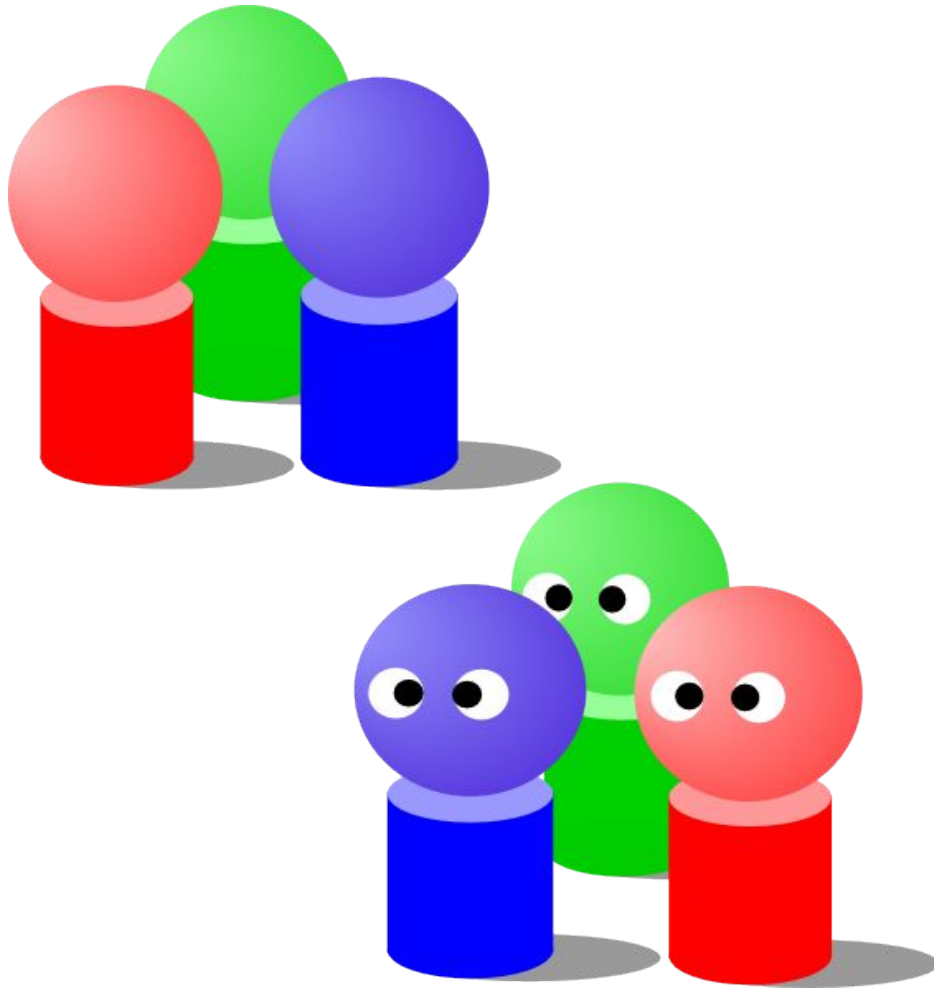# Classification   Chapter 18

How do we identify and name all living organisms?

- We use classification systems
- Ways to organize all organisms into specific groups

Common Name –VS- Scientific Name

- **Avoids confusion with common names**
  - Different places in the world call the same organism by different names
    - *Examples: Mountain lion, puma, cougar, or panther*
    - *Example: Roly Poly, potato bug, pill-bug*
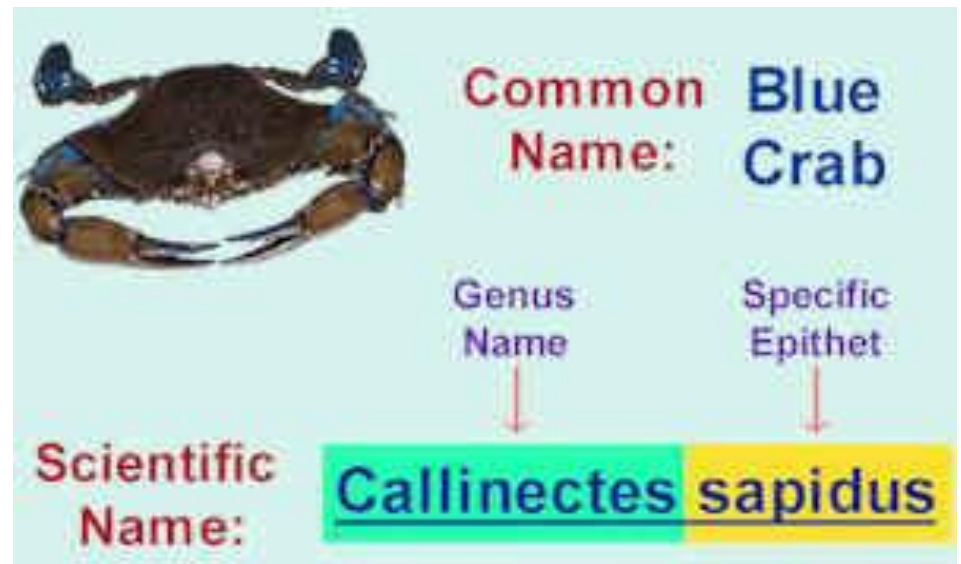   - *Example: Woodchuck or Ground Hog*

Carolus Linnaeus's

- First to develop a **2** word naming system called **binominal nomenclature**
- Each **species** is assigned a **2** part scientific name
- Why have a scientific name?

Kingdom
Class
Order
Family
Genus
Species
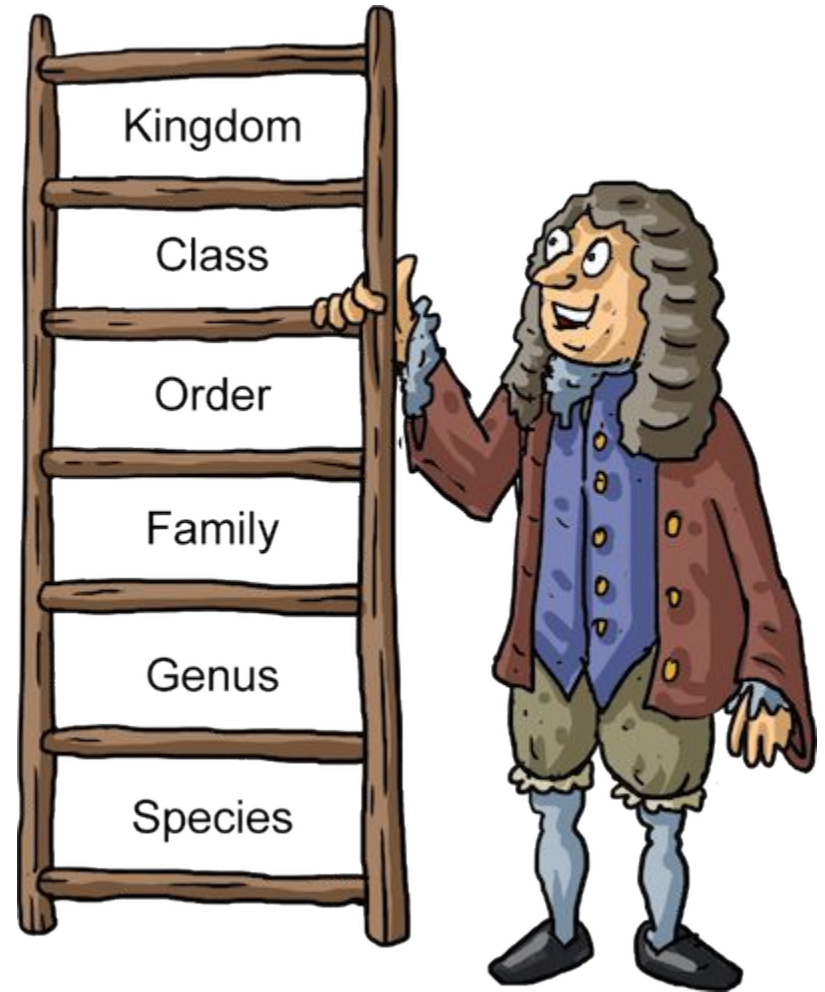
Scientific Names

- Written in Latin
- The first word of the scientific name is the organism's **Genus**
  - It must be **Capitalized**
- The second word is the organism's **species (epithet)**
  - It must be **lowercase**
- Both names are <u>underlined</u> or *italicized*

Can you guess the Scientific Name?

