

I. \_\_\_\_\_ = age of an object \_\_\_\_\_ to the ages of other objects. Can tell the \_\_\_\_\_ of \_\_\_\_\_, but does not tell exact age in \_\_\_\_\_.

A) \_\_\_\_\_ = theory that states that gradual geological processes that occur \_\_\_\_\_ happened the \_\_\_\_\_ in the past.

B) \_\_\_\_\_ = The law that a sedimentary rock layer is \_\_\_\_\_ than the layers above it and \_\_\_\_\_ than the layers below it if the layers are \_\_\_\_\_.

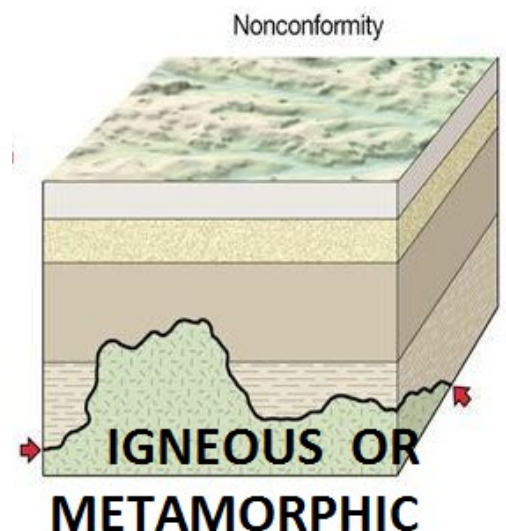
C) **Principle of** \_\_\_\_\_ = sedimentary rock will remain in horizontal layers if left \_\_\_\_\_. This happens because gravity pulls \_\_\_\_\_ flat and \_\_\_\_\_ to each other. If disturbed, scientists look for clues to determine the original order of layers.

### 1) WAYS ROCK LAYERS GET \_\_\_\_\_:

- a) \_\_\_\_\_ -a break in the Earth's crust where pieces \_\_\_\_\_ past each other
- b) \_\_\_\_\_ -molten rock that \_\_\_\_\_ into existing rock and cools
  - 1. \_\_\_\_\_ - magma seeps in between layers of rock (\_\_\_\_\_ magma flow)
  - 2. \_\_\_\_\_ - magma breaks a crack through several layers (\_\_\_\_\_ magma flow)
- c) \_\_\_\_\_ -when rock layers \_\_\_\_\_ and \_\_\_\_\_ from Earth's internal forces
- d) \_\_\_\_\_ -when internal forces in the Earth \_\_\_\_\_ rock layers
- e) \_\_\_\_\_ - when rock layers are not made in an area (but in other areas)

D) \_\_\_\_\_ = The break in the geologic record created when rock layers are \_\_\_\_\_ or when sediment is \_\_\_\_\_ for long periods of time.

- 1) \_\_\_\_\_ = sedimentary rock layers form on top of eroded \_\_\_\_\_ or \_\_\_\_\_ rock. The eroded rock represents missing \_\_\_\_\_.



Angular unconformity




Diagram illustrating the relative ages of rock layers (stratigraphy). The layers are numbered 1 to 5, with 1 being the oldest and 5 being the youngest. The layers are colored: 1 (red), 2 (green), 3 (purple), and 5 (yellow). A diagonal orange layer labeled 4 is shown cutting through layers 1, 2, and 3, indicating it is younger than the layers it cuts through.

Intrusion = Magma injected in rock and cooling forming rock.

# 8<sup>th</sup> Science Notes 12-2

name \_\_\_\_\_ hr \_\_\_\_\_

II. \_\_\_\_\_ = the remains of \_\_\_\_\_ or \_\_\_\_\_ that lived in a previous geologic \_\_\_\_\_.

A) \_\_\_\_\_ = The study of \_\_\_\_\_

- 1) Fossils mostly found in \_\_\_\_\_ rock because sediment covers the organism and prevents \_\_\_\_\_. Igneous and metamorphic rock forming processes \_\_\_\_\_ the organic structures. Fossils in rock can form if organism is \_\_\_\_\_ immediately after \_\_\_\_\_. Then, the \_\_\_\_\_ become preserved as \_\_\_\_\_ forms around them

B) Interpreting the Fossil Record

- 1) Shows us clues to the Earth's \_\_\_\_\_  
a) \_\_\_\_\_ changes are seen by \_\_\_\_\_ fossils found on land. This shows that the area once was under oceans. (\_\_\_\_\_ was under \_\_\_\_\_ for 300 million years laying down our \_\_\_\_\_, gypsum, and dolomite, as well as \_\_\_\_\_ stones (our state stone) which are \_\_\_\_\_.  
b) Shows how living things have \_\_\_\_\_ over \_\_\_\_\_

