New 3 Domain System

- Reflects greater understanding of evolution and molecular evidence
- **Three Domain System:**
  - Molecular Analysis gave scientists new information
  - All organisms placed into three broad groups called domains
- Domain Archaea (kingdom Archaebacteria) contains chemosynthetic bacteria living in harsh environments
- Domain Bacteria (kingdom Eubacteria) contains all other bacteria including those causing disease
- Domain Eukarya (kingdoms Protista, Fungi, Plantae, & Animalia) contains all eukaryotic organisms

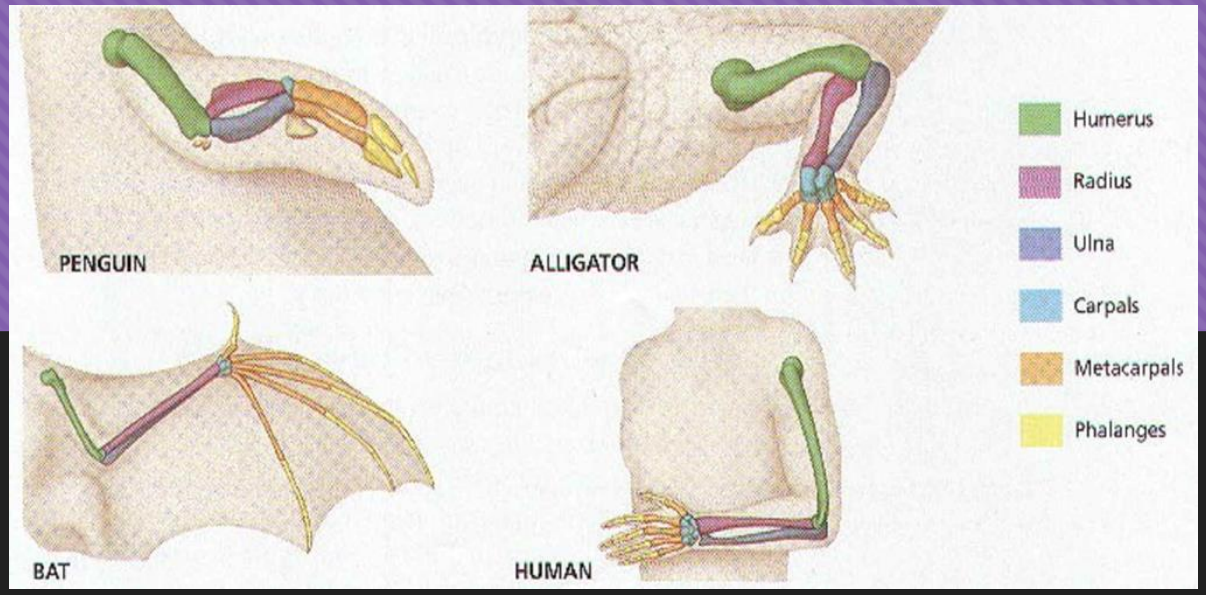
Classification of Living Things

DOMAIN	Bacteria	Archaea	Eukarya			
KINGDOM	Eubacteria	Archaebacteria	Protista	Fungi	Plantae	Animalia
CELL TYPE	Prokaryote	Prokaryote	Eukaryote	Eukaryote	Eukaryote	Eukaryote
CELL STRUCTURES	Cell walls with peptidoglycan	Cell walls without peptidoglycan	Cell walls of cellulose in some; some have chloroplasts	Cell walls of chitin	Cell walls of cellulose; chloroplasts	No cell walls or chloroplasts
NUMBER OF CELLS	Unicellular	Unicellular	Most unicellular; some colonial; some multicellular	Most multicellular; some unicellular	Multicellular	Multicellular
MODE OF NUTRITION	Autotroph or heterotroph	Autotroph or heterotroph	Autotroph or heterotroph	Heterotroph	Autotroph	Heterotroph
EXAMPLES	*Streptococcus*, *Escherichia coli*	Methanogens, halophiles	*Amoeba*, *Paramecium*, slime molds, giant kelp	Mushrooms, yeasts	Mosses, ferns, flowering plants	Sponges, worms, insects, fishes, mammals

