Classification

Unit 7

Hierarchy of Classification- Linnaean System

- Kingdom- largest, most broad

- Phylum

- Class

- Order

- Family

- Genus

- Species- smallest, most specific

    If two organisms share the same Order, they will also have the same Domain, Kingdom, Phylum, & Class

Binomial Nomenclature

- Two names used to refer to each type of organism.

  -First name is the **Genus** name and the second name is **species** (when typed it should be italicized).

  -International system so all scientists use same names for species

  -Names agreed at congresses

  -Avoids misunderstandings due to language differences or regional names (puma, cougar, panther, mountain lion are all the same cat)

Technology and Classification

- Traditional methods based on morphology (being able to fly/ similarities rather than differences) resulted in inaccurate groups from an evolutionary perspective.

- New technology allowed scientists to re-evaluate relationships and how organisms were classified.

- Molecular studies allowed changes to classification based on amino acid sequences that have only been possible since the late half of the 20th century.

- As a result, names of species and the groups they are classified into may change with new discoveries about them.
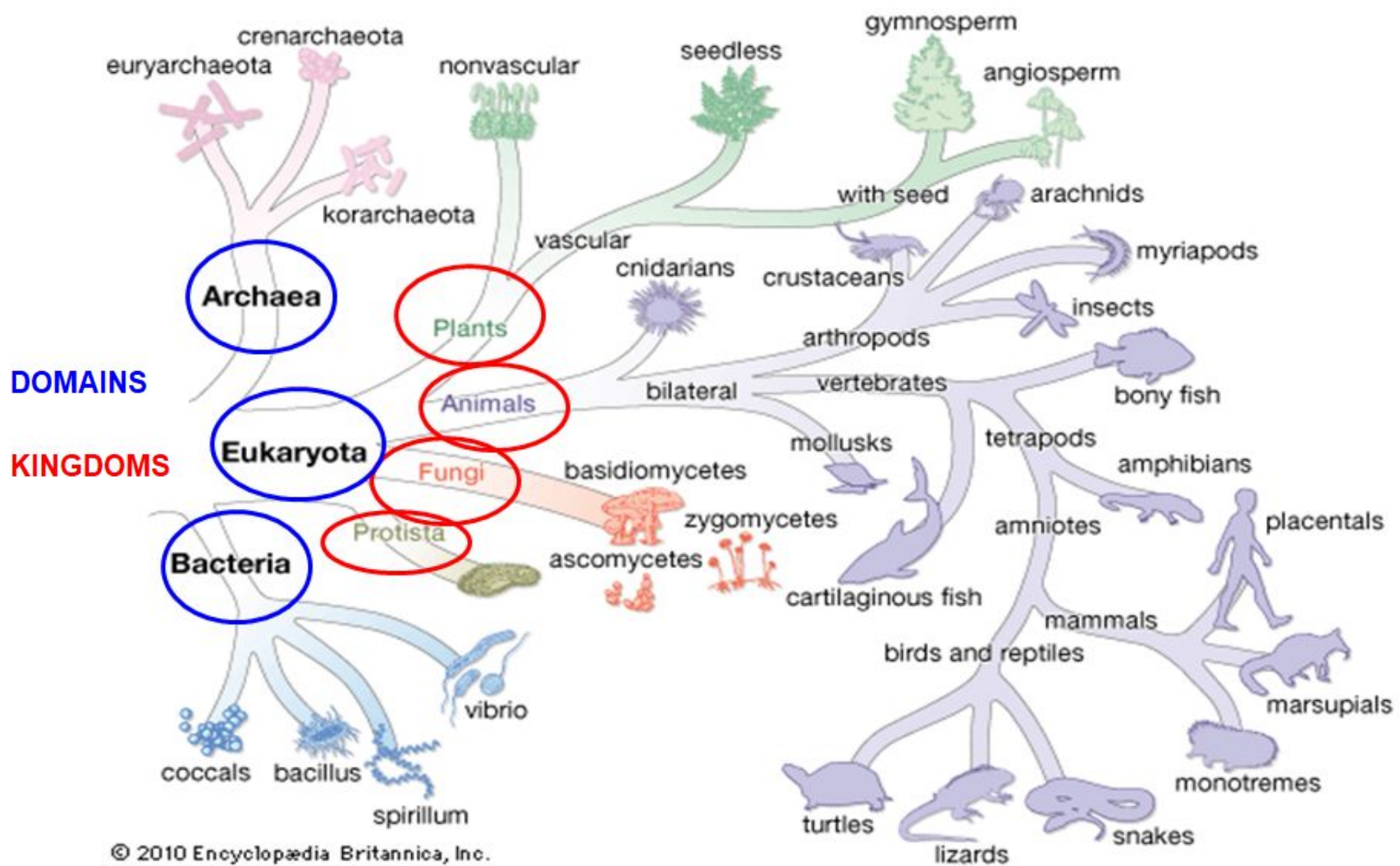
Advantages of Classification