- *Quercus phellos*

- Homo sapiens

- *Ursus arctos horriblis*

- *Desmodus rotundus*

- Quercus alba

- *Odocoileus virginianus*

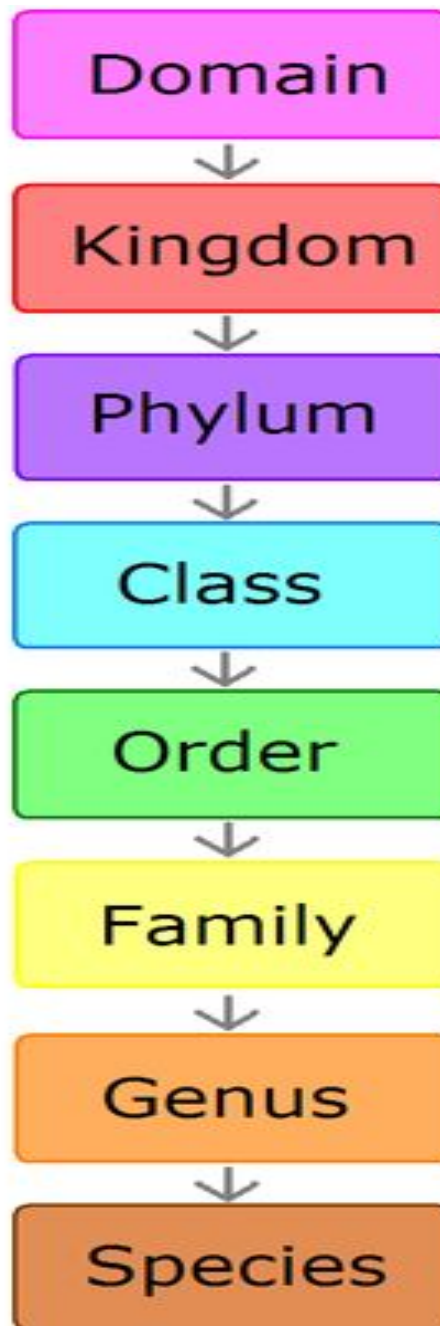- *Thamnophis sirtalis*

- Aedes japonicus
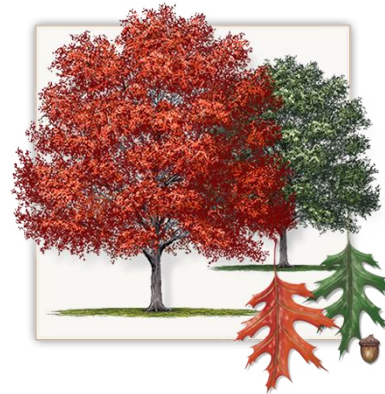
Over time

- The **binomial nomenclature** (2 word naming system) wasn't enough

- Needed to **classify** organisms into **larger** groups

- Goal of **systematics** is to organize living things that have **biological** meaning

- These groups are called **Taxa**

Taxon

- Named group of organisms
- This is a hierarchical classification system

Classification of Humans
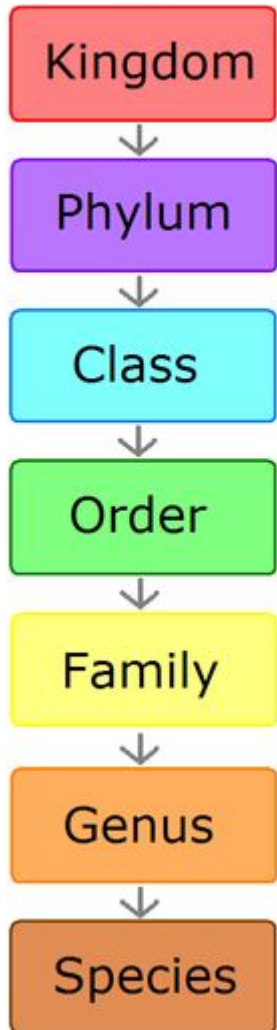
- Domain=   Eukarya
- Kingdom=   Animalia
- Phylum = Chordata
- Class=   Mammalia
- Order=   Primates
- Family=   Hominidae
- Genus=   *Homo*
- Species = *sapiens*

Kingdom
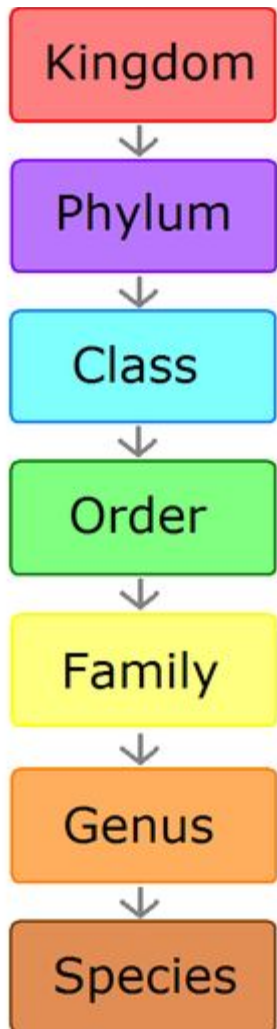
- This is the largest and most diverse of groups
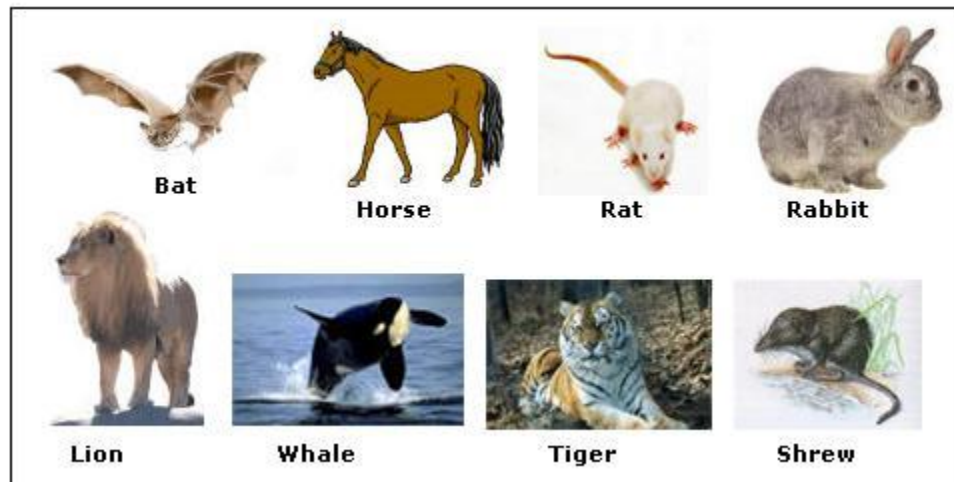
  - **Kingdom Animalia**
    - For humans

