

Monday-Tuesday (1/7-1/8)

You have 4 minutes to write the following about
your winter break:

3 things you did

2 places you went

1 favorite memory

Geologic Time Line Contest

1. Start of the age of the dinosaurs
2. First land plants
3. First eukaryotes
4. First prokaryotes (bacteria)
5. Dinosaur extinction
6. Modern form of humans
7. First small mammals
8. Significant rise in oxygen

Correct Order

4. First prokaryotes (bacteria) ~3.5 bya
8. Significant rise in oxygen ~2.4 bya
3. First eukaryotes ~1.8 bya
2. First land plants ~440 mya
1. Start of the age of the dinosaurs ~240 mya
7. First small mammals ~220 mya
5. Dinosaur extinction ~65 mya
6. Modern form of humans ~100,000 ya

Warm Up (1/9-1-10)

Take out your completed Era drawing to share with your table mates!

- Describe the picture you drew
- Read the information you listed on the back

Agenda





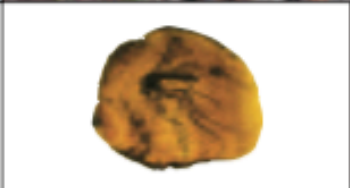
- Era table presentations
- Geologic time scale questions on Google Classroom
- Chapter 14 Notes and videos: The History of Life
- Chapter 14 Quick Quiz

Homework: Ch 14 worksheet posted on website
(Due FRIDAY- Answers must be hand written)

Chapter 14

The History of Life

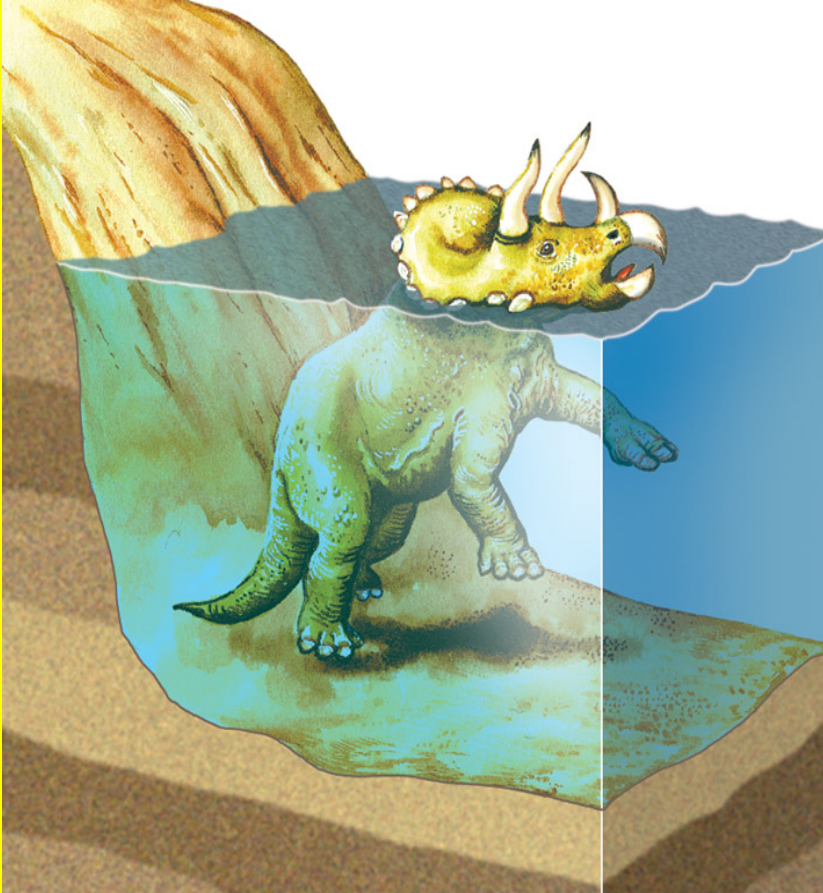
What is the Geologic Time Scale Based On?