Time out

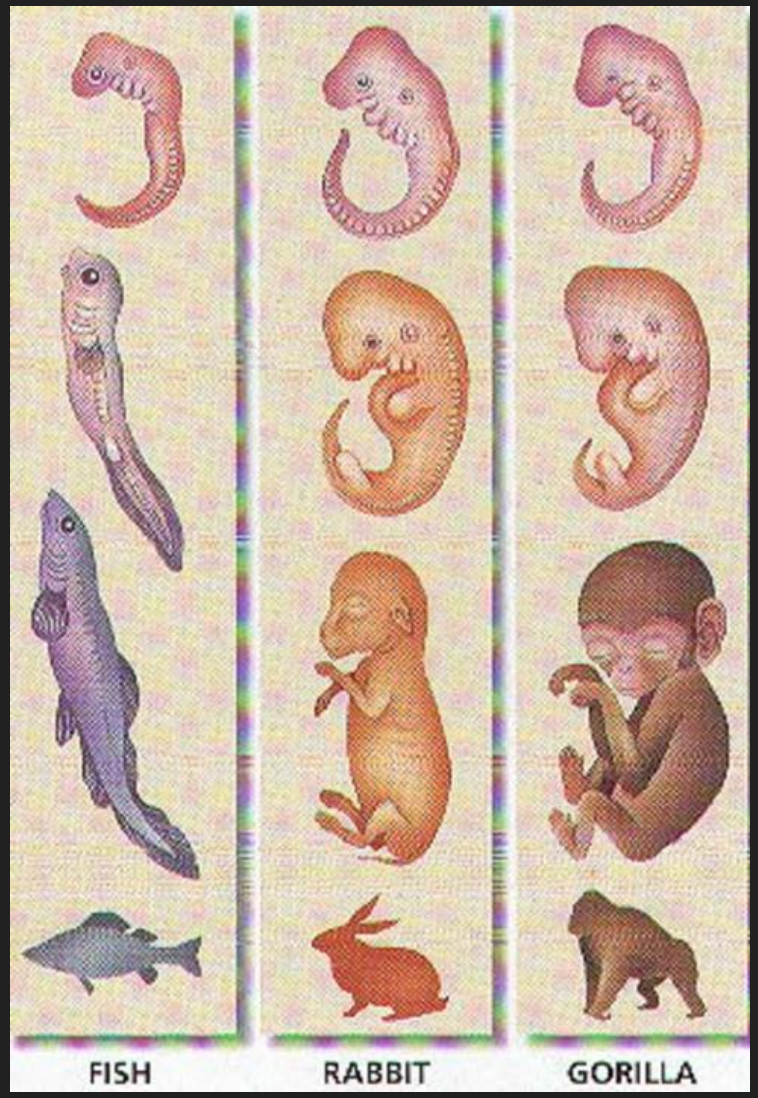
- 18-2/18-3 Textbook Questions

Modern Taxonomy



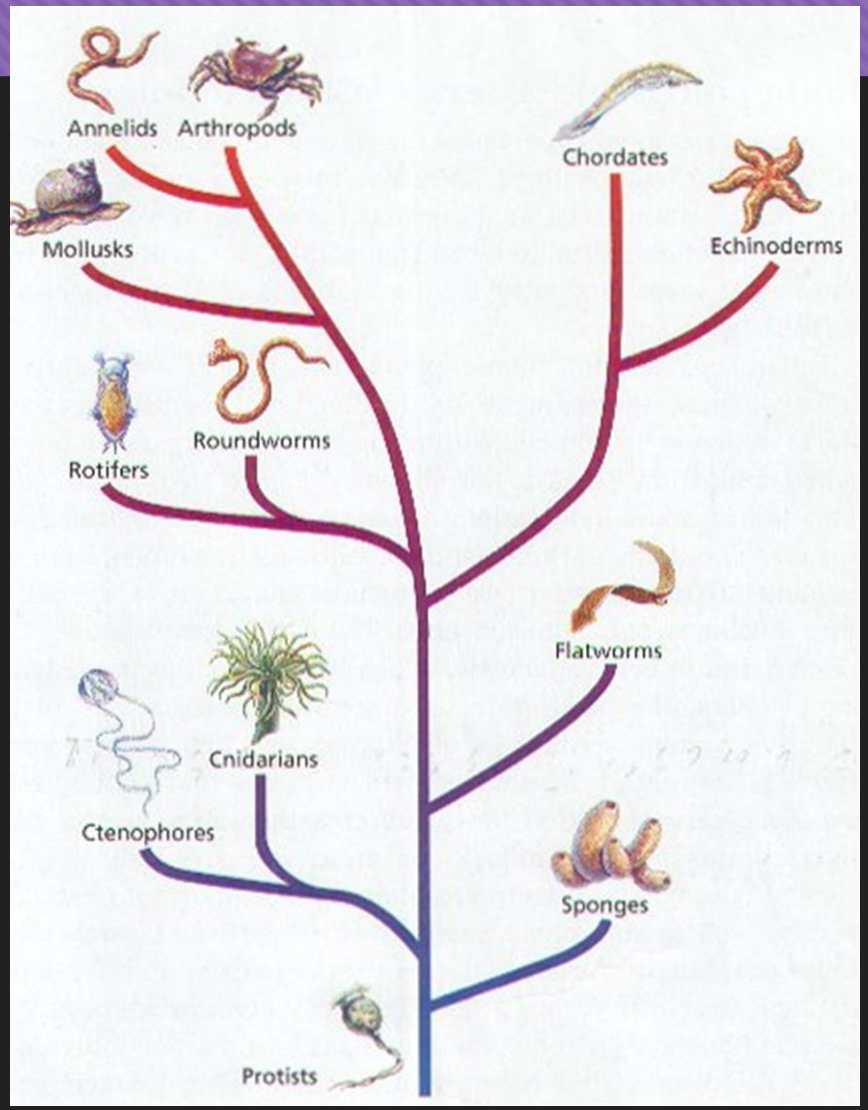
- Modern taxonomists classify organisms based on their evolutionary relationships
- Homologous structures have the same structure, but different functions & show common ancestry
- The bones in a bat's wing, human's arm, penguin's flipper are the same (homologous), but the function is different

