Physical Geology
South Sevier High School
Lecture Notes – Chapter 8

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Name _____
Date _____
Per _____

1. According to the biblical view, the Earth is approximately _____ years old, but based on scientific evidence and radiometric dating, the Earth is approximately _____ years old.

2. Who is the "Father of Geology?"

3. _____ says that same processes operating in past are operating at present, or "The present is the key to the past".

4. There are two basic ways that Geologists determine the age of Earth's materials. The first is called _____ age dating where the age of something is determined by the order in which it appeared. The second is called _____ age dating, at it is based upon the natural and predictable decay of radioactive isotopes founding rocks and minerals.

5. Match the correct principle of Stratigraphy with its correct definition.

_____Original horizontality	A. Original horizontal layer extends laterally until it tapers or thins at its edges.
_____Cross-cutting relationships	B. Beds of sediment deposited in water are initially formed as horizontal or nearly horizontal layers.
_____ Superposition	C. Within an undisturbed sequence of sedimentary or volcanic rocks, layers get younger from bottom to top.
_____ Lateral continuity	D. A disrupted pattern is older than the cause of the disruption or intrusions and faults are younger than the rocks they cut through.

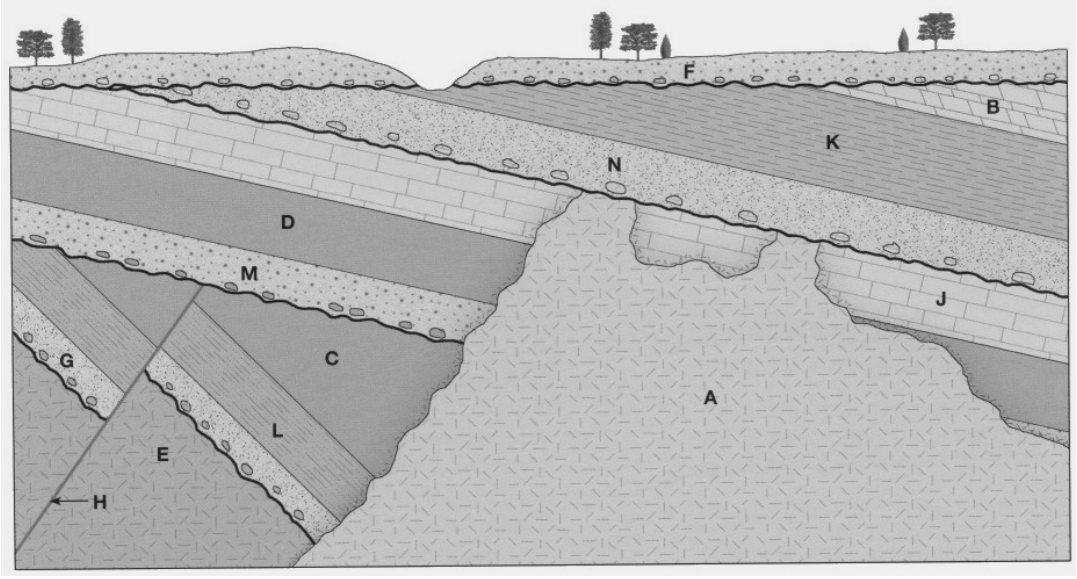
6. _____ are surfaces separating successive rock layers (beds).

7. _____ are bodies of rock of considerable thickness with recognizable characteristics allowing them to be distinguished from adjacent rock layers.

8. Contacts between igneous intrusions and surrounding rocks, where surrounding rocks have experienced contact metamorphism are called _____ contacts.

9. _____ are fragments embedded in host rock are older than the host rock.

