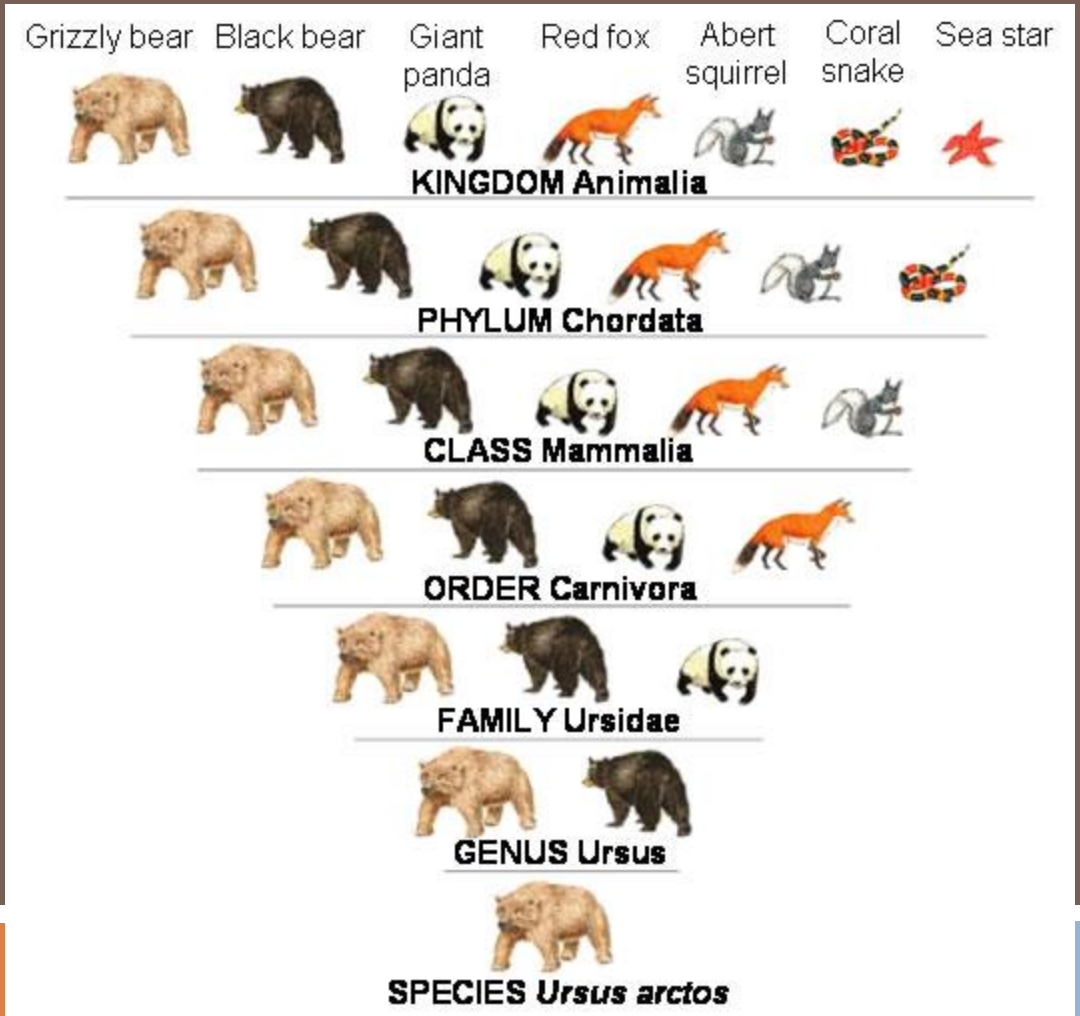
CLASSIFICATION NOTES



Classification

- **Classification** = arrangement of living things into groups according to their observed similarities

- Important because it allows us to be able to study life easier

- Living things are being classified

History of Classification

- First classification system was developed by Aristotle
- The first system grouped livings things into plants and animals
- **Taxonomy** is the practice of naming and classifying organisms

History of Classification

- Another system was developed by Carolus Linnaeus that for the most part is still used today
  - He used similar characteristics in structure to group organisms
  - The two-word naming system he came up with is called binomial nomenclature

History of Classification

- The scientific name (binomial nomenclature name) uses the genus and species level names

- Ex: Humans = Homo (genus) sapiens (species)

Video

- Linnaeus's Life

Levels of Classification

- Domain
- Kingdom
- Phylum
- Class
- Order
- Family
- Genus
- Species

Your Acronym

- On your sheet of paper, create an acronym to remember the order of the levels of classification