Phylum

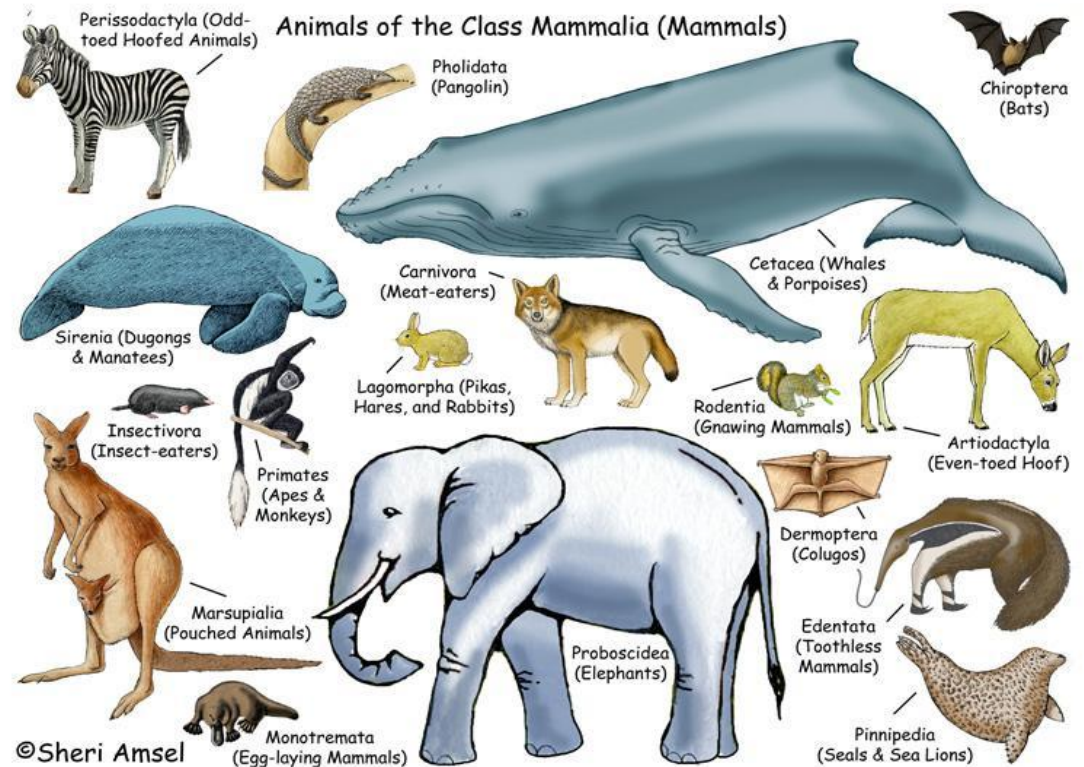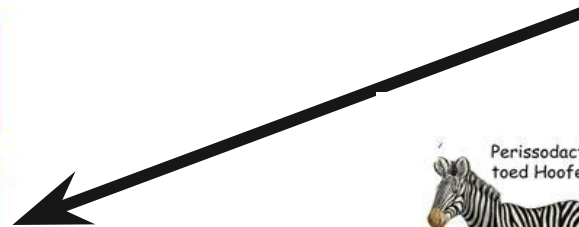- P= these are related groups of **<u>classes</u>** that are different but share important **<u>characteristics</u>**

Phylum Chordata

Class These are closely related orders

Class Mammalia

Kingdom
Phylum
Class
Order
Family
Genus
Species

Animals of the Class Mammalia (Mammals)

Perissodactyla (Odd-toed Hoofed Animals)
Pholidata (Pangolin)
Chiroptera (Bats)
Carnivora (Meat-eaters)
Cetacea (Whales & Porpoises)
Sirenia (Dugongs & Manatees)
Lagomorpha (Pikas, Hares, and Rabbits)
Rodentia (Gnawing Mammals)
Artiodactyla (Even-toed Hoof)
Insectivora (Insect-eaters)
Primates (Apes & Monkeys)
Dermoptera (Colugos)
Marsupialia (Pouched Animals)
Proboscidea (Elephants)
Edentata (Toothless Mammals)
Monotremata (Egg-laying Mammals)
Pinnipedia (Seals & Sea Lions)

©Sheri Amsel

Order

Kingdom
↓
Phylum
↓
Class
↓
Order ←
↓
Family
↓
Genus
↓
Species

- These are closely related families

Order Primates

Family

- These consist of several related genera (genus)

Family Homindae

Gibbon   Orangutan   Gorilla   Chimpanzee   Human
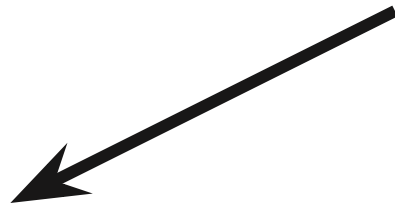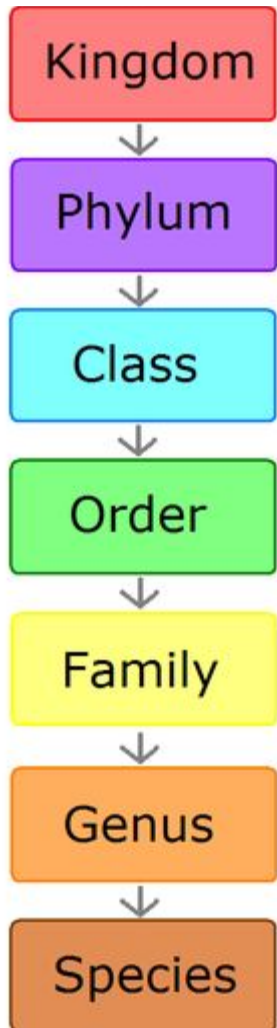
Genus

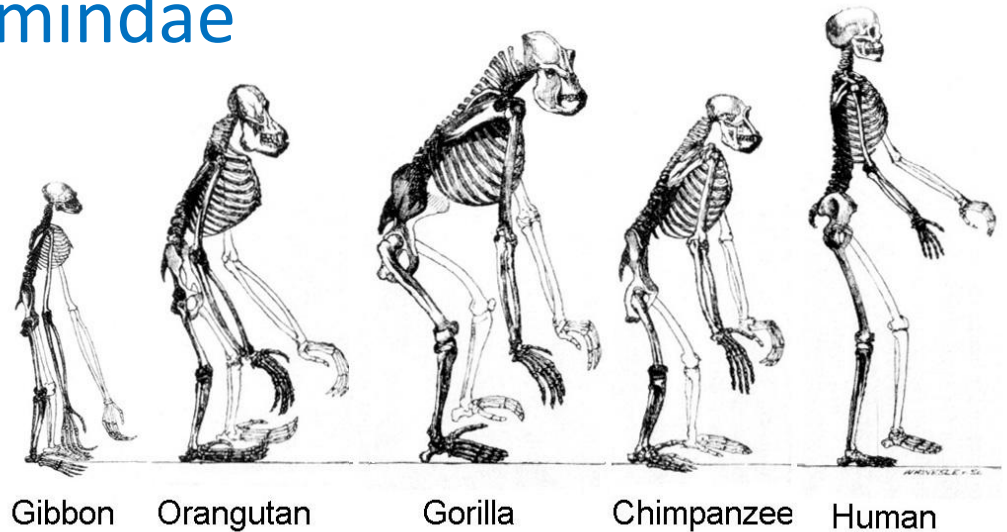- A group of species that are closely related and share a common ancestor