Fossils Types	Formation	Example
Trace fossils	A trace fossil is any indirect evidence left by an animal and may include a footprint, a trail, or a burrow.	
Casts	When minerals in rocks fill a space left by a decayed organism, they make a replica, or cast, of the organism.	
Molds	A mold forms when an organism is buried in sediment and then decays, leaving an empty space.	
Petrified/ Permineralized fossils	Petrified—minerals sometimes penetrate and replace the hard parts of an organism. Permineralized—void spaces in original organism infilled by minerals.	
Amber- preserved or frozen fossils	At times, an entire organism was quickly trapped in ice or tree sap that hardened into amber.	

Fossilization

- Specific conditions are needed for fossilization. Rarely do dead organisms fossilize.
- Fossils are almost always found in sedimentary rock.
- Serves as the basis for fossil record.

<https://youtu.be/yDIQzUSezmA>



Relative dating -estimates the time during which an organism lived based on the location of the fossil in rock.

- The lower the layer of rock the older the fossil.
- It compares the placement of fossils in layers of rock.

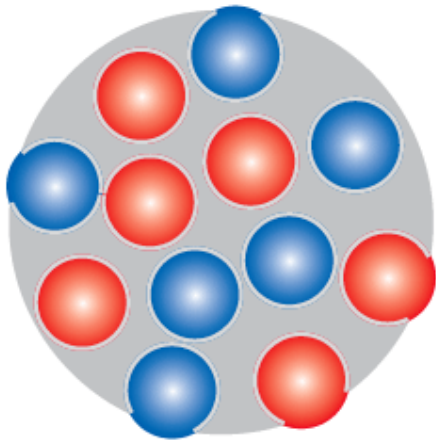


Radiometric dating provides an accurate way to estimate the age of fossils

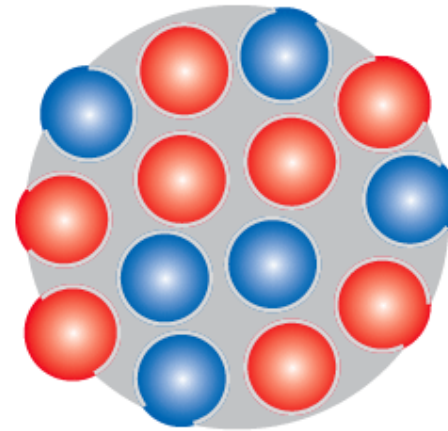
- Radiometric dating uses decay of unstable isotopes.
 - Isotopes are atoms of an element that differ in their number of neutrons.