Practice Question Answer

- Panthera leo

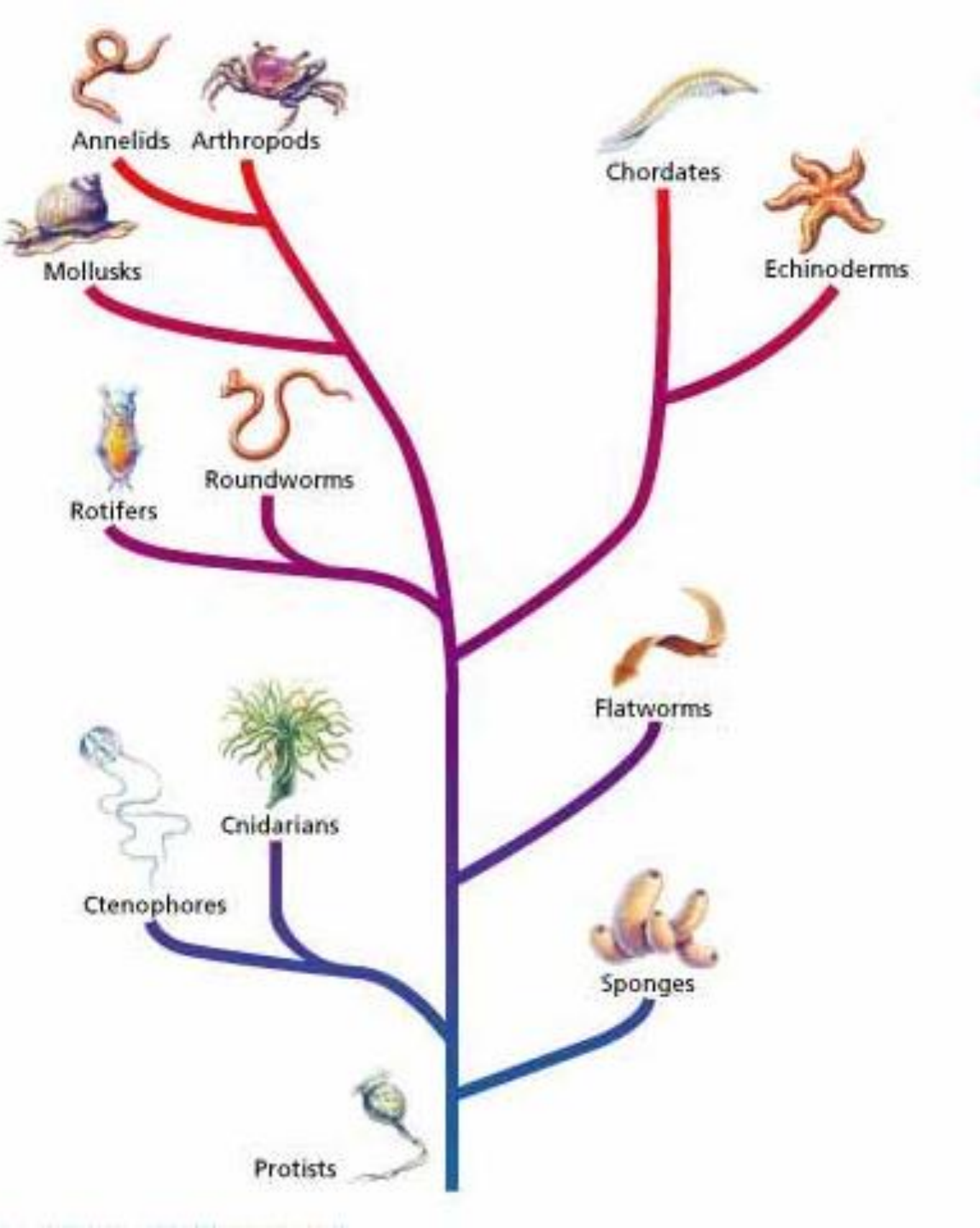
Phylogeny vs Cladistics

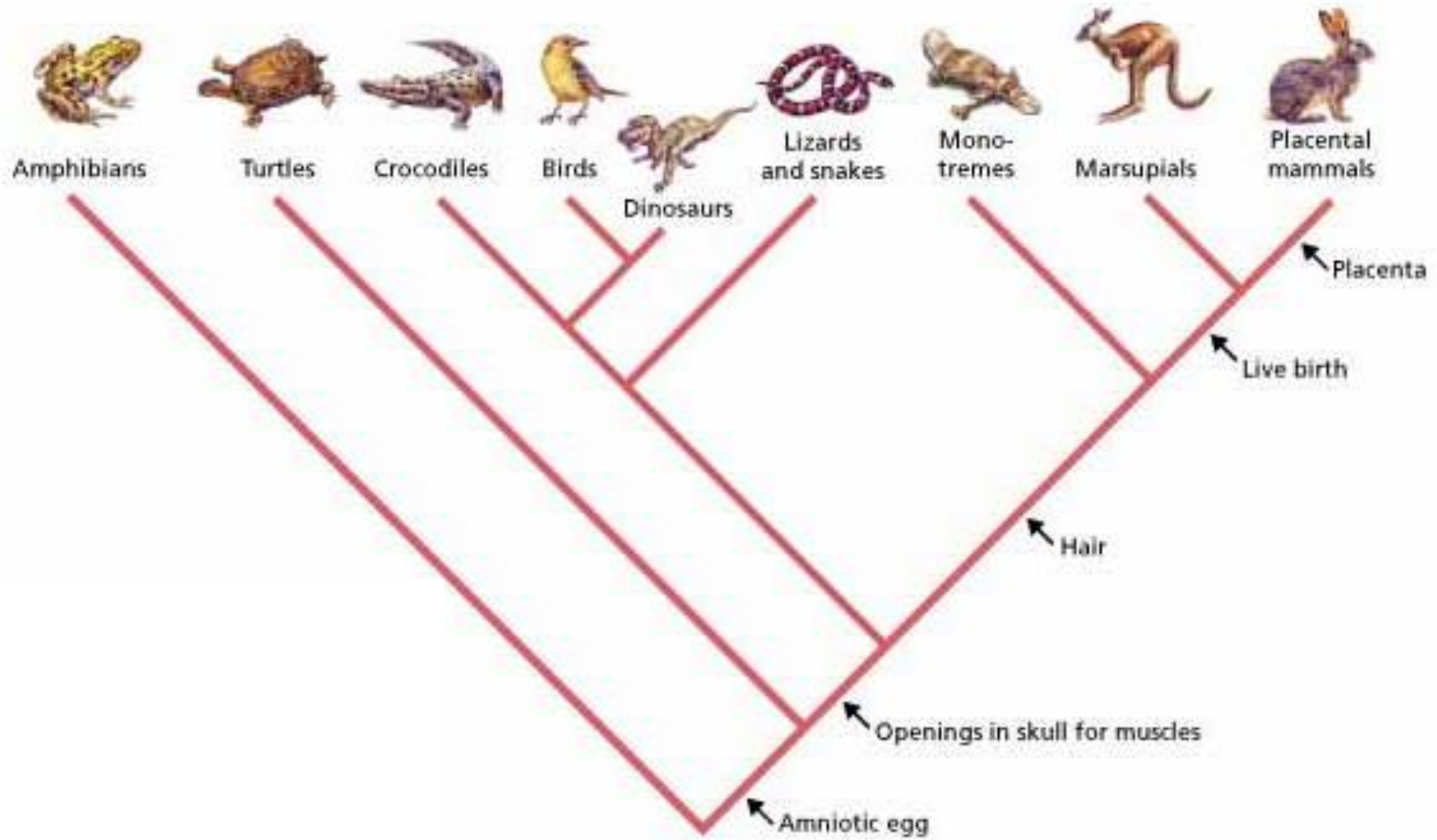
- Linnaeus' system has been modified when new branches of science helped sort out more differences between species

- Phylogeny = Science of grouping species using relationships based on species similarities
- Cladistics = Science of using shared derived characters to group organisms and show relationships

Phylogenic tree vs Cladogram

- Phylogenic tree = hypothesis of evolutionary relationships between several groups
- Cladogram = diagram to show evolutionary relationships and shared derived characters
  - Derived character = evolved in one group but not another
  - Example of shared derived character: 4 legs, flowers, vertebral column


Annelids
Arthropods
Chordates
Mollusks
Echinoderms
Rotifers
Roundworms
Flatworms
Cnidarians
Ctenophores
Sponges
Protists


Amphibians
Turtles
Crocodiles
Birds
Dinosaurs
Lizards and snakes
Mono-tremes
Marsupials
Placental mammals
Placenta
Live birth
Hair
Openings in skull for muscles
Amniotic egg

