Wednesday, October 20
The Evolution of Us

Quiz #2 will be on Friday.

The Evolution of Us
Key Concepts
1) The **Cambrian Explosion** of biodiversity occurred at the start of the Phanerozoic.

2) Plants colonized the land ~475 Myr ago; animals followed later.

3) The first primates lived ~60 Myr ago; the first modern humans lived ~0.2 Myr ago.

You are a eukaryote (containing cell nuclei).
The 1st eukaryotes arose ~2.1 Gyr ago, during the early Proterozoic:

Eukaryotes started as a **symbiosis** of prokaryotes: Mitochondria (where ATP is made) and chloroplasts (where photosynthesis happens) began as "invaders".
You are a multi-celled eukaryote. The 1st multi-celled eukaryotes arose ~1.2 Gyr ago, during the middle Proterozoic.

Fossil algae resemble their modern descendants. They probably started as colonies of cells, then developed specialized cell functions.

Body plans of multi-celled organisms didn't evolve much during the late Proterozoic Eon.

Only toward the end of the Proterozoic (~600 Myr ago) did complex multicellular organisms arise.

These first large organisms (up to 4 feet long) were soft-bodied; no shells, no bones.

You are a member of the Animal kingdom. (Animals are self-mobile, and eat food.)

Oldest animal fossil: sponge-like critters dating to ~650 Myr ago.
The Phanerozoic Eon marks the spread of animal and plant life around the planet.

The Cambrian Explosion in complex life marks the start of the Phanerozoic Eon.

Most major groups (or phyla) of animals appeared rapidly during a 40 Myr period at the start of the Cambrian Period.

Complex animal and plant life filled most available ecological niches.

Why was there an explosion in biodiversity at the beginning of the Phanerozoic Eon?

Abundant atmospheric O$_2$ allows larger animals by providing faster metabolism.

“Snowball Earth”, at the end of the Proterozoic, caused mass extinctions & opened up ecological niches.
You are a **land** animal (mostly).

Animals and plants colonized the land **slowly**.

Ultraviolet light is hazardous; life on land was only safe after the ozone layer built up.

Plants and fungi colonized the land ~475 Myr ago; animals followed ~400 Myr ago.

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You are a **mammal**. (Mammals are animals that are warm-blooded, and have hair.)

Mammals and dinosaurs appeared roughly simultaneously, ~220 Myr ago.

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**Dinosaurs went extinct 65 Myr ago.**

(Why? Tune in tomorrow...)
You are a primate. (Primates are mammals with binocular vision and flexible, grasping hands.)

The first primates appeared ~58 Myr ago.
The lineage of monkeys split off ~40 Myr ago.
The last common ancestor of chimpanzees and humans lived ~7 Myr ago.

You are a hominid. (Hominids are upright bipedal primates.)
The first hominids lived ~6 Myr ago.

Humans (*Homo sapiens*) are just one branch on the hominid “tree of life”.

Although *H. sapiens* is the only living hominid species, there were many other hominid species, now extinct.