- Analogous structures have the same function, but different structures & do not show a close relationship (insect wing & bird's wing)
- Similarity in embryo development shows a close relationship (vertebrate embryos all have tail & gill slits)
- Similarity in DNA & amino acid sequences of proteins show related organisms

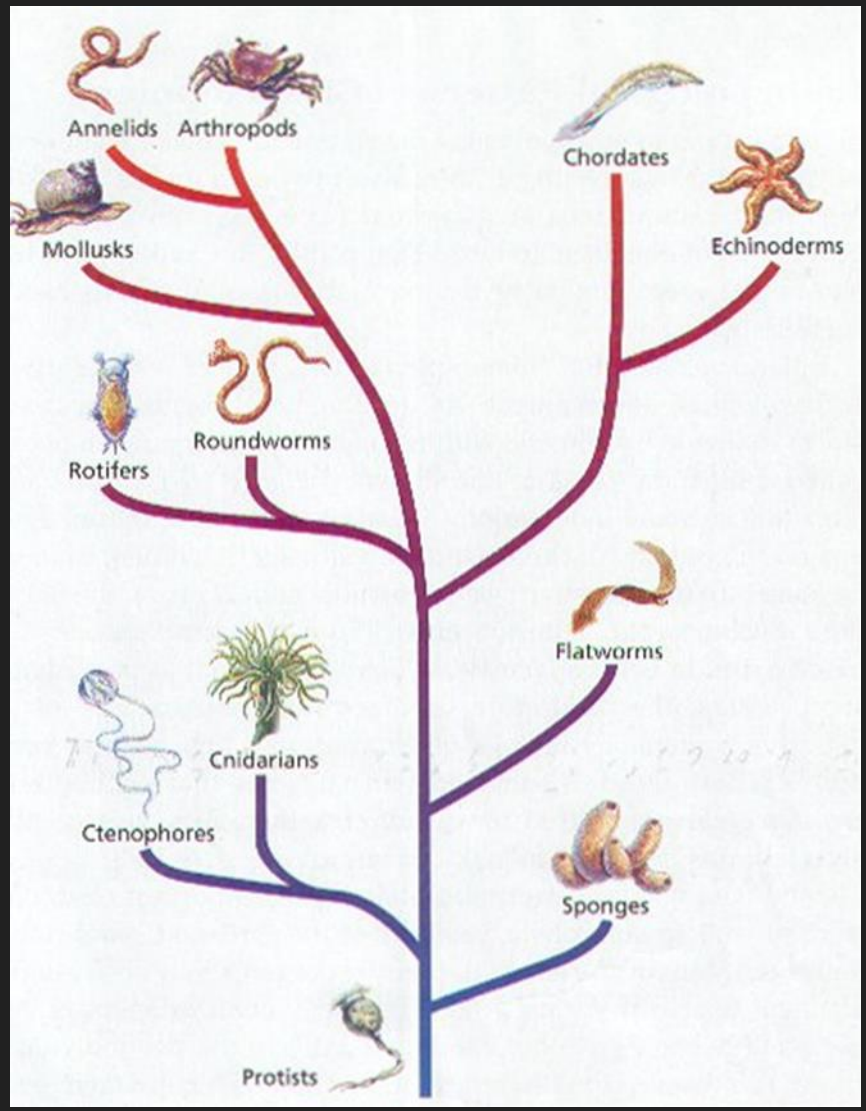


Phylogeny(evolutionary history)