Pieces of Evidence to Determine Evolutionary Relationships

- Fossils = preserved remains of organisms

- DNA = genetic material of living things

Pieces of Evidence to Determine Evolutionary Relationships

- Homologous structures = similar internal structures (bones) between different organisms that suggest the organisms have common ancestors
  - Ex: bat wing, human arm, horse leg

- Embryology = study of the development of organisms

Traditional Classification

- Scientists have traditionally used similar physical characteristics to group organisms

- Some organisms have the same structures or body parts (analogous structures) because they live similar environments (same selective pressures), but are not related or DNA is not similar
  - Ex: sharks (fish) and dolphin (mammal)

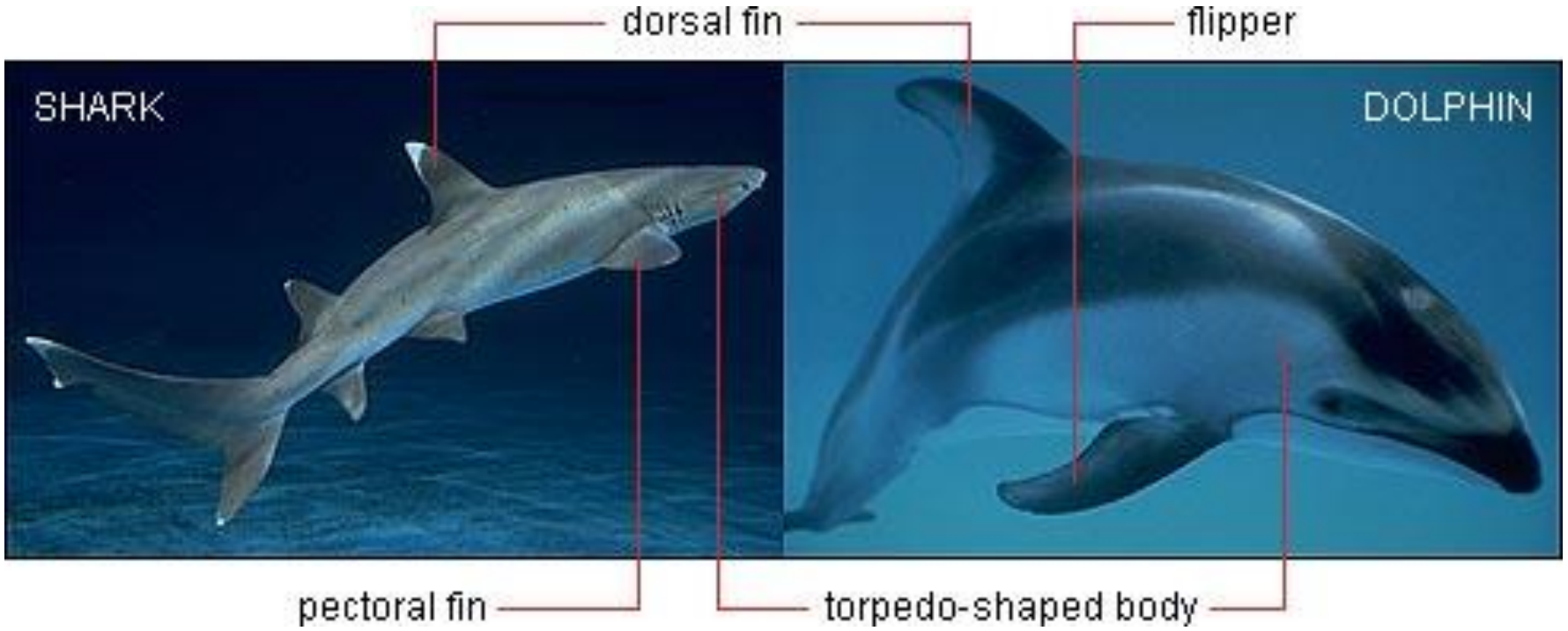
Traditional Classification

- Analogous structures = parts that serve the same function in different organisms, but the organisms are not closely related