- Genus *Homo*

The human lineage

Australopithecus afarensis

Homo habilis

Homo erectus

Homo neanderthalensis

Homo sapiens

40 cm
12 inches

© 2005 Encyclopædia Britannica, Inc.
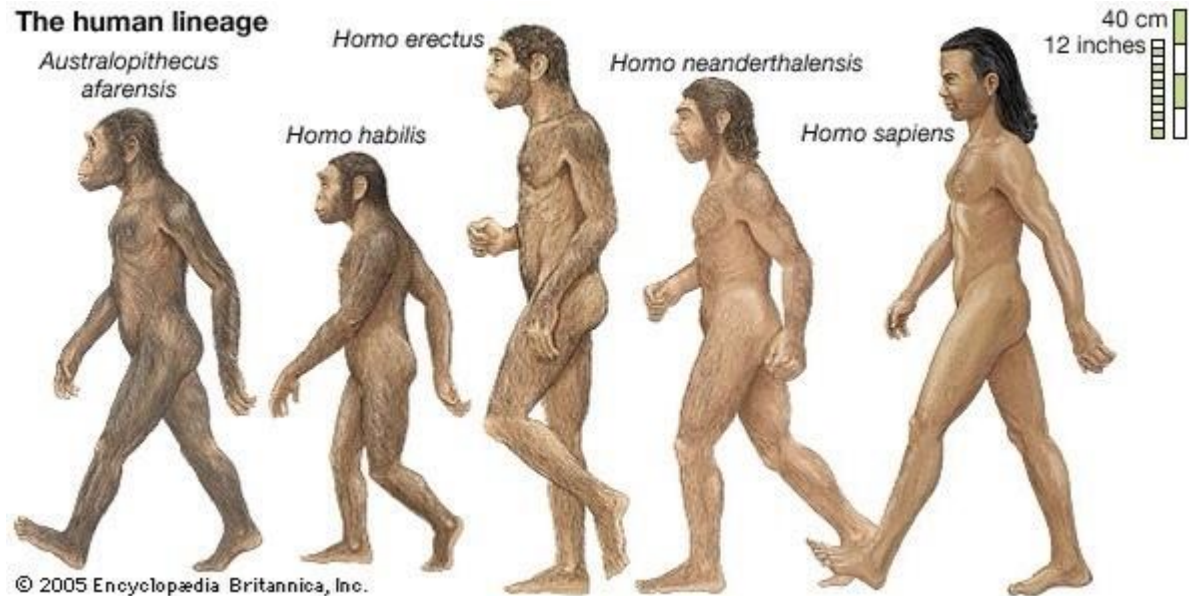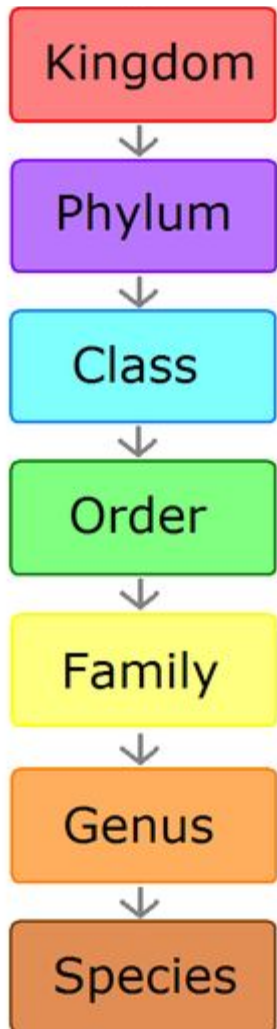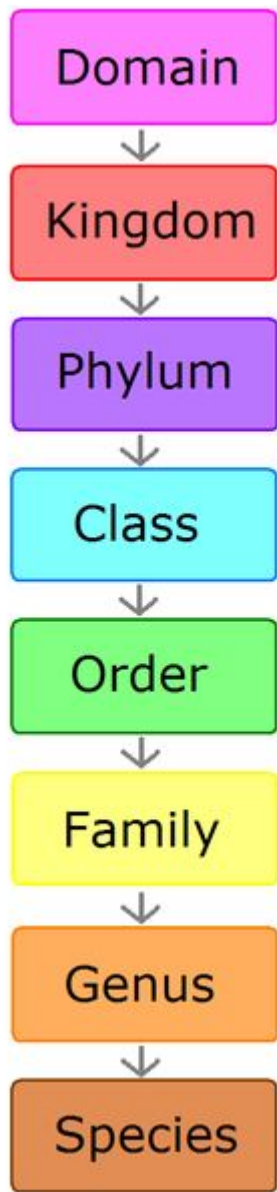
Species

- The specific organism

- Group of organisms that are capable of producing fertile offspring

- Species *sapiens*
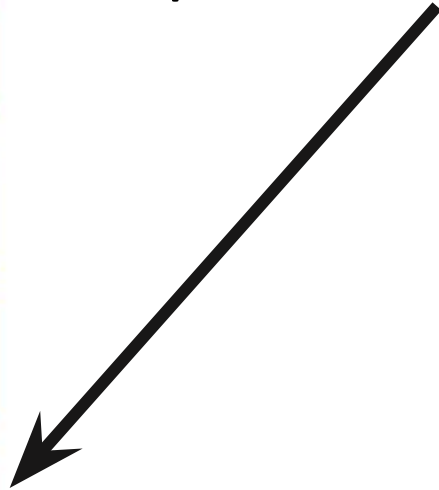
Classification of Humans

- Domain=   Eukarya
- Kingdom=   Animalia
- Phylum   =   Chordata
- Class=   Mammalia
- Order=   Primates
- Family=   Hominidae
- Genus=   *Homo*
- Species   =   *sapiens*

Kingdom.......Animalia

Phylum........Chordata

Class........Mammalia

Order............Cetacea

Family....Delphinidae

Genus..........*Orcinus*

Species...........*orca*

KINGDOM — Animalia

PHYLUM — Chordata

CLASS — Mammalia

ORDER — Carnivora

FAMILY — Felidae

GENUS — Panthera

SPECIES — Panthera pardus

©1999 Addison Wesley Longman, Inc.
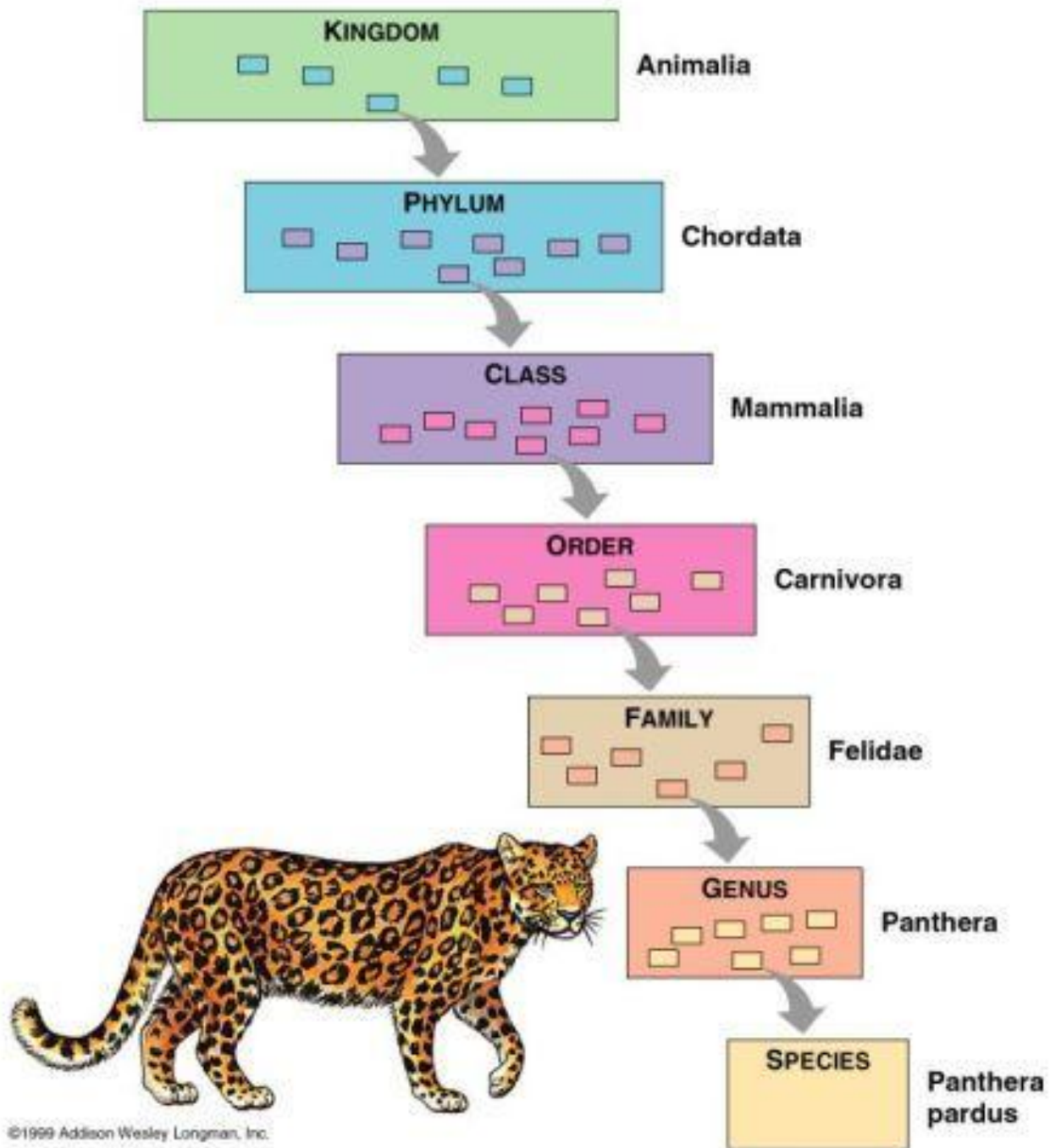
Grizzly bear Black bear Giant panda Red fox Abert squirrel Coral snake Sea star

