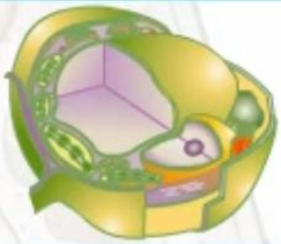
PLANTS	ANIMALS
Plants generally are rooted in one place an do not move on their own	Most animals have the ability to move fairly freely.
Plants contain chlorophyl and can make their own food	Animals cannot make their own food and are dependent on plants and other animals for food.
Plants give off oxygen and take in carbon dioxide given off by animals.	Animals give off carbon dioxide which plants need to make food and take in oxygen which they need to breathe.
Plants cells have cell walls and other structures differ from those of animals.	Animal cells do not have cell walls and have different structures than plant cells
Plants have either no or very basic ability to sense.	Animals have a much more highly develped sensory and nervous system.

Plant cells	Animal cells
	
They have a rigid, non-living cell wall that lies outside the cell membrane and is made up of cellulose	There is no cell wall
A plant cell contains plastids	Plastids are absent
Centrosome is absent	Centrosome is present near the nucleus
Lysosomes are absent	Lysosomes are present
Contains large and central vacuoles	Contains small and few vacuoles

Plastids areorganelles in plant cells where important chemical compounds are manufactured and stored.
Centrosome is an oraganelle in animal cells comprised of microtubules and used as a cell organizing center and to regulate cell division.
Lysosomes are spherical animal cell organelles used to break down various biomolecules for cell use. They contain as many as 50 enzymes for this purpose.
Vacuoles are water-filled organelles and have varied use depending on the type of plant or animal cell.
Cellulose, a polysaccharide organic compound, $C_6H_{10}O_5)_n$ similar to chitin) makes up the cell wall in plants providing structure to the cell and protection of the organelles inside.

There are a number of different classifications of living species and the number and names of kingdoms associated with thm. The Sci. Olym. Appears to be aligned with a system that recognizes 6 kingdoms and you have examples from 4 of them in your Fossil List:

Protozoa, Animalia, Chromista, and Plantae

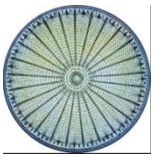
You have no **Bacteria** or **Fungi** on the list, but it is likely a good idea to recognize that those are distinct Kingdoms is this classification.

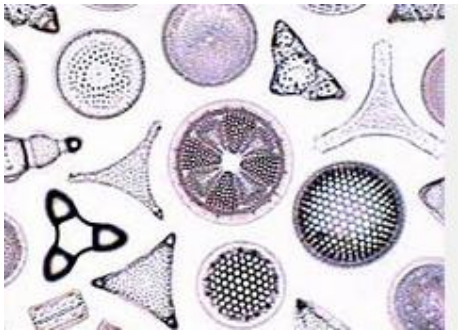
(forams)

Kingdom Chromista

89a) Class Bacillariophyceae (diatoms)

- Diatoms are a major group of algae, and are the most common form of phytoplankton.
- Most are unicellular, and sub millimeter in diameter
- Encased within a cell wall of silica (called a frustrate)
- Known back to at least the Jurassic
- Diatoms “bloom and bust” based on water temperature, nutrient availability, lack of silica for frustate formation, this can be seasonal or climatic





Kingdom Plantae

- Plants are generally distinct from other kingdoms by obtaining their energy to grow and thrive from sunlight via photosynthesis.
- Fungi and some algae are not in the Plantae kingdom.
- Best estimate is that there are between 300,000-315,000 plant species on earth today.
- Most of the world's molecular oxygen is produced by plants, their role in global ecology can not be understated.
- Fungi and brown algae are not plants as they do not generate energy in the same manner
- Earliest "plant-like" species are Cambrian algae, but these may not be true plants.
- Some evidence exists for Ordovician plants, but by the Silurian land plants. The first tree like plant came in the Devonian.
- The massive coals of the world are products of prolific plant of the late Paleozoic (Missippian-Pennsylvanian-Permian), and to a lesser extent, the Mesozoic Era.

You are responsible for 10 individual Genus of plants in 6 different Phylums

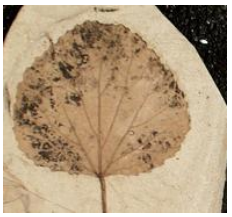
Phylum Anthophyta (plants with flower-bearing structures)

89) Genus Acer – maples

- Over 120 species
- desiduous

Phylum Anthophyta

90) Genus Populus – poplars, aspen, cottonwood)

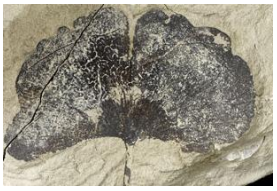


Phylum Anthophyta

91) Genus s Platanus – sycamores

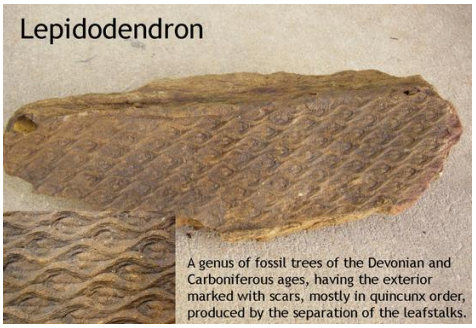
First appeared in Cretaceous (115 MYA)

Phylum Gingkophyta
92) Genus Gingko



- First appeared in Permian (270 MYA)
- Lots of Mesozoic species and diversity
- One living species today, wild in China, cultivated elsewhere

Phylum Lycopodiophyta
93) Genus Lepidodendron (scale tree)



- Extinct, thrived in Carboniferous
- key component of coal forst flora
- Characterized by diamond shaped trunk/stem pattern through which CO2 diffuses into the plant
- Up to 1m trunks

Phylum Pinophyta
94) Genus Metasequoia

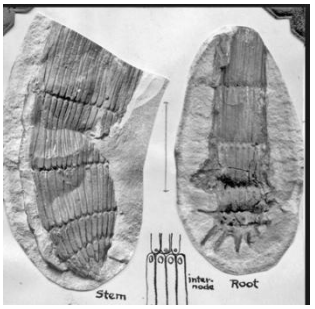
- Phylum of conifers (i.e. they bear cones which hold seeds)
- First conifers in Pennsylvania (300 MYA)
- Thrived into the Eocene in North America
- Today, Metasequoia are only in China and not the US redwood or sequoia. It is also desiduous

95) Phylum Pteridophyta (ferns)

- Reproduce and disperse via spores, producing neither seeds or flowers

Phylum Pteridophyta (ferns)

96) Genus Calamites (horsetail)



- Genus of extinct horsetails (360-300 MYA)

Phylum Pteridophyta (ferns)

97) Plant leaf: Annularia

The leaf whorls of an Calamites are called annularia

Phylum Pteridospermatophyta (seed fern)

98) Genus Glossopteris

- The term Pteridospermatophyta (or "seed ferns") refers to several distinct groups of extinct seed-bearing plants
- They go back to the Devonian.
- Glossopteris is the largest and best known Genus, and were around in the Permian in the southern Hemisphere
- Leaves are tongue shaped

Fossils of the gymnosperm *Glossopteris* (dark green) found in all of the southern continents provide strong evidence that the continents were once amalgamated into a supercontinent Gondwana