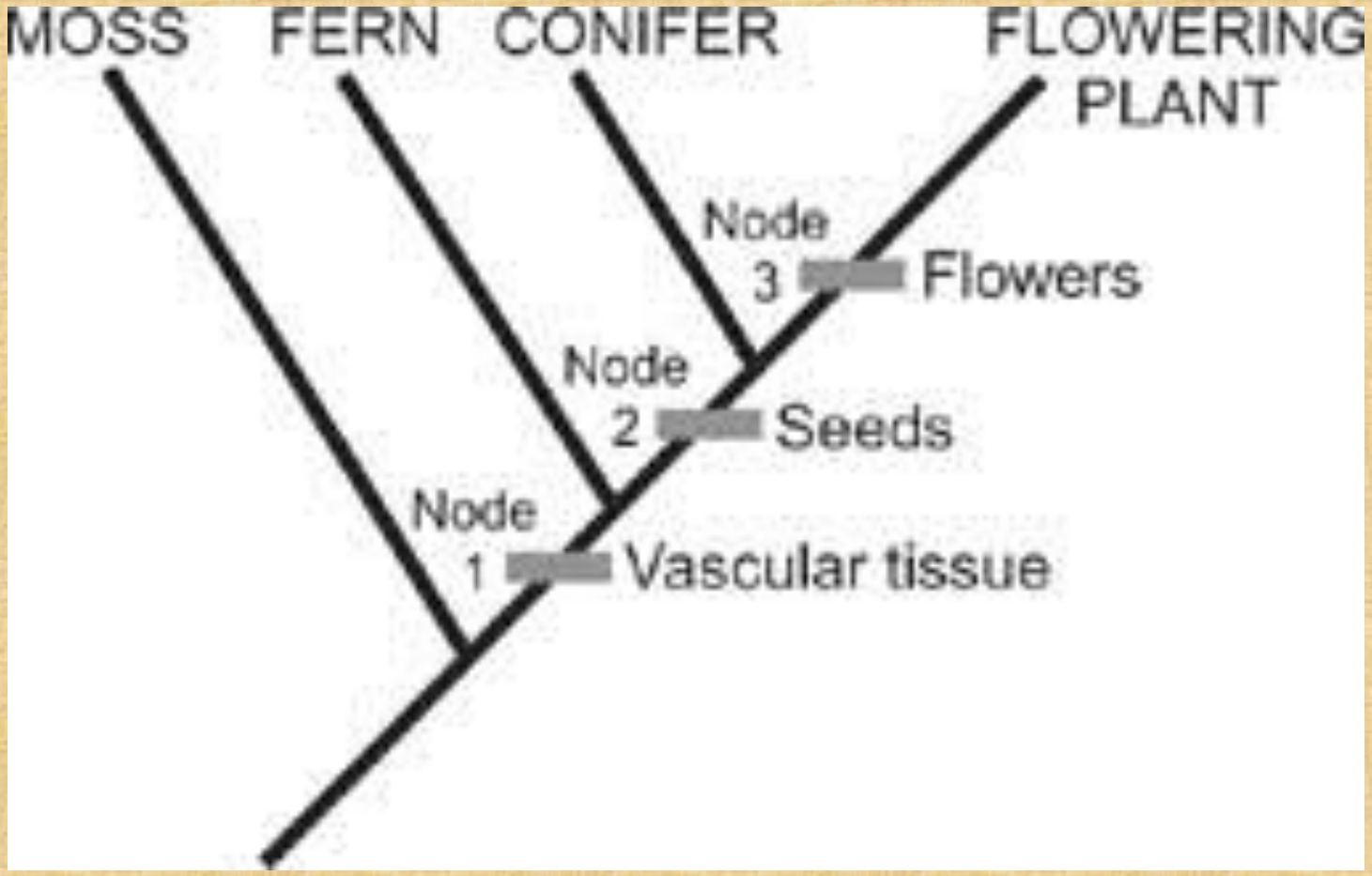
- Convergent evolution = when organisms become more and more similar because they live is similar environments with the same selective pressures

Practice: Look at the 2 pictures below

- Why are these two organisms not considered the same species?