10. Examine the image below, then correctly order the labeled strata from oldest to youngest (13pts).

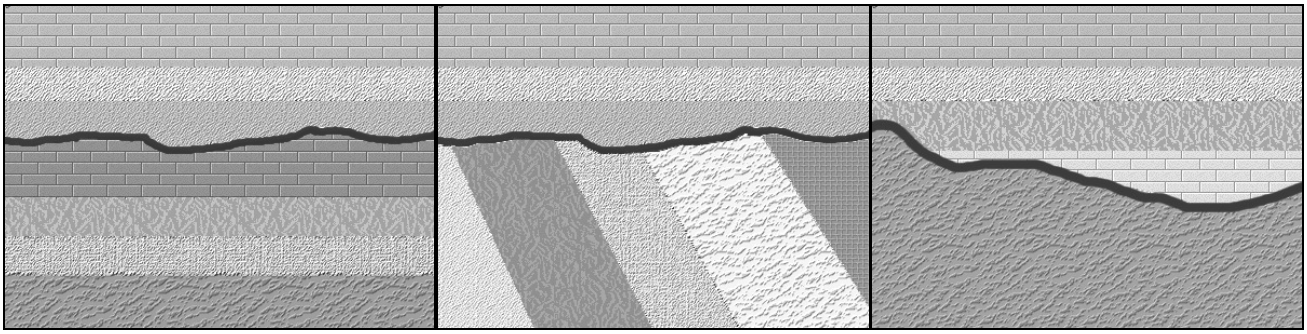


Oldest ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ Youngest

11. An _____ is a surface (or contact) that represents a gap in the geologic record. There are three types:

    A. _____ - an unconformity in which the contact representing missing rock layers separates beds that are parallel to each other.
    B. _____ unconformity - an unconformity in which the contact separates overlying younger layers from eroded tilted or folder layers.
    C. _____ - an unconformity in which an erosional surface on plutonic or metamorphic rock has been covered by younger sedimentary or volcanic rock. This type of unconformity typically represents a large gap in the geologic record.

12. The images below show the three types of unconformities. Label each one correctly (3pts).



_____ _____ _____

12. There are other ways that Geologists may determine the relative ages of materials. One such method is called correlation. Match the correlation method with its correct definition.

____ Physical continuity — A. Assumes similar sequences of rocks formed at the same time.

____ Similarity of rock types — B. Fossil species succeed one another in layers in a predictable order.

____ Correlation by fossils — C. Tracing a continuous exposure of a rock unit.

13. _____ is the time it takes for a given amount of a radioactive isotope to be reduced by half.

14. Isotopes of an element are atoms containing different numbers of _____ but the same number of protons, and are usually unstable.

15. Which radioactive isotope is the most effective in dating the age of the Earth? _____

16. Carbon-14 is often used to calculate the age of organic materials that are less than 40,000 years old, and has a half-life of 5,730 years. Carbon-14 eventually breaks down into the daughter isotope Nitrogen-14. Pretend you find a bone in the forest and you want to know how old it is. A laboratory determines that there are 980,000 atoms of Carbon-14 present in the bone sample, and 22,000 atoms of Nitrogen-14. Based on equation we used in class, calculate the age of the bone (10pts, show work).

17. Why is there no complete record of geologic time preserved anywhere on Earth (5pts)?

18. Fill in the Geologic Time Scale below (44pts).

Geologic Time Scale

EON	ERA	PERIOD	EPOCH	MILLIONS OF YRS AGO	MAJOR BIOLOGICAL EVENTS
PHANEROZOIC				.01	
					Four major glaciations cause rapid shifts in ecological communities.
		Neogene		5	Extensive radiation of flowering plants and mammals. First hominids appear.
				23	Coevolution of Dogs and bears appear.
		Paleogene		38	Pigs, cats, and rhinos appear. Dominence of snails and bivalves in the oceans.
				54	Rodents, primitive whales and grasses appear.
					Early placental mammals appear; modern birds.
				146	Marsupials, ants, bees, butterflies, of most large animals and many plants.
				208	
					Origin of mammals, dinosaurs and true flies. Less diverse marine fauna.
				286	Gymnosperms, amphibians dominant. Beetles, stoneflies appear. Major extinction of 95% of marine species and 50% of all animal families.
				325	First reptiles, cockroaches and mayflies appear. Extensive coal swamp forests. Sponge reefs.
			Missippian	360	Echinoderms, bryozoans dominant in oceans. Early
				410	Extensive radiation of fish, land plants. Many corals, brachiopods and echinoderms.
				440	early insects, vascular plants, jawed fish and large reefs appear.
				505	primitive sea weed appear. Diverse marine life: corals, molluscs, bivalves, echinoderms, etc.
				543	
PROTEROZOIC EON				570	Origin of organisms. First sponges, colonial algae and soft-bodied invertebrates.
ARCHEAN EON				2,500	as a result of photosynthetic organisms. First (single-celled algae): 1.4 billion years old. Earliest life, (bacteria, archaeans) originate 3.5 billion years ago.
HADEAN EON					Cooling and solidifying of Earth's crust.