KINGDOM Animalia

PHYLUM Chordata

CLASS Mammalia

ORDER Carnivora

FAMILY Ursidae

GENUS Ursus

SPECIES *Ursus arctos*

Dichotomous Key

A key based on a series of 2 choices between alternate characteristics

Bird W   Bird X   Bird Y   Bird Z

Dichotomous Key to Representative Birds

1. a. The beak is relatively long and slender.................................Certhidea
   b. The beak is relatively stout and heavy.................................go to 2
2. a. The bottom surface of the lower beak is flat and straight ......Geospiza
   b. The bottom surface of the lower beak is curved ....go to 3
3. a. The lower edge of the upper beak has a distinct bend...........Camarhynchus
   b. The lower edge of the upper beak is mostly flat ....Platyspiza
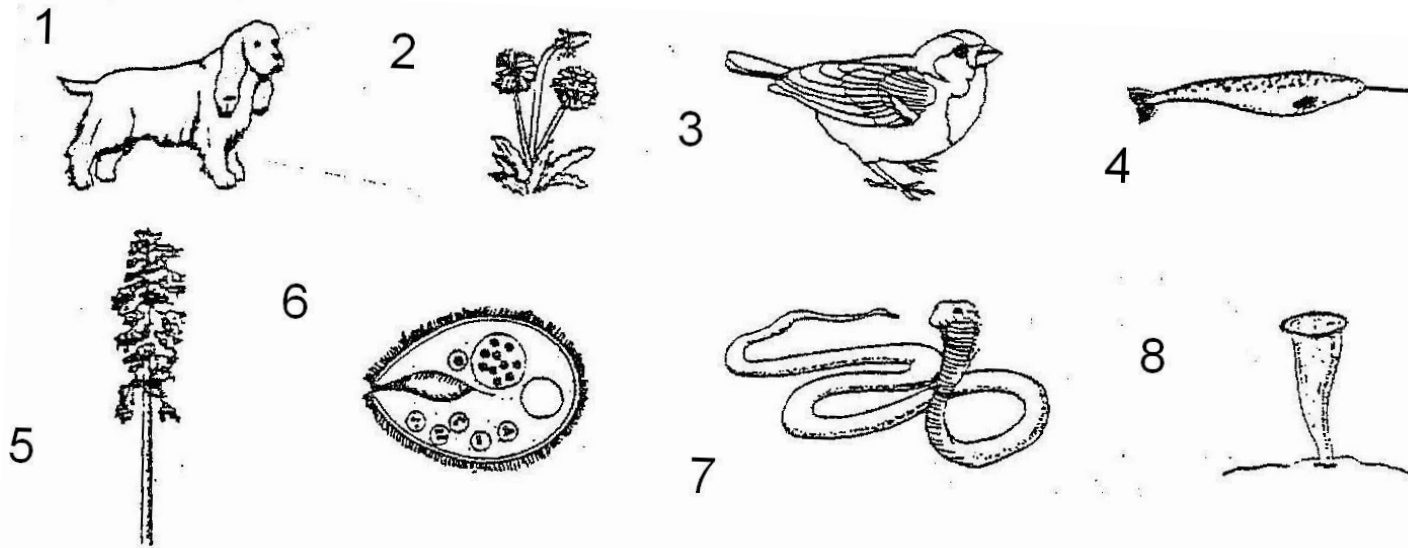
1a. organism with two or four functional legs . . . go to **2**
1b. organism without two or four legs . . . . go to **3**

2a. organism without wings . . . . *Canis familiaris* . . . . .dog

2b. organism with wings . . . . *Passer domesticus* . . . . . . .house sparrow
3a. organism is unicellular . . . . go to **4**
3b. organism is multicellular . . . . go to **5**

4a. organism swims freely in water . . . . *Balantidium* sp. . . . . .balantidium

4b. organism anchored to substrate . . . . *Stentor* sp. . . . . .stentor
5a. organism is heterotrophic . . . . go to **6**
5b. organism is autotrophic . . . . go to **7**

6a. organism lives in oceans . . . . *Monodon monoceros* . . . . .narwhal

6b. organism lives on land . . . . *Ophiophagus hannah* . . . .king cobra

7a. organism is a tree . . . . *Pinus ponderosa* . . . . . . .ponderosa pine

7b. organism is an herb . . . . *Taraxicum officinale* . . . . .dandelion
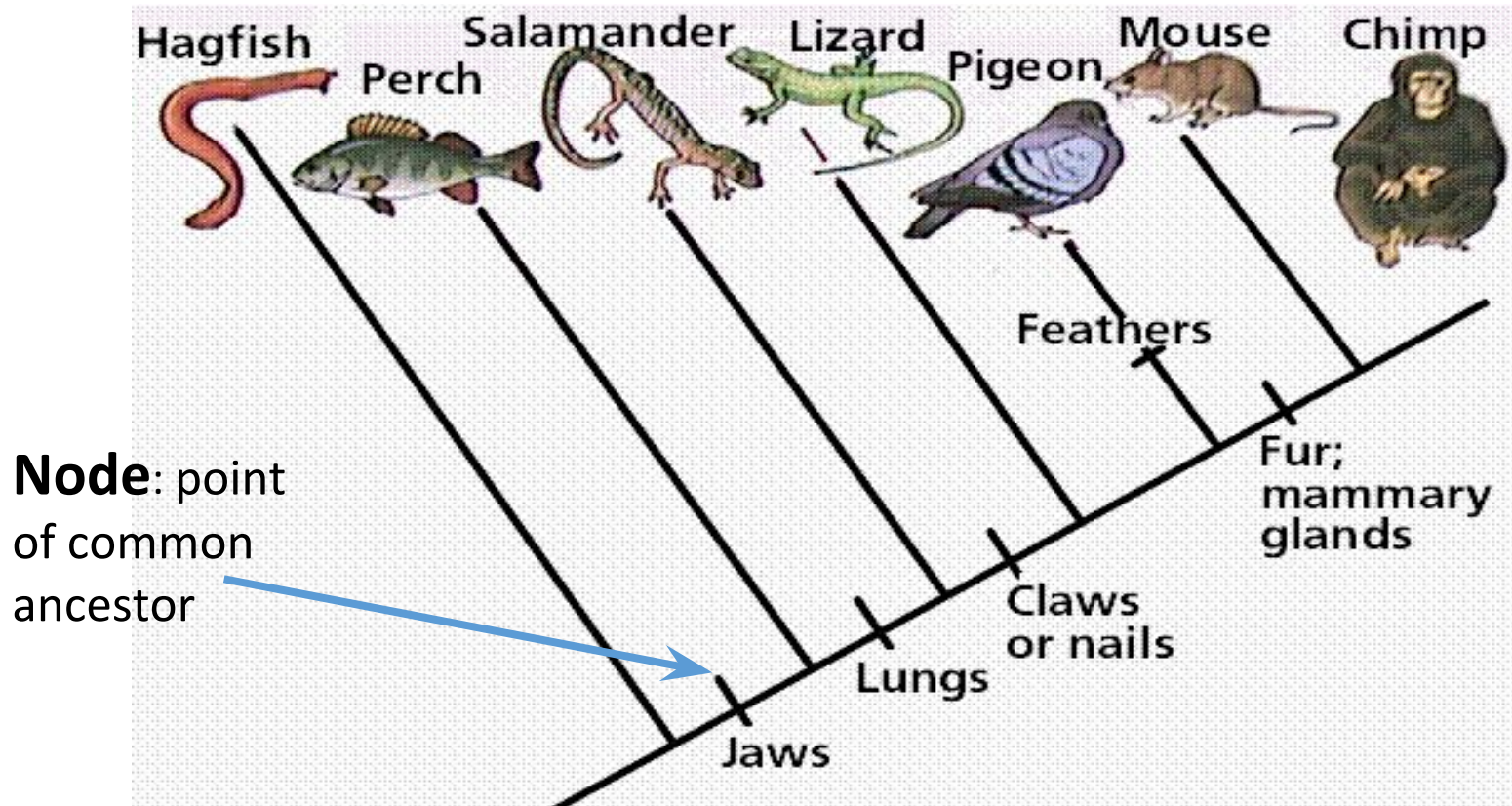
Phylogeny