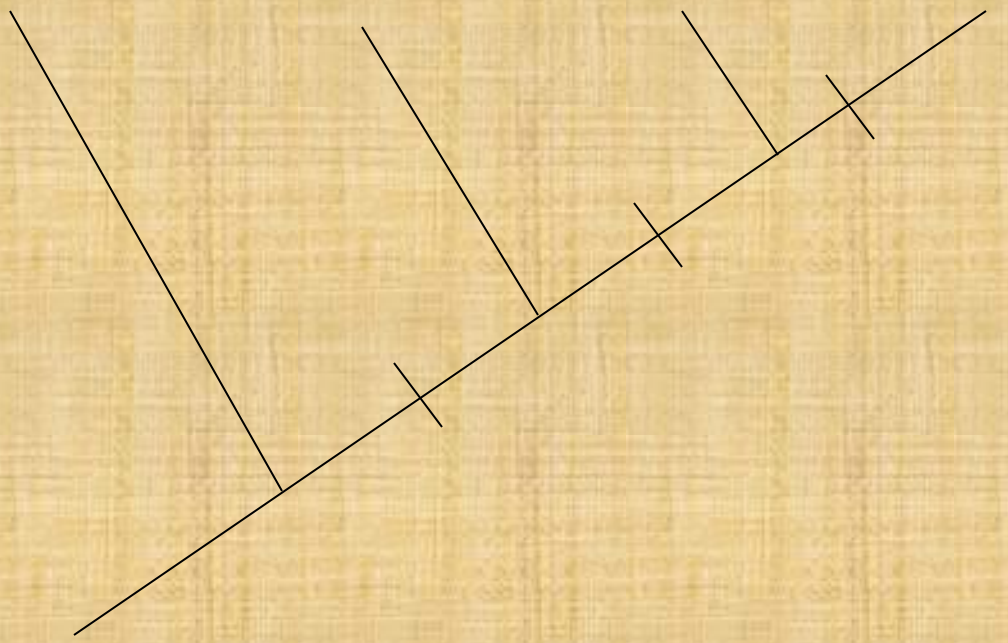
Practice: Plant Cladogram



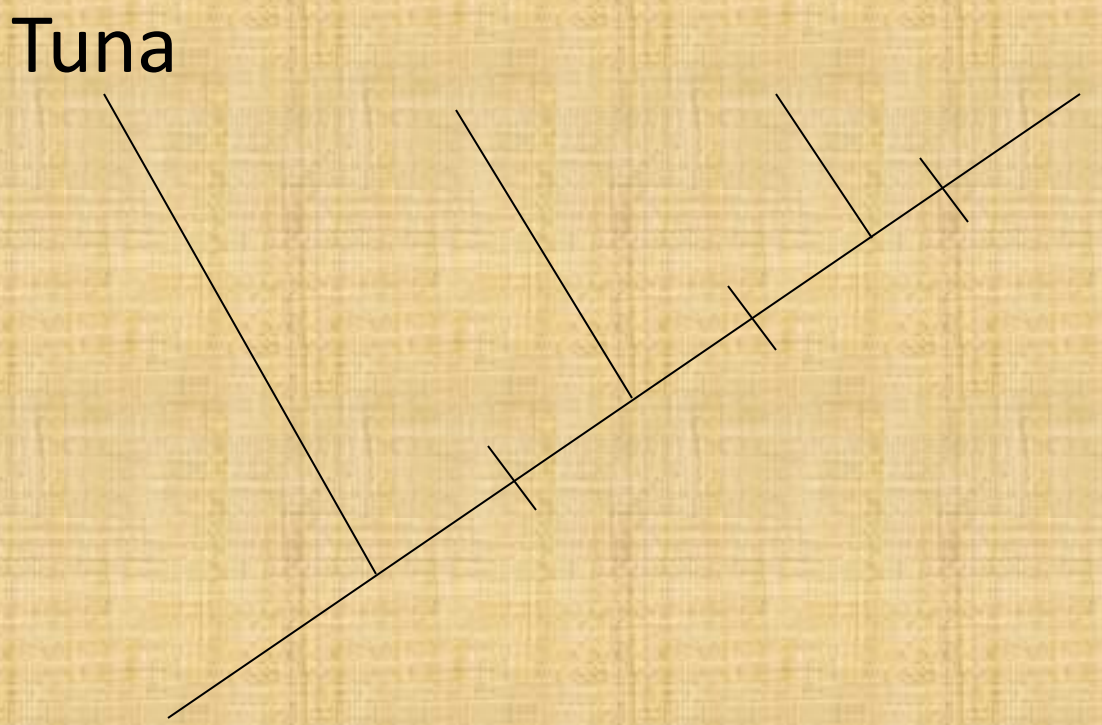
How to Construct a Cladogram

	Four Legs	Amniotic Egg	Hair
Tuna	No	No	No
Frog	Yes	No	No
Lizard	Yes	Yes	No
Cat	Yes	Yes	Yes