C) Ways to make a fossil:

- 1) buried under \_\_\_\_\_ in the \_\_\_\_\_  
2) buried in \_\_\_\_\_ / mudslide / landslide on \_\_\_\_\_  
3) buried in volcanic \_\_\_\_\_  
4) buried in \_\_\_\_\_ / glacier \_\_\_\_\_  
5) buried in \_\_\_\_\_ pit  
6) buried in tree \_\_\_\_\_ (amber)  
7) buried in hot \_\_\_\_\_ of desert (\_\_\_\_\_)

D) Types of fossils

- 1) \_\_\_\_\_ = Form in dry places where \_\_\_\_\_ cannot live.  
2) \_\_\_\_\_ = fossils form when \_\_\_\_\_ land on a tree and get covered in \_\_\_\_\_ which \_\_\_\_\_. Sometimes \_\_\_\_\_ can be extracted (Jurassic Park?)  
3) \_\_\_\_\_ seeps/asphalt = fossils form when an organism fell into an \_\_\_\_\_ /tar \_\_\_\_\_ while trying to drink the water floating above it. Creature is then \_\_\_\_\_. (Le Brea asphalt/tar pit in LA, California)

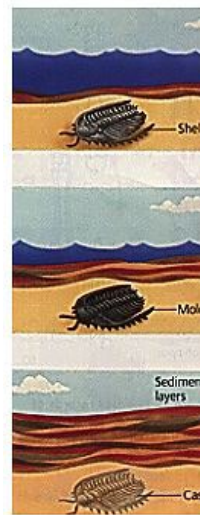
4) \_\_\_\_\_ = Frozen fossils form when organisms from the last ice age died and froze, \_\_\_\_\_ the \_\_\_\_\_ process.

5) \_\_\_\_\_ = Petrified fossils form when \_\_\_\_\_ in \_\_\_\_\_, \_\_\_\_\_, or \_\_\_\_\_ fill with dissolved \_\_\_\_\_ (silica, calcite, pyrite) and crystallize over time

6) \_\_\_\_\_ = When original organic material \_\_\_\_\_ decays, leaving \_\_\_\_\_ behind a \_\_\_\_\_



7) \_\_\_\_\_ = A mark or \_\_\_\_\_ made in a sedimentary surface by a shell or other body part. \_\_\_\_\_ = A fossil that forms when \_\_\_\_\_ fill in the cavity left by a \_\_\_\_\_ organism.

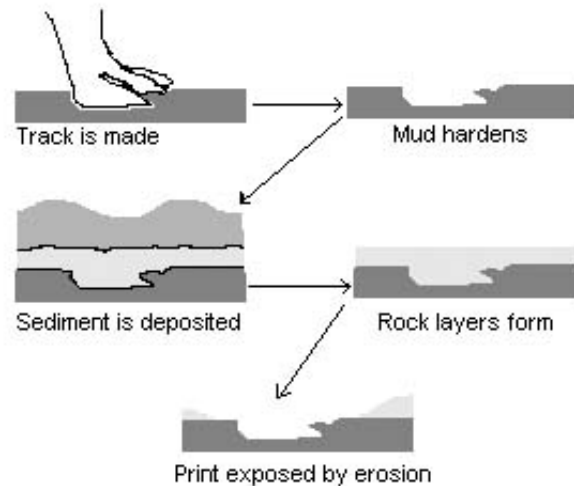


8) \_\_\_\_\_ = Fossilized \_\_\_\_\_ can preserve information about what the animal ate



9) \_\_\_\_\_ = Stones that were used in the \_\_\_\_\_ tract of some dinosaurs. (Like the stones in a bird's gizzard) They reveal that the dinosaur was a \_\_\_\_\_.

10) \_\_\_\_\_ fossil- A fossilized mark that is formed in soft sediment by the movement of an animal (\_\_\_\_\_, \_\_\_\_\_, boring, etc.)



E) \_\_\_\_\_ Fossil = A fossil that lived during a relatively \_\_\_\_\_ geological \_\_\_\_\_ that can be used to find the \_\_\_\_\_ of the rock layer it is found in.