- Evolutionary history of a species
- Goal of **phylogenic** is to group species into **larger** categories
- that reflect lines of **evolutionary** descent rather than overall **similarities** and differences

Cladogram

- Links groups of **organisms** by showing how evolutionary lines **branched** off from common **ancestors**
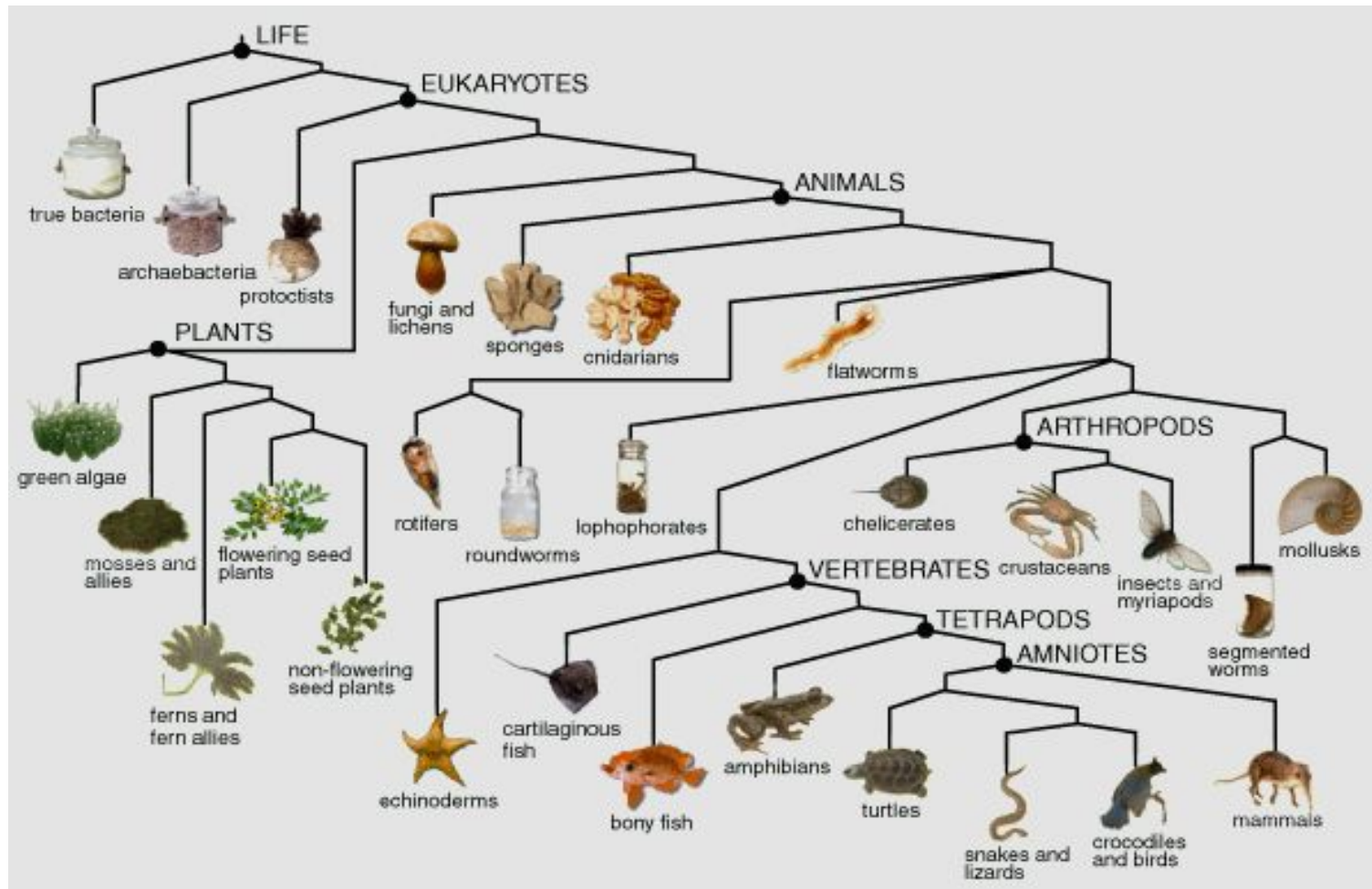
Phylogenetic Tree

Phylogeny of BIRDS worksheet

1. In 2 words, what does "phylogeny" mean?

2. List the 3 most ancient birds shown:

3. What 2 other birds are Woodpeckers most related to?

4. What are penguins most related to?

5. What 4 types of birds appear to have evolved from the Loons?

6. Which evolved longer ago: flightless birds or doves?

7. List 2 adaptations of woodpeckers.

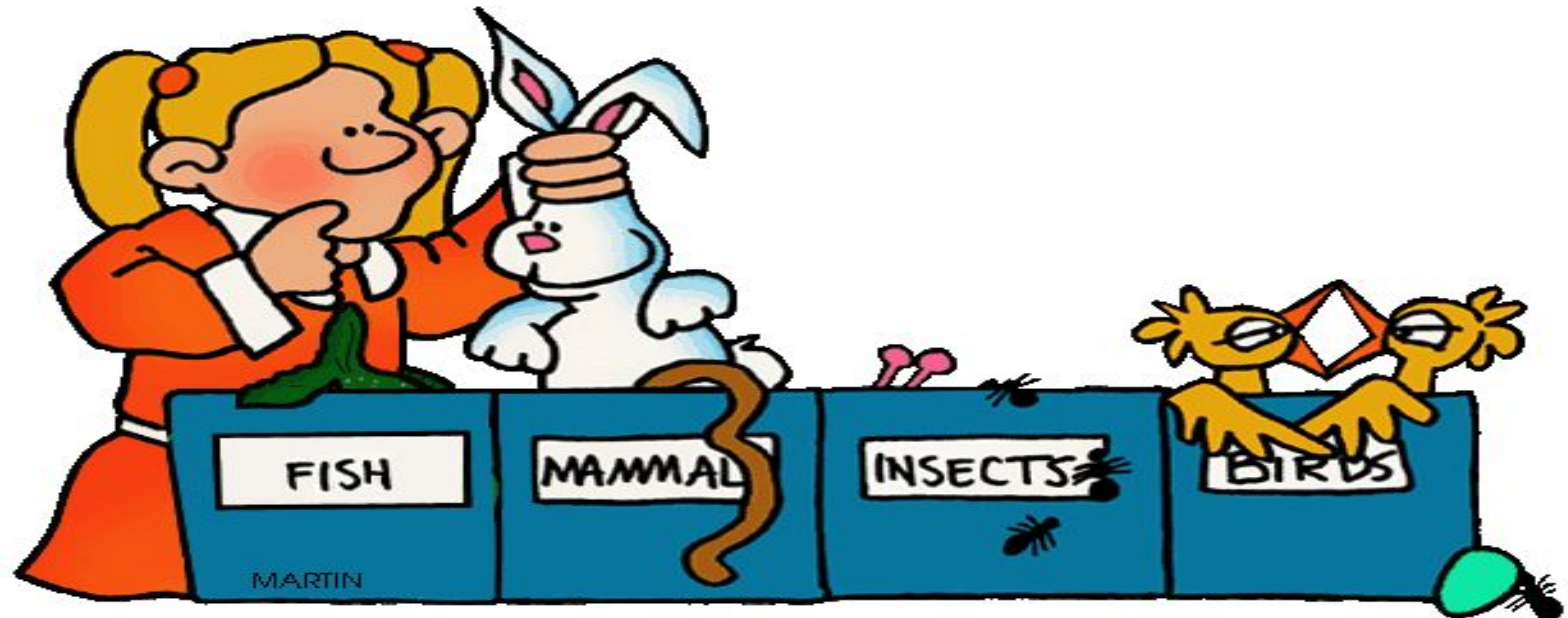# Worksheets

1) Spider dichotomous key

My dichotomous Key

- Let's do one together 😊
- Page 137

Building the Tree of Life

- So how do we classify all organisms??
- Start big and work your way to the most specific

- Linnaeus started with only 2 groups back in the 1700's
  - Plants
  - Animals

Who goes where?