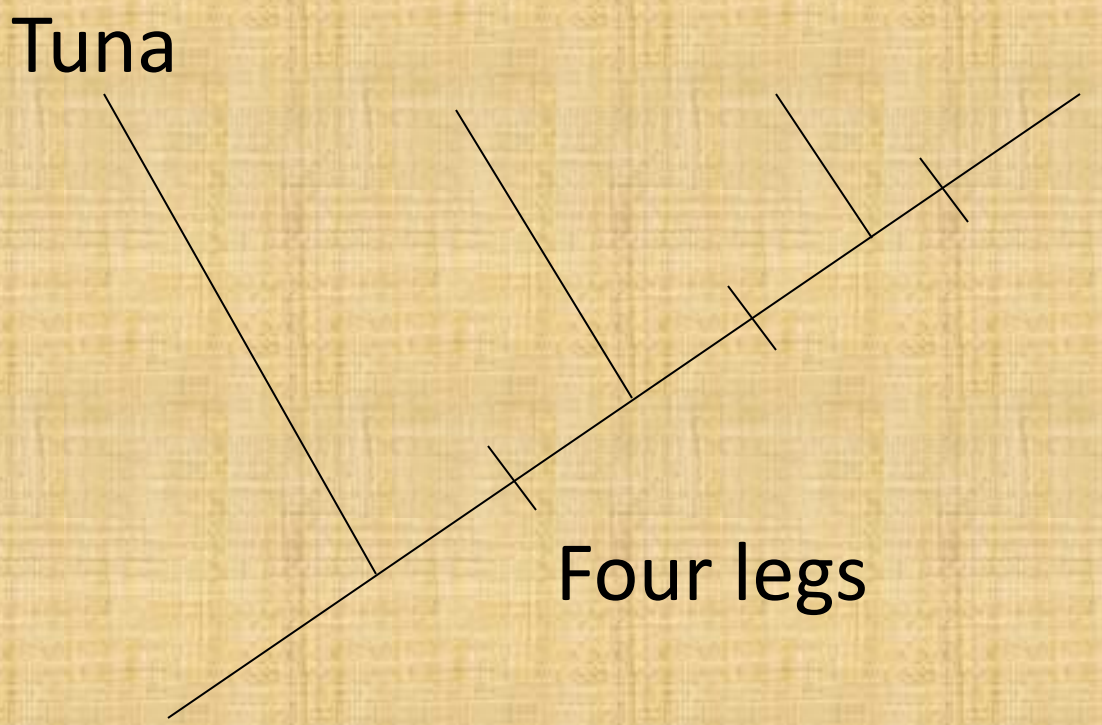
How to Construct a Cladogram



How to Construct a Cladogram



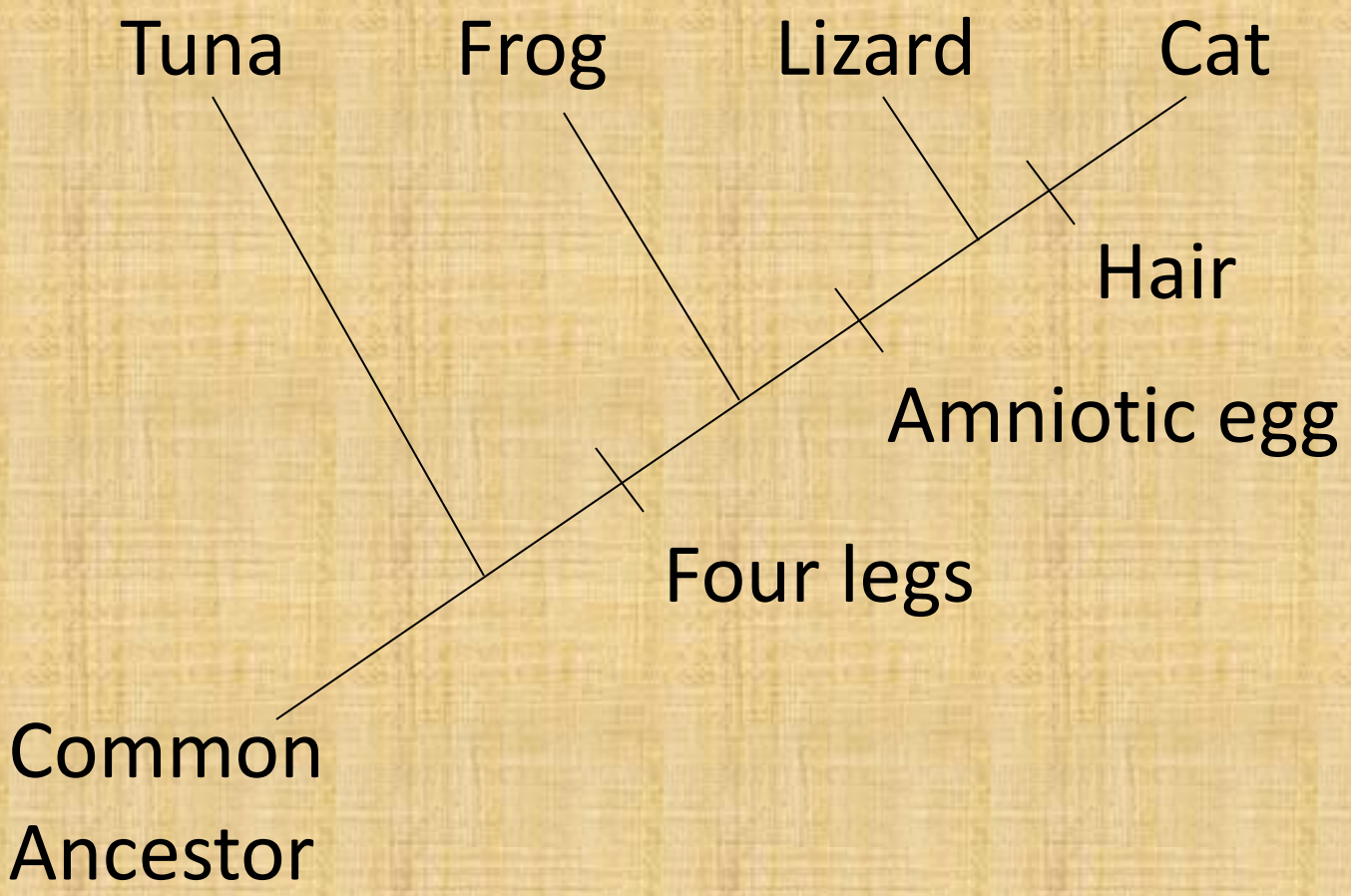
How to Construct a Cladogram



How to Construct a Cladogram

- Complete the rest of the cladogram on your sheet

How to Construct a Cladogram



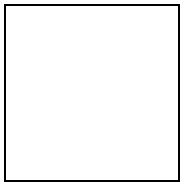
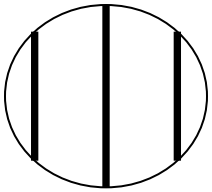
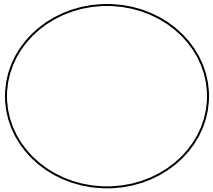
Dichotomous Key

- Series of paired statements to determine the identity of an organism

- If you pick up an organism in the woods, you can use a dichotomous key to identify what you are holding

Practice: Dichotomous key

- Each of the following objects was given a human name. Determine the name of each object using the key provided.

A  B  C  D 

1a. Square shaped…Go to 2

1b. Circle shaped…Go to 3

2a. Shaded completely…**Fred**

2b. Not shaded …**Terry**

3a. No strips…**Ginger**

3b. Strips …**Shelly**

Answers to Sample Key

A = Fred

B = Terry

C = Shelly

D = Ginger

Kingdom and Domains

- First to be introduced was Plantae and Animalia
- Advances in science to develop more kingdoms were the microscope
- Changes can constantly occur because of new discoveries and revising the criteria for each kingdom