- A hierarchy makes identification of species easier
  - If an organism is found and the species is not obvious, it can first be determined to be plant, animal, fungi, etc. (kingdom). From there, the phylum, class, and so forth can be determined. If not for this, two plants could be classified together because of color but be two completely different species.

- Similar characteristics because they evolved from a common ancestor
  - This is helpful in predicting characteristics. If a chemical is in a plant of a certain genus, it can be assumed the same chemical can be found in other species within that genus. A new type of bat will have characteristics of a mammal, not an insect or bird just because it also flies.

Human

- Kingdom- Animalia
- Phylum- Chordata
- Class- Mammalia
- Order- Primate
- Family- Hominidae
- Genus- *Homo*
- Species- *sapiens*

Dog

- Kingdom- Animalia
- Phylum- Chordata
- Class- Mammalia
- Order- Carvivora
- Family- Canidae
- Genus- *Canis*
- Species- *familiaris*

DOMAINS

KINGDOMS

euryarchaeota
crenarchaeota
korarchaeota
nonvascular
seedless
gymnosperm
angiosperm
with seed
vascular
cnidarians
arachnids
myriapods
insects
crustaceans
arthropods
bilateral
vertebrates
bony fish
mollusks
tetrapods
amphibians
amniotes
placentals
basidiomycetes
zygomycetes
ascomycetes
cartilaginous fish
mammals
birds and reptiles
marsupials
vibrio
coccals   bacillus
monotremes
spirillum
turtles
lizards
snakes

Archaea
Eukaryota
Bacteria
Plants
Animals
Fungi
Protista

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Domains

- Archaea (bacteria)

    "Ancient" bacteria that have survived by adapting to extreme conditions

- Bacteria

    Modern bacteria that are prokaryotes so they have no nucleus. They are also unicellular and may be autotrophs or heterotrophs
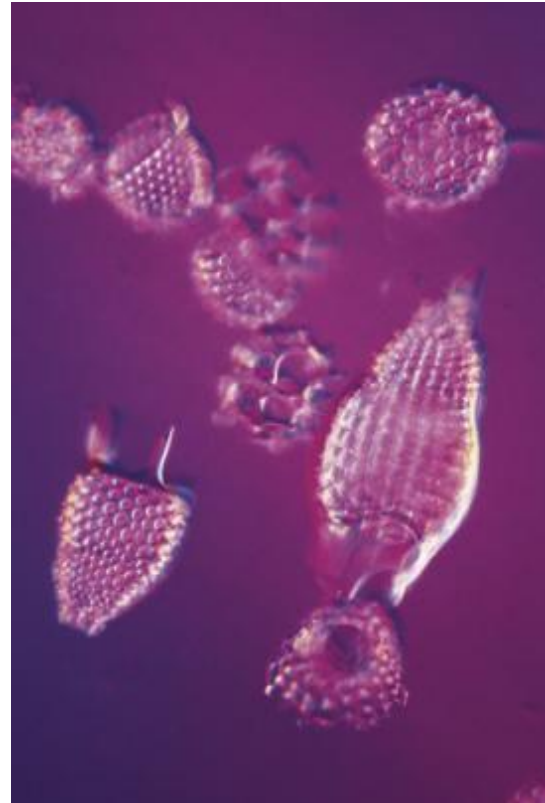
- Eukaryota/ Eukarya

