—Earth’s history is divided into time units that make up a **geologic time scale**.
2. Time units on the scale are based on the appearance or disappearance of types of organisms such as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, index fossils that lived during specific periods of time.
3. Geologic time is divided into 4 major \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
4. \_\_\_\_\_\_\_ – longest subdivision; based on abundance of fossils
5. \_\_\_\_\_\_\_ – marked by significant worldwide changes in the types of fossils present in rock
6. \_\_\_\_\_\_\_\_\_\_\_\_\_ – based on types of life existing worldwide at a particular time
7. \_\_\_\_\_\_\_\_\_\_\_\_\_ – characterized by differences in life-forms, but differences can be regional rather than global
8. Geological time can be subdivided only if fossils are present in rock records.
9. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ evolution—Organisms have changed over time, most likely because of environmental changes.
10. **Species**—organisms that normally \_\_\_\_\_\_\_\_\_\_\_\_\_\_ only with other members of their group.
11. Darwin’s theory of **natural** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - organisms more adapted to an environment are more likely to reproduce.
12. Natural selection within a species occurs only if characteristics present in some numbers increase their \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
13. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ selection - breeding individuals with desired characteristics; humans use this type of selection when breeding domestic animals.
14. \_\_\_\_\_\_\_\_\_\_ species can evolve from natural selection.
15. Trilobites – have an exoskeleton with three lobes; lived in oceans for more than 200 million years
16. Trilobite \_\_\_\_\_\_\_\_ position changed as the species adapted to various environments.
17. Trilobite bodies and \_\_\_\_\_ changed in response to changing environments.
18. Continental collisions formed the giant landmass \_\_\_\_\_\_\_\_\_\_\_\_ near the end of the Paleozoic \_\_\_\_\_\_. These collisions may have dropped\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, causing the extinction of trilobites.

**Early Earth History**

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **time** – from 4 billion to about 544 million years ago
2. Very few\_\_\_\_\_\_\_\_\_\_\_\_\_ remain from this time.
	1. Many Precambrain rocks were deeply buried, causing the fossils in them to be changed by \_\_\_\_\_\_\_\_\_\_\_\_ and pressure.
	2. Most Precambrain organisms lacked \_\_\_\_\_\_\_\_\_\_\_\_ parts.
3. **Cyanobacteria** are blue-green \_\_\_\_\_\_\_\_\_\_\_\_\_.
	1. One of the \_\_\_\_\_\_\_\_\_\_\_ life forms to appear
	2. Added \_\_\_\_\_\_\_\_\_\_ to the atmosphere through photosynthesis
4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and Ediacaran animals appeared late in Precambrain time.
5. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Era -** about 544 million years ago to about 245 million years ago
6. Many organisms with \_\_\_\_\_\_\_\_\_\_\_\_ and vertebrates evolved in the warm, shallow seas.
7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ evolved to survive in water and on land.
	1. Might have evolved from \_\_\_\_\_\_\_\_\_
	2. Could obtain oxygen from \_\_\_\_\_\_\_\_\_\_\_\_ or from lungs.
8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ evolved from amphibians to survive farther from water
9. Several mountain-building episodes occurred during the Paleozoic Era because of \_\_\_\_\_\_\_\_\_ collisions.
10. Most marine and land species became \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ at the end of the Paleozoic Era.

**Middle and Recent Earth History**

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Era-**lasted from 245 to 65 million years ago
2. Pangaea separated into \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the climate became drier.
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ evolved; they might have been warm-blooded, traveled in herds, and nurtured their young.
4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which probably evolved from small, meat-eating dinosaurs, appeared during the Jurassic Period.
5. Small, mouse-like \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which are warm-blooded vertebrates with hair and milk to feed their young, appeared in the Triassic Period.
6. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,** plants that produce seeds but not flowers, appeared in the Paleozoic Era.
7. Flowering plants or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ appeared during the Cretaceous Period.
8. A great extinction, perhaps caused by a comet or an asteroid collision, occurred about \_\_\_\_\_\_\_\_\_\_\_\_\_\_ years ago, marking the end of the Mesozoic Era.
9. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Era** began about 65 million years ago and continues today.
10. Many \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ formed, perhaps creating cooler climates worldwide.
11. Mammals continued to evolve
12. Many species became \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as the continents continued to separate.
13. *Homo sapiens,* or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, appeared about 400,000 years ago.