Vocabulary

- Prokaryotic cells = no nucleus, no membrane-bound organelles, unicellular
  - Ex: bacteria
- Eukaryotic cells = nucleus, organelles, unicellular or multicellular
  - Ex: protists, fungi, plants, and animals

- Heterotroph = consumes food
- Autotroph = makes own food

Cell Type

- Eubacteria – prokaryotic
- Archaebacteria – prokaryotic
- Protista – eukaryotic
- Fungi – eukaryotic
- Plantae – eukaryotic
- Animalia – eukaryotic

Cell Number

- Eubacteria – unicellular
- Archaebacteria – unicellular
- Protista – both
- Fungi – both
- Plantae – multicellular
- Animalia – multicellular

Nutrition

- Eubacteria – both
- Archaebacteria – both
- Protista – both
- Fungi – mostly heterotrophs
- Plantae – mostly autotrophs
- Animalia – heterotrophs

Cell Wall

- Eubacteria – yes; peptidoglycan
- Archaebacteria – yes; no peptidoglycan
- Protista – both
- Fungi – yes; chitin
- Plantae – yea; cellulose
- Animalia – no

Examples

- Eubacteria – streptococcus, salmonella
- Archaebacteria – methanogens; thermophils
- Protista – amoeba, algae, seaweed
- Fungi – yeast, mushroom
- Plantae – moss, fern, pinetree, rose
- Animalia – sponge, crab, dog, human

THE END