- **P**hylogenetic trees are branching diagrams showing how organisms are related
- Also called family trees
- Fossil records help establish relationships on a phylogenetic tree
- Organizes living things based on their evolution

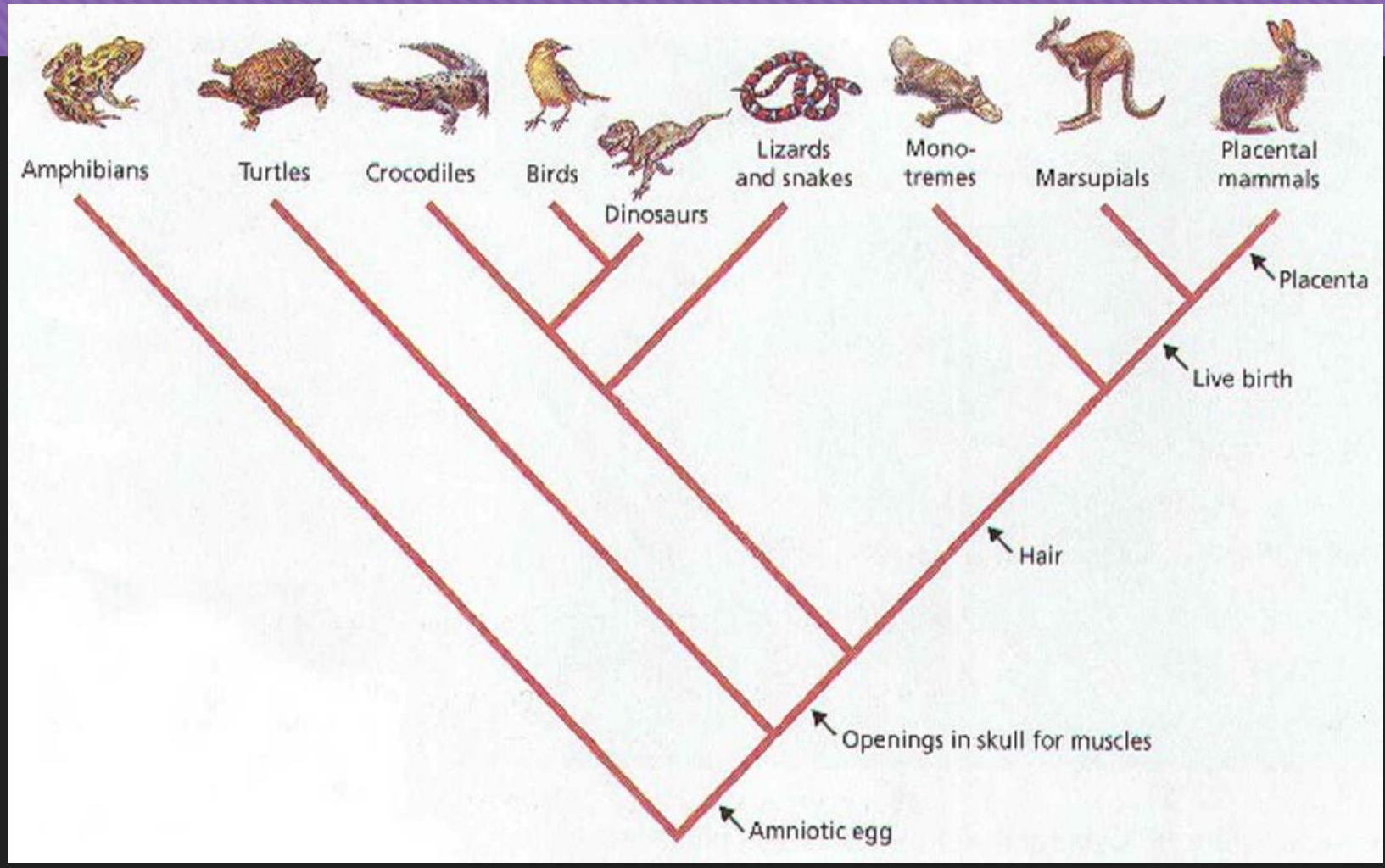


- Common ancestor is shown at the base of the tree
- Most modern organisms shown at tips of branches
- Each time a branch divides into a smaller branch, a new species evolves