    Cells have a nucleus

Kingdoms of Eukarya

- Protista
- Fungi
- Animalia
- Plantae

Protista

- Eukaryotes

- Multicellular or unicellular

- Heterotrophs or autotrophs

- 'Junk drawer' of classification

Fungi

- Eukaryotes

- Multicellular
    -Yeast is unicellular

- Heterotrophs

- Cell wall of chitin

Animalia

- Eukaryotes
- Multicellular
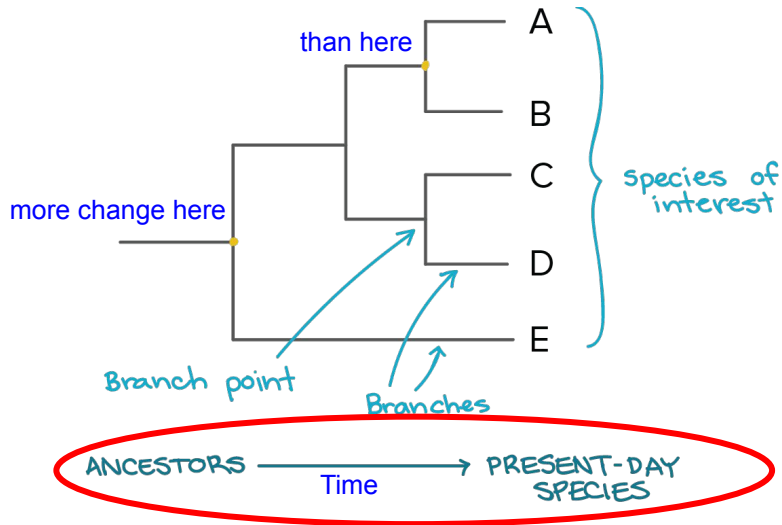- Heterotrophs
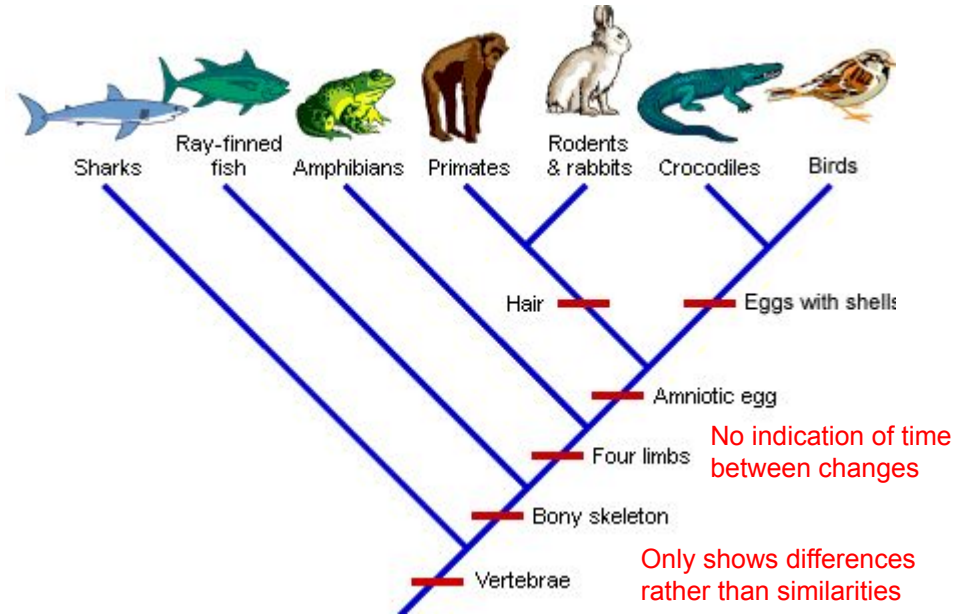- No cell wall