**Ammonites** Mesozoic Era (245 to 65 mya)



**Trilobites** Paleozoic Era (540 to 245 mya)

III. \_\_\_\_\_ = The ACTUAL age of an object \_\_\_\_\_

A) Absolute Dating \_\_\_\_\_

1) \_\_\_\_\_ **Dating**-- a dating method that compares \_\_\_\_\_ with \_\_\_\_\_

more parent = \_\_\_\_\_

more daughter = \_\_\_\_\_

a) \_\_\_\_\_ **decay**-- the process in which a radioactive isotope \_\_\_\_\_ into a \_\_\_\_\_ isotope

b) \_\_\_\_\_ -- an atom with the same number of protons as other atoms, but a different number of \_\_\_\_\_

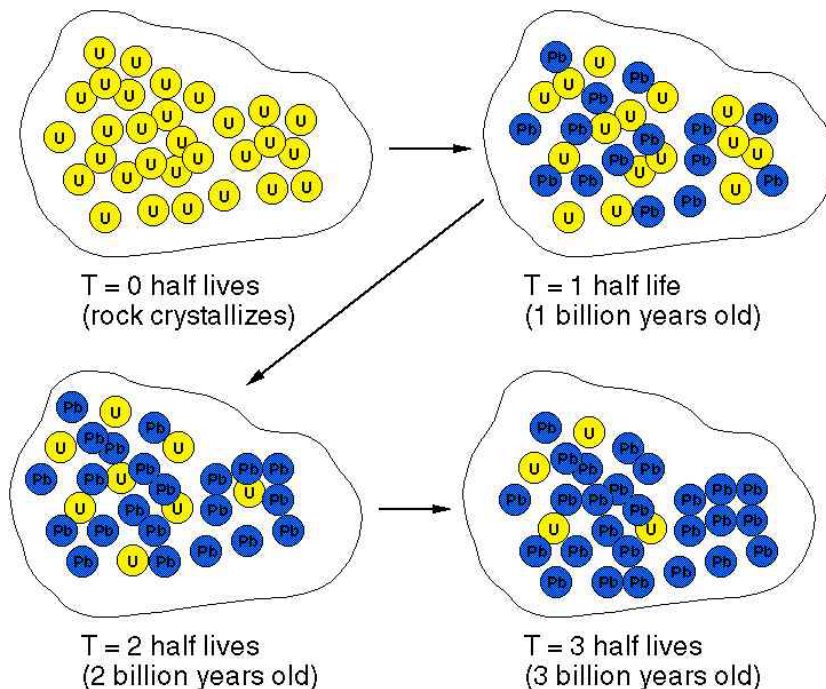
(1) \_\_\_\_\_ **isotope** -- the \_\_\_\_\_ radioactive isotope

(2) \_\_\_\_\_ **isotope**-- the \_\_\_\_\_ isotope produced after a radioactive decay

c) \_\_\_\_\_ = \_\_\_\_\_ -- the time it takes one half of the \_\_\_\_\_ material to decay into \_\_\_\_\_ material

d) types of \_\_\_\_\_

| Parent Isotope | Daughter Isotope | Half-life    | Effective range        |
|----------------|------------------|--------------|------------------------|
| Carbon-14      | Nitrogen-14      | 5730 years   | less than 70,000 years |
| Uranium-235    | Lead-207         | 704 million  | 10 mill - 4.6 bill     |
| Uranium-238    | Lead-206         | 4.5 bill     | 10 mill - 4.6 bill     |
| Potassium-40   | Argon-40         | 1.25 billion | 50,000 - 4.6 bill      |
| Thorium-232    | Lead-208         | 14 bill      | up to 200 mill         |
| Rubidium-87    | Strontium-87     | 48.8 bill    | 10 mill - 4.6 bill     |



## I EVIDENCE OF THE PAST 6-1

A \_\_\_\_\_ - a trace or imprint of living things that are preserved in rock

1] \_\_\_\_\_ **dating**- any method of determining whether an event or object is older or younger than other events or objects

2] **Absolute dating** — a method of measuring the age of fossils \_\_\_\_\_

a) **Radiometric dating** — using radioactive elements' \_\_\_\_\_ to come up with a date range

b) Types – \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

B \_\_\_\_\_ — the standard method used to divide earth's long natural history into manageable parts based on significant events (like \_\_\_\_\_, appearance of new organism, formation of mountain \_\_\_\_\_ or \_\_\_\_\_, \_\_\_\_\_ age, or widespread \_\_\_\_\_ eruptions.)