The 3 Domains

DOMAIN	KEY CHACTERISTICS
DOMAIN BACTERIA	Kingdom Bacteria
DOMAIN ARCHEA	Kingdom Archaea
DOMAIN EUKARYA	Kingdom Protista Kingdom Fungi Kingdom Plantae Kingdom Animalia

Kingdom Bacteria

Cell type	Prokaryote
# of cells	Unicellular
Cell wall	Yes peptidoglycan
Mode of nutrition	Autotroph Heterotroph
Mobility	Yes Flagella/cilia
Examples	Streptococcus *E. coli* staphylococcus

	ARCHAEA
Cell type	Prokaryote
# of cells	Unicellular
Cell wall	Yes NO peptidoglycan
Mode of nutrition	Autotrophic heterotrophic
Mobility	Yes Flagella/cilia
Examples	methanogens, thermopiles

Kingdom Archaea

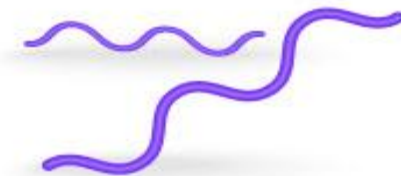- Special – *lives in extreme heat, salt, acid*

BACTERIA SHAPES

SPHERES (COCCI)

Streptococci
(Streptococcus pyogenes)

Diplococci
(Streptococcus pneumoniae)

Tetrad

Staphylococci
(Staphylococcus aureus)

Sarcina
(Sarcina ventriculi)

RODS (BACILLI)

Chain of bacilli
(Bacillus anthracis)

Flagellate rods
(Salmonella typhi)

Spore-former
(Clostridium botulinum)

SPIRALS

Vibrios
(Vibrio cholerae)

Spirilla
(Helicobacter pylori)

Spirochaetes
(Treponema pallidum)

COCCUS   BACILILUS   SPIRILLUM

Kingdom Protista
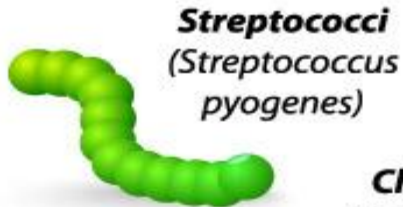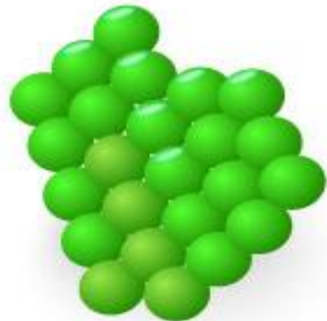
	PROTISTS
Cell type	Eukaryote
# of cells	Unicellular/multicellular
Cell wall	Yes cellulose
Mode of nutrition	Autotrophic heterotrophic
Mobility	Yes Pseudopods/flagella/cilia
Examples	Amoeba Paramecium euglena

Kingdom Fungi

MOLDS

YEASTS

MUSHROOM
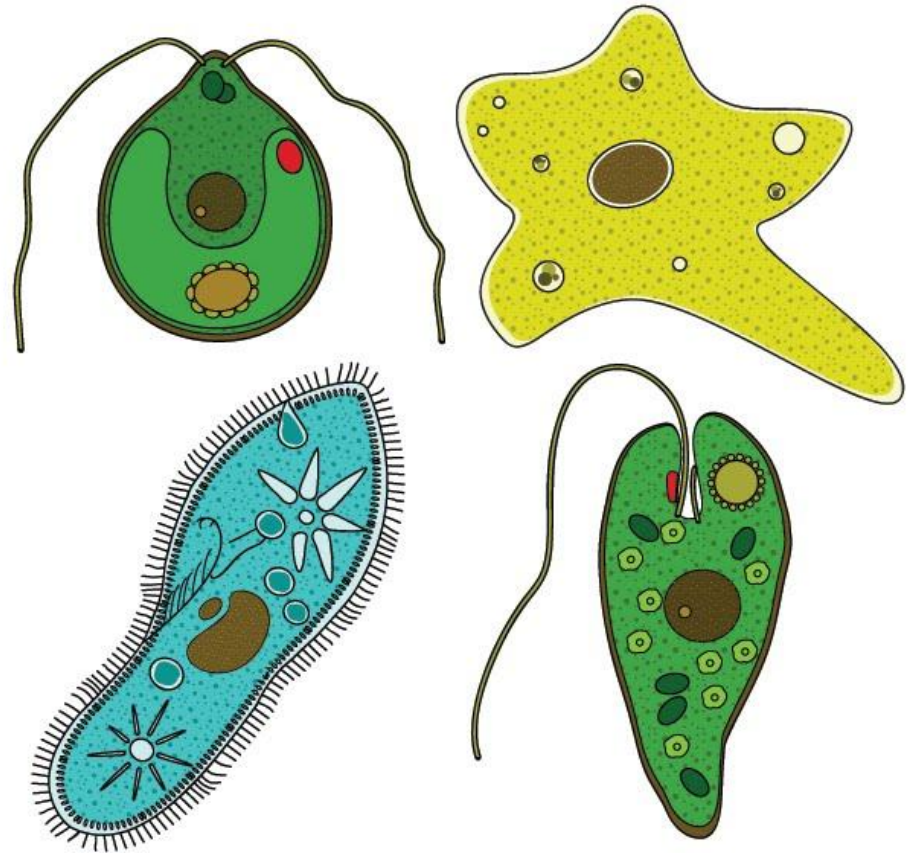
REPRESENTATIVES OF KINGDOM FUNGI

	FUNGI
Cell type	Eukaryote
# of cells	Mostly multicellular
Cell wall	Yes chitin
Mode of nutrition	Heterotrophic (decomposers)
Mobility	No… immobile
Examples	Yeast, mold, mushrooms

- Habitat – lives in dark, warm and moist areas

Kingdom Plantae

Special – chlorophyll, roots

	PLANTAE
Cell type	Eukaryote
# of cells	Multicellular
Cell wall	Yes cellulose
Mode of nutrition	Autotrophic
Mobility	No… immobile
Examples	Rose, daisy, orange,

Other Plant Stuff

FRUITS AND VEGETABLES
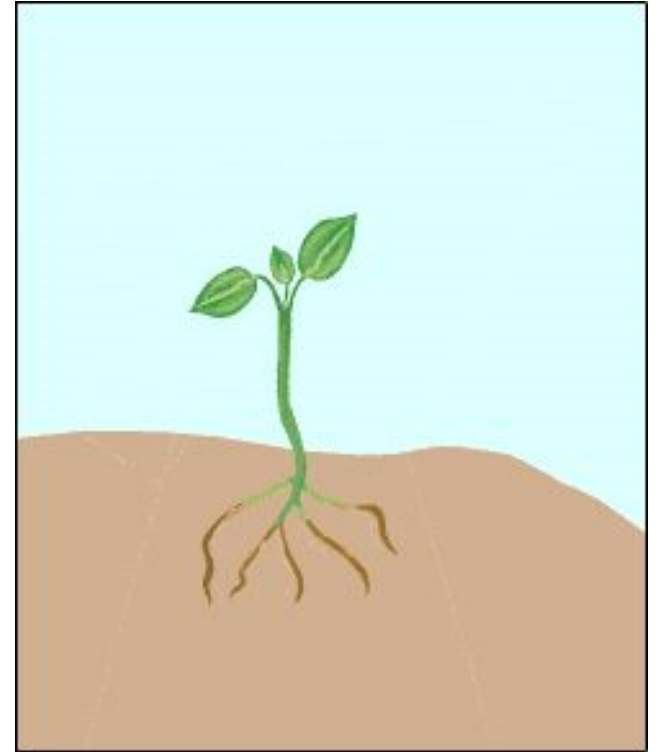
TROPISM

Kingdom Animalia

Special – ability to think

	ANIMALS
Cell type	Eukaryote
# of cells	Multicellular
Cell wall	No
Mode of nutrition	Heterotrophic
Mobility	Mobile
Examples	Jellyfish, cat, worm, ladybug