 neutrons

 protons

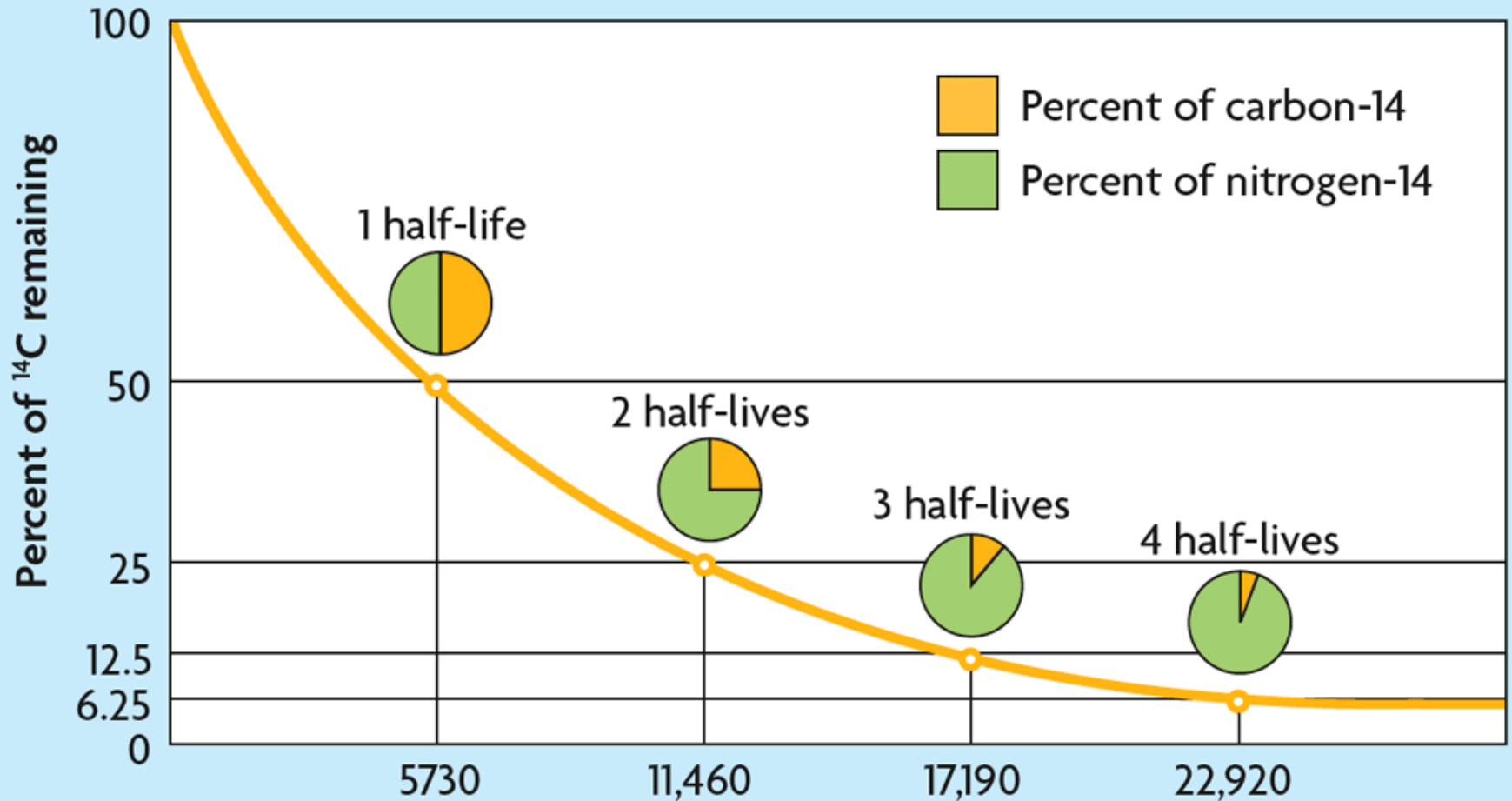


CARBON-12
NUCLEUS
6 protons
6 neutrons



CARBON-14
NUCLEUS
6 protons
8 neutrons

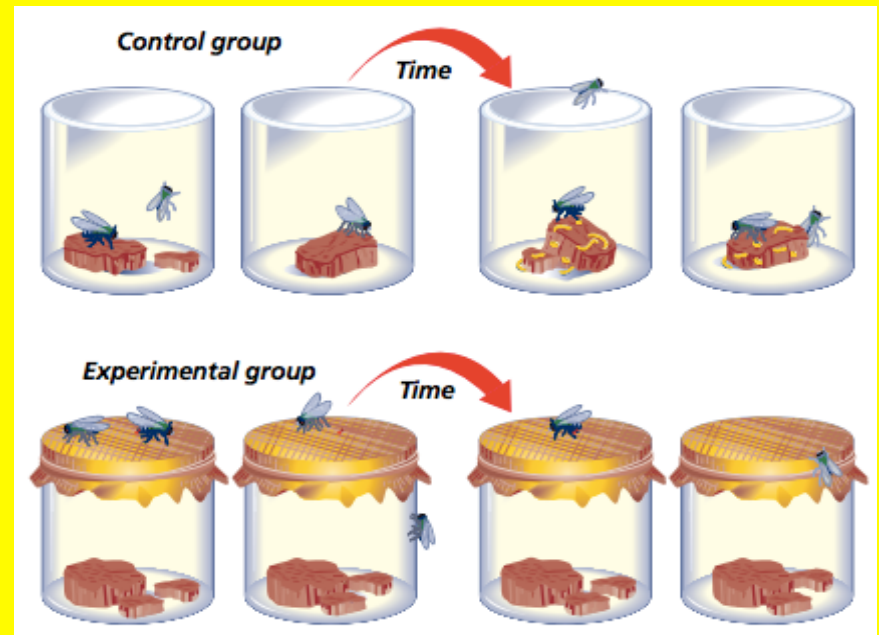
- A half-life is the amount of time it takes for half of the isotope to decay.