Plantae

- Eukaryotes
- Multicellular
- Autotrophs
- Cell wall of cellulose

Phylogenetic Trees vs Cladograms

Phylogenetic trees show relationships among different organisms and have branches representing evolutionary time and amount of change.
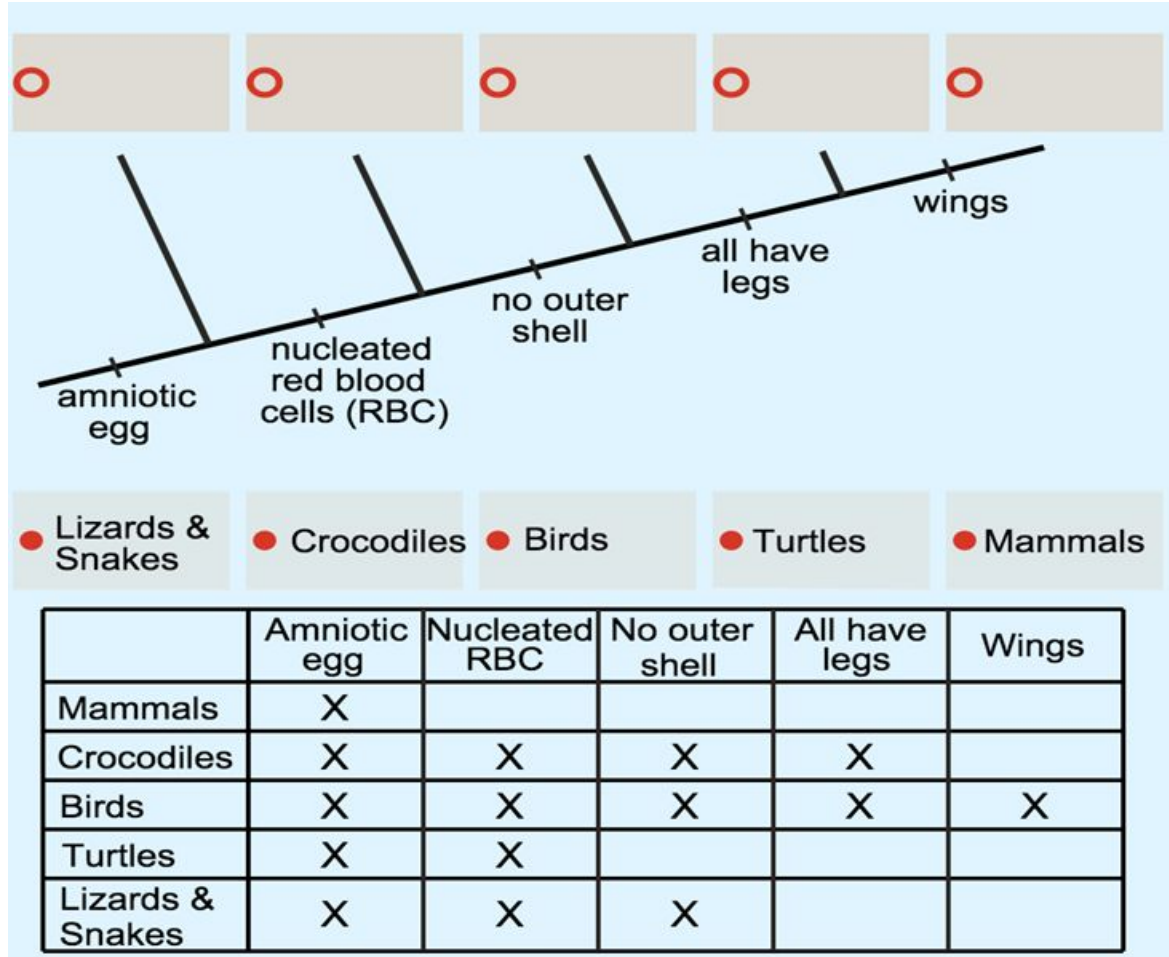
Cladograms show relationships among different organisms, but do not show how organisms are related to one another, or how much they have changed

Cladogram

Show relatedness based on physical characteristics.

As you go along, species are excluded based on presence or absence of these characteristics.

Have all characteristics below, but none of the ones above.

	Amniotic egg	Nucleated RBC	No outer shell	All have legs	Wings
Mammals	X				
Crocodiles	X	X	X	X	
Birds	X	X	X	X	X
Turtles	X	X			
Lizards & Snakes	X	X	X		

Practice

	Shark	Tuna	Chicken	Horse	Rabbit	Monkey	Human
Thumbs						X	X
Terrestrial			X	X	X	X	X
Bone Skeleton		X	X	X	X	X	X
Padded Feet					X	X	X
Hair				X	X	X	X
Walks Erect							X