Invertebrates
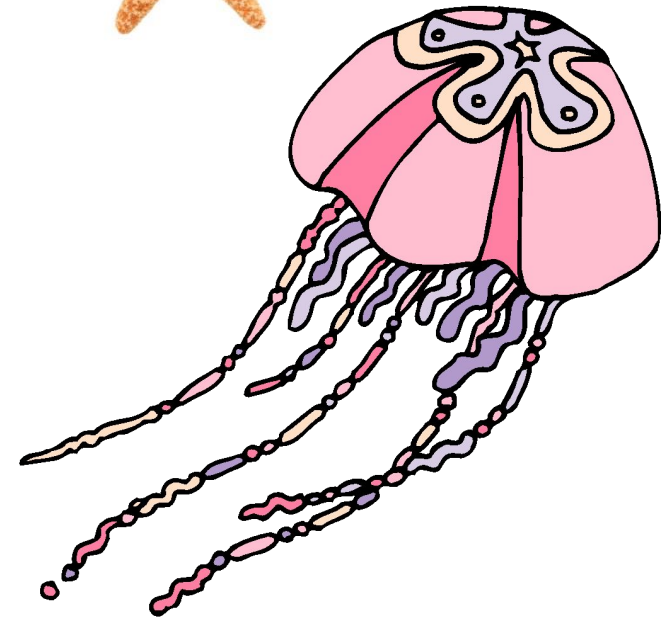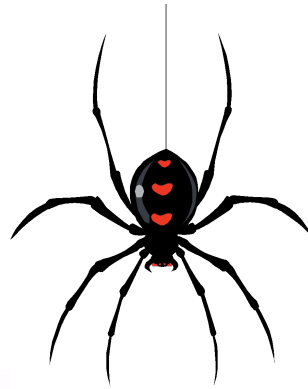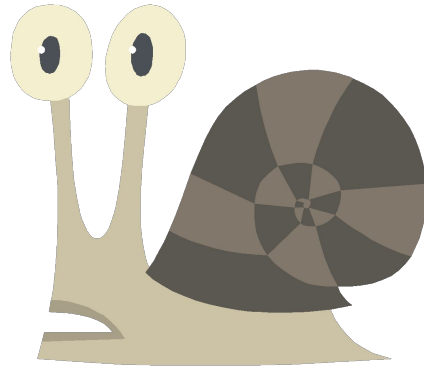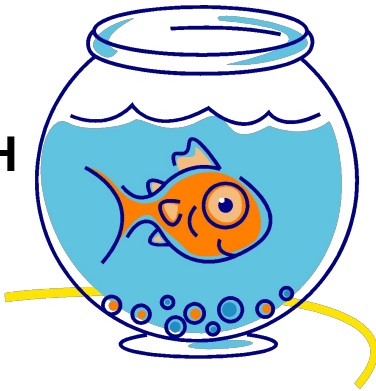
VERTEBRATES

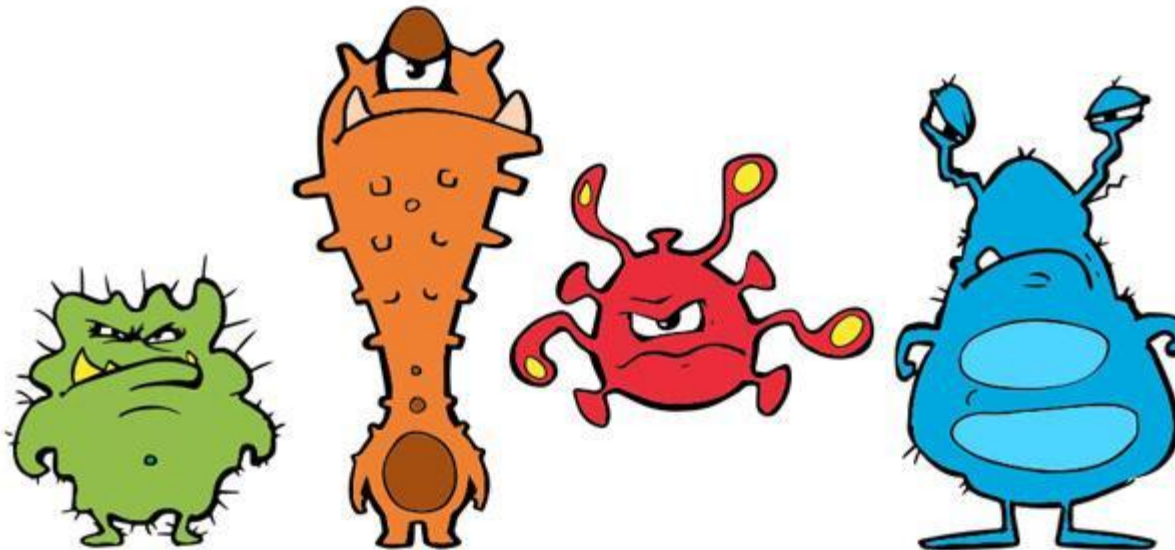AMPHIBIANS

BIRDS

FISH

REPTILES

MAMMALS

Viruses

- A nucleic acid surrounded by a protein coat
- Non-living
- Not part of biological classification system

Kingdom Chart Pg 140-41

- Make 5 columns between pages 140-41
- These pages should be open together like a book
- Label each top with a Kingdom Name
  - Archea/Bacteria
  - Protista
  - Fungi
  - Plantae
  - Animalia
- Use the words on the sheet and place each into the correct kingdom column

Kingdom Chart pg 140-41

Archaea/ bacteria	Protista	Fungi	Plantae	Animalia
1. No nucleus 2. 3. 4. 5. 6. 7. 8.	1. nucleus 2. 3. 4. 5. 6. 7. 8.	1. nucleus 2. 3. 4. 5. 6. 7. 8. 9.	1. Vascular 2. Nucleus 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14.	1. Live anywhere 2. Nucleus 3. 4. 5. 6. 7. 8. 9. 10. 11.

Creature Creation (Day 1)

① All animals (4) need to be represented somehow in creature

② Each group <u>member</u> must draw their Animal part

③ Decide on a Common Name (combo of all animals)

④ Using Taxonomy... Classify your new creature into each level
  — You may have to do some research (Google)

⑤ Key Environment features should be in the background

Day 2

① Please see me once the entire paper is colored
  [must answer ?'s]

② 1 part of enviroment needs to be 3D

③ 1 part [animal] of the creature needs to be 3D

④ Common Name written on paper [I will show you]

⑤ Written paper of the following:
  - common name (why)
  - Scientific name
  - All levels classified
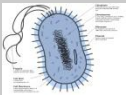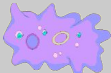 - 6 sentences of how your creature fits your enviroment

Let's Play

- Kahoot!

- Quizziz

PICK 1 OF THE 2 GAMES 😊

Kingdom Journal Practice

Kingdom name	Archaebacteria Eubacteria	Protista	Fungi	Plantae	Animalia
Mode of nutrition How do they get their food? Autotroph or Heterotroph	1	6	11	16	21
How many cells do most organisms contain? Unicellular or multicellular	2	7	12	17	22
What type of cell are they? Nucleus present or absent	3	8	13	18	23
Are they mobile or immobile?	4	9	14	19	24
Examples: Name 2 besides the images that are seen	5	10	15	20	25