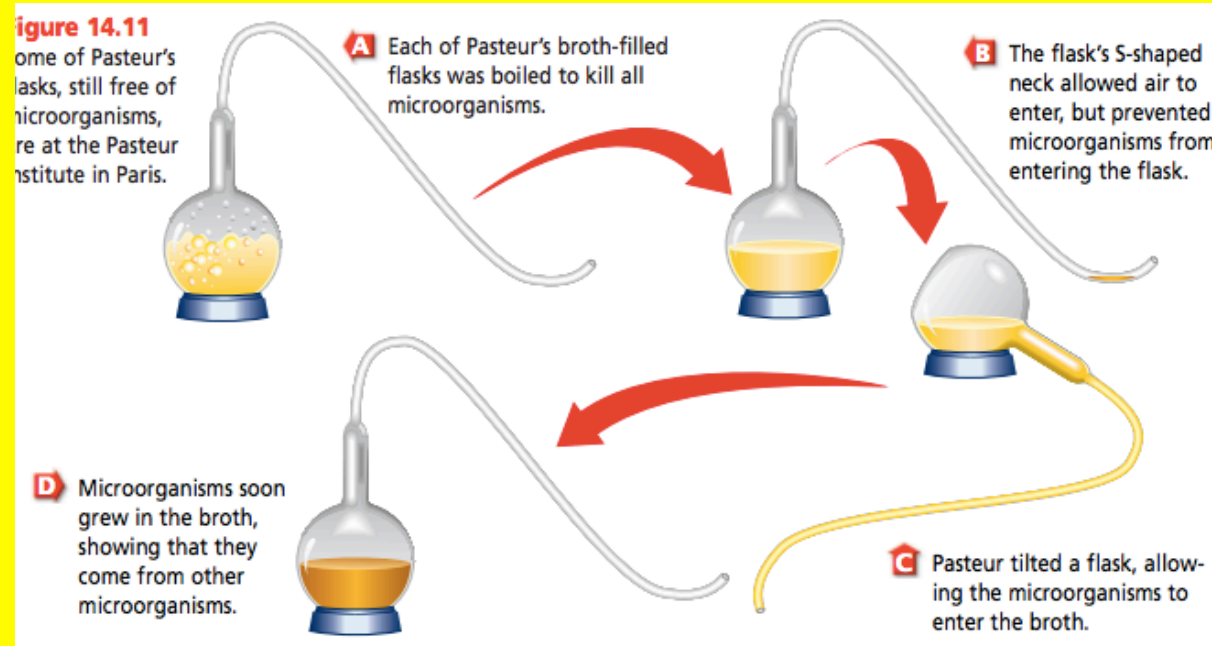
Early Ideas of the Origin of Life

- **Spontaneous generation:** idea that nonliving material can produce life
- Francesco Redi's experiment tested the spontaneous generation of maggots from decaying meat (1668):

*Maggots didn't appear if covered



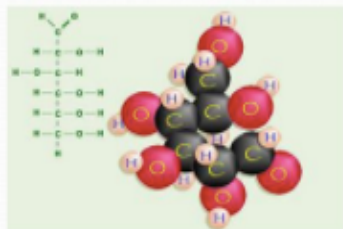
- Louis Pasteur's experiment- Disproved spontaneous generation of microorganisms
- Showed that microorganisms do not simply arise in broth, even in the presence of air
- **Biogenesis**: living organisms come only from other living organisms



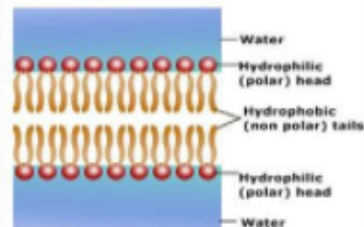
Origin of Life Theories

- **Before life began-** simple organic molecules must have formed to serve as the building blocks of complex organic molecules.
- **Stanley Miller and Harold Urey (1953)** simulated conditions of early Earth and found that several amino acids, sugars, and other small organic molecules formed in water.