1] \_\_\_\_\_ — major time division (4)

a) \_\_\_\_\_

b) \_\_\_\_\_

c) \_\_\_\_\_

d) \_\_\_\_\_

2] \_\_\_\_\_ - a division of an era

3] \_\_\_\_\_ - a division of a period

C The changing Earth

1] **Pangaea** — all continents formed one \_\_\_\_\_

2] \_\_\_\_\_ — large pieces of earth's crust "float" moving the continents around over time

3] Rapid changes- create \_\_\_\_\_ (species dying out)

4] Slow changes — allow for \_\_\_\_\_ (animals changing to survive)

## II ERAS OF GEOLOGIC TIME 6-2

A \_\_\_\_\_ - 4,600 mya — 543 mya (4.6Bya-543mya)

1] 4600 million years ago \_\_\_\_\_

2] 3800 million years ago \_\_\_\_\_

3] 3500 million years ago = first \_\_\_\_\_ (no nucleus) life forms

a) \_\_\_\_\_ - \_\_\_\_\_, \_\_\_\_\_ (make food from sun), cyanobacteria

b) released \_\_\_\_\_ into \_\_\_\_\_

c) created \_\_\_\_\_ (O<sub>3</sub>) which blocked UV rays

4] 2500 m.y.a

a) first \_\_\_\_\_ (nucleus and other organelles) life forms

b) \_\_\_\_\_ (ate their food) like an amoeba

5] Ended with \_\_\_\_\_

B \_\_\_\_\_ — ("ancient life") 543 -248 mya

1] \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_,

\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

2] \_\_\_\_\_, club \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_ appear on land toward the end of era

3] \_\_\_\_\_ insects, salamander-like \_\_\_\_\_ during middle, followed by winged \_\_\_\_\_ and \_\_\_\_\_ by the end of the era

4] Ends in largest \_\_\_\_\_ in history (90% of all species)

C \_\_\_\_\_ (middle life) 248 -65 mya

1 "Age of \_\_\_\_\_"

2 \_\_\_\_\_ dominate for 150 million years

3 \_\_\_\_\_ broke up

4 \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

5 Ended with \_\_\_\_\_ extinction 65 m.y.a.

D \_\_\_\_\_ - 65mya- present

1 Age of \_\_\_\_\_

2 \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_,

\_\_\_\_\_ , \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

3 Several ice ages (glaciers)

### III HUMANS AND OTHER PRIMATES 6-3

A \_\_\_\_\_ - group of mammals that include humans, apes, monkeys, lemurs who have \_\_\_\_\_ thumbs (can grab things) and 3-d binocular vision

1 First \_\_\_\_\_ (45 mya)

2 \_\_\_\_\_ and \_\_\_\_\_ separate (30-5 mya)

3 \_\_\_\_\_ – primate characterized by \_\_\_\_\_ - (walk on 2 legs), longer back limbs (legs), and lack of a tail

APE SKELETON

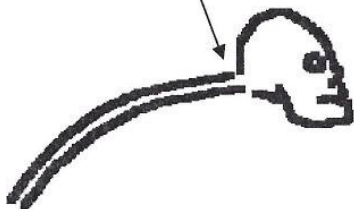


\_\_\_ Shaped spine

\_\_\_\_\_ hip bones

\_\_\_\_\_ forehead

Forum magnus in \_\_\_\_\_ of skull



HOMINID SKELETON

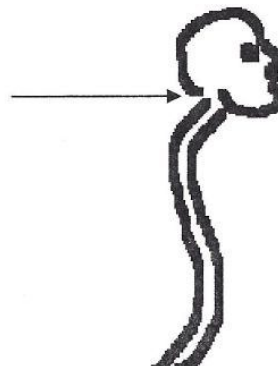


\_\_\_ shaped spine

\_\_\_\_\_ hip bones

flat, \_\_\_\_\_ forehead

forum magnus \_\_\_\_\_ skull





B \_\_\_\_\_ through time  
1 Earliest, 6-7 mya in Africa

- a \_\_\_\_\_
- (1) Used \_\_\_\_\_ tools
  - (2) \_\_\_\_\_ on 2 legs (no opposable toe)
  - (3) \_\_\_\_\_ (larger \_\_\_\_\_)
  - (4) \_\_\_\_\_ jaws and teeth and feet
  - (5) "Lucy" 3.2 mya (Australopithecus afarensis)

- b \_\_\_\_\_
- (1) Homo \_\_\_\_\_ — 2 mya
  - (2) Homo \_\_\_\_\_ — 1 mya — 300,000
  - (3) Homo \_\_\_\_\_ — 400,000- 30,000
  - (4) Homo \_\_\_\_\_ -- (knowledge) 30,000 y.a.
    - (i) \_\_\_\_\_
    - (ii) \_\_\_\_\_
    - (iii) Extensive \_\_\_\_\_