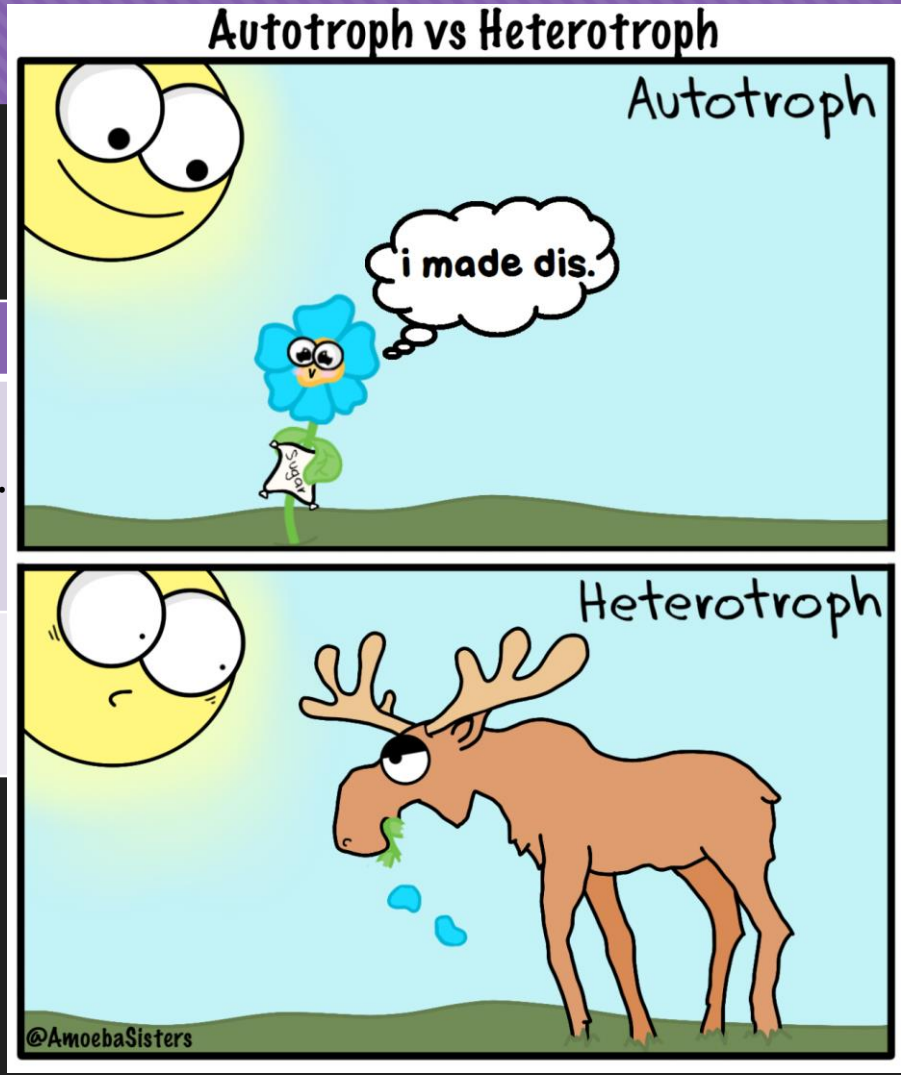
Cladograms

- Cladograms shows how organisms are related based on shared, derived characteristics such as feathers, hair, scales, etc.



Classification On How Organism obtain energy

Autotrophs	Heterotrophs
Make their own food from inorganic molecules (CO_2)	Obtain energy by consuming organic molecules (sugars etc. made by other organisms
Ex-Photosynthesis in Producers (Plants)	Ex- Consumers (Animals)

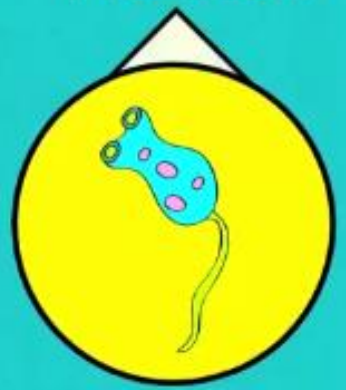


DOMAIN

EUKARYA

KINGDOM

PROTISTA



AUTOTROPHS
HETEROTROPHS

FUNGI

HETEROTROPHS

PLANTAE

AUTOTROPHS

ANIMALIA

HETEROTROPHS

TABLE 18-2 *Six Kingdoms of Life*

Kingdom	Cell type	Number of cells	Nutrition
Archaebacteria	prokaryotic	unicellular	autotrophy and heterotrophy
Eubacteria	prokaryotic	unicellular	autotrophy and heterotrophy
Protista	eukaryotic	unicellular and multicellular	autotrophy and heterotrophy
Fungi	eukaryotic	unicellular and multicellular	heterotrophy
Plantae	eukaryotic	multicellular	autotrophy and (rarely) heterotrophy
Animalia	eukaryotic	multicellular	heterotrophy

Time out

- Complete your Domain and Kingdom Chart
  - Use Notes and Textbooks