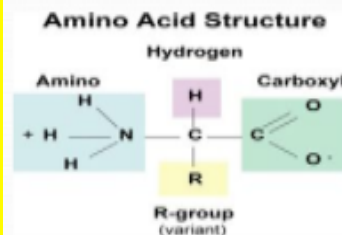
Carbohydrate



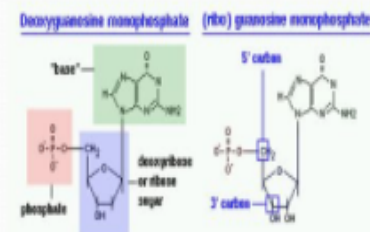
Lipids



Proteins

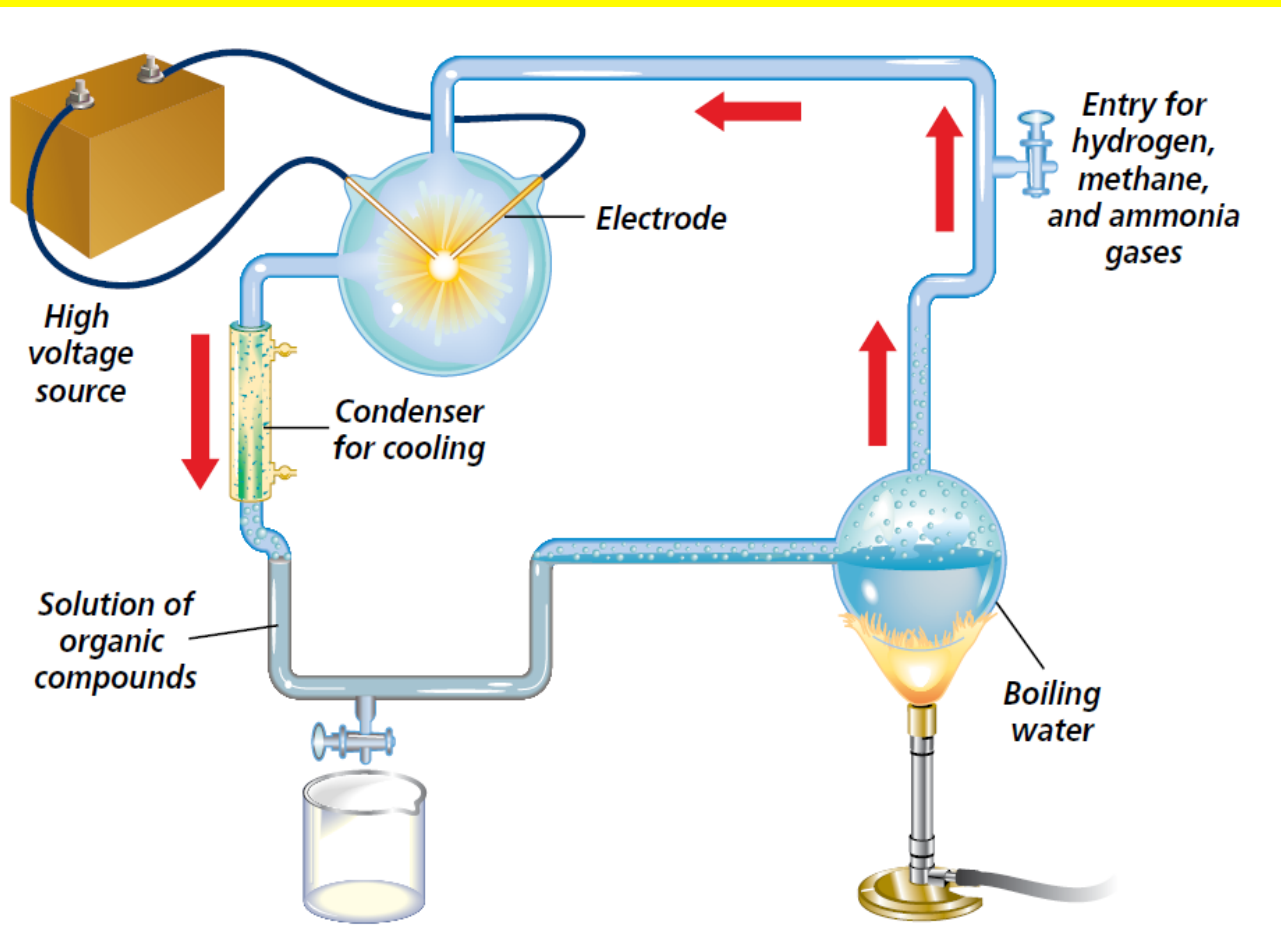


Nucleic acid



Miller & Urey's Experiments

An attempt to form complex organic compounds.



- Boiling chamber was heated to vaporize "ocean" water.
- Water vapor then traveled through a tube to the "atmosphere".
- An electrical current which represented lightning passed through the "atmosphere", causing the formation of organic material such as amino acids.



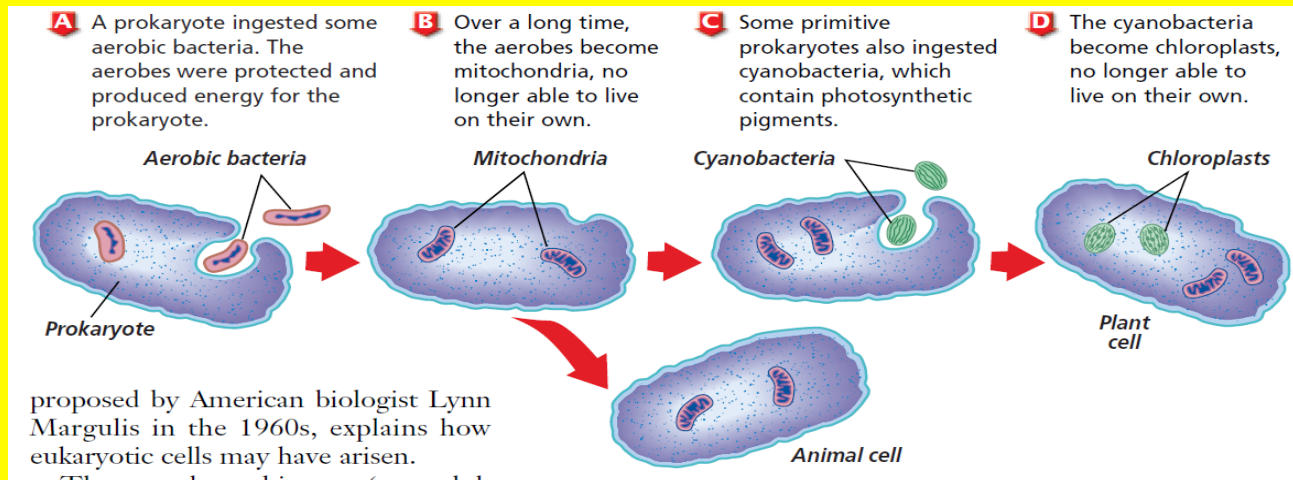
<https://www.youtube.com/watch?v=NNijmxsKGbc>

Protocells to True Cells

- Protocells: large, ordered structure that is enclosed by a membrane and carries out some life activities (growth and division)
- First true cells (prokaryotes) evolved from protocells and probably used available organic molecules as food source.
- Over time, photosynthetic prokaryotes (produce oxygen) evolved, changing the atmosphere and triggering the evolution of aerobic cells and eukaryotes.
- Prokaryotes ingested aerobic bacteria, which led to Eukaryotes (theory)

Endosymbiont Theory

- Proposes that eukaryotes evolved through a symbiotic relationship between ancient prokaryotes.
 - Similarities in size and function between some present day prokaryotes and chloroplasts/mitochondria
 - Chloroplasts and mitochondria have their own DNA and can reproduce independently of the cells that contain them



<https://www.youtube.com/watch?v=9i7kAt97XYU>