BINOMIAL NOMENCLATURE

This system was developed to prevent confusion when identifying animals and plants. The two parts of the name consists of the last two parts of Linnaeus's system. This is _____**Genus**_____ and _____**species**_____. The language used is _____**Latin**_____, because it is a universal language. The rules are simple.

Steps:
1) _____**Genus**_____ name first, then _____**species**_____ name.
2) _____**Capitalize**_____ the genus name.
3) Write in _____**italics**_____.

Examples:

14

Dendrobates azureus
- Species name = _____**dendrobates**_____
- Genus name = _____**azureus**_____

Sarcorhamphus papa
- Species name = _____
- Genus name = _____

Common name:	Human	Canadian Goose	Lake darner	Mosquito
Kingdom	Animalia	Animalia	Animalia	Animalia
Phylum	Chordate	Chordate	Arthropoda	Arthropoda
Class	Mammalia	Aves	Insects	Insects
Order	Primate	Anseriformes	Odonate	Diptera
Family	Hominidae	Anatidae	Aeschnidae	Culicidae
Genus	Homo	Branta	Aeshna	Aedes
Species	Sapiens	Canadensis	Eremita	Fitchii

1. Write the binomial scientific names of the species below:
   a. Canadian goose: _____**Branta canadensis**_____
   b. Mosquito: _____
   c. Human: _____
   d. Lake darner: _____
2. Which two species are most closely related? (share the most taxons, or categories)
   _____**lake darner**_____ & _____**mosquito**_____

PHYLOGENETIC TREES

The diagram to the right represents a
__**phylogenetic**__ tree (also known as the
_____ of _____:
A phylogenetic tree shows a timeline of
_____ **evolutionary** _____ relationships.
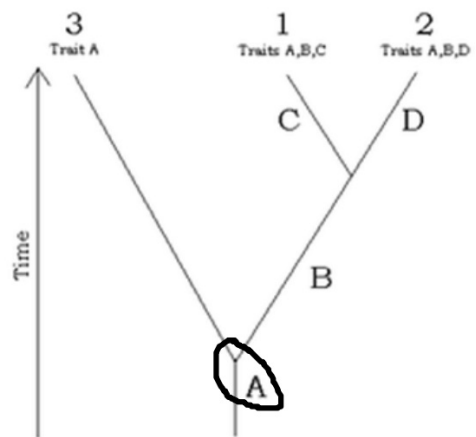
1. Circle the common ancestor.
2. Write the letter of the organism that *evolved* first: __**a**__
3. Write the letters of the two organisms that are most closely
   related: __**c**__ and __**d**__
4. Write the letters of the two organisms that share the
   greatest similarity in their DNA: __**c**__ and __**d**__
5. Write the letters of the two organisms that share the
   greatest number of amino acids: __**c**__ and __**d**__

3 — Trait A
1 — Traits A,B,C
2 — Traits A,B,D

Time

C   D

B

A

DICHOTOMOUS KEYS

- Sets of two (di=two) statements that can be used to identify organisms
- You simply read the statements until you determine what organism you are dealing with

Example:

1. a. Solid coat	Go to 2
b. Not solid coat	Go to 3
2. a. Smooth coat, long tail, no mane	*Felis concolor*
b. Smooth coat with mane	*Panthera leo*
3. a. Striped	*Panthera tigris*
b. Spotted	*Acinonyx jubatus*

15

45cm

Use the Dichtomous key to identify the animal:
    1.a. Larger than 40. cm ………………....2
    1.b. Not larger than 40. cm …………… 4

    2.a. Hooked beak……………………….. 3
    2.b. Beak not hooked…..Phasianus colchicus

    3.a. Feathers over eyes that look like ear……Bubo virginianus
    3.b. No Feathers that look like ears…Haliaeetus leucocephalus

    4.a. Head one solid color of feathers………… 5
    4.b. Head not solid color of feathers…… Colinus virginianus

    5.a. Bill flat………………… Anas platyrhynchos
    5.b. Bill pointed …………… Archilochus colubris

1. What is the scientific name of the animal?
A. Bubo virginianus   B. Haliaeetus leucocephalus   C. Colinus virginianus   D. Anas platyrhynchos

2. What kingdoms did Carolus Linnaeus originally use for his classification system?
A. Fungi and Protista   B. Fungi and Animalia   C. Plantae and Protista   D. Plantae and Animalia

3. An organism is eukaryotic, multicellular, autotrophic, and has a cell wall. To which kingdom does it belong?
A. Animal   B. Fungi   C. Plant   D. Protist

4. According to the cladogram, which animal is most closely related to the mouse?
A. Salamander   B. Perch   C. Lizard   D. Chimp

5. Linnaeus divided his classification system for animals into 7 distinct categories. Which group orders the categories from least to most specific?
A. Kingdom class phylum family order genus species
B. Kingdom phylum class order family genus species
C. Species family genus order phylum class kingdom
D. Species genus family order class phylum kingdom

6. What is the difference between the full classification of organisms and their
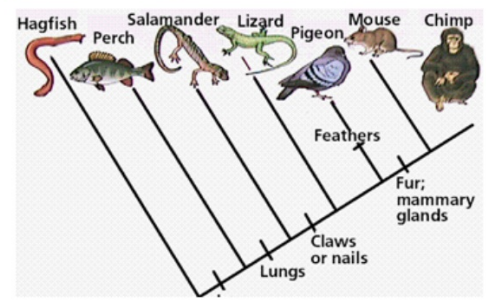
6. What is the difference between the full classification of organisms and their scientific names?

A. The full classification of organisms and their scientific names vary in different countries.

B. The scientific names of organisms include the order and family of the organisms, but the full classification includes only the species name.

C. The full classification of organisms will include more categories of organisms than their scientific names.

D. The scientific names of organisms include a single nomenclature, but the full classification includes various nomenclatures.

Lungs
Jaws

III   IV

II

V   VI

I

Common Ancestor
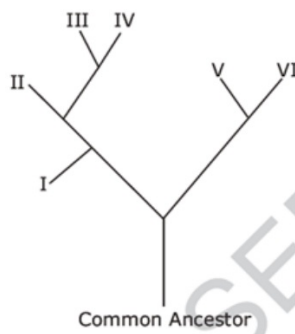
7. Which two species are the most closely related?
A. I and II   B. II and IV   C. I and V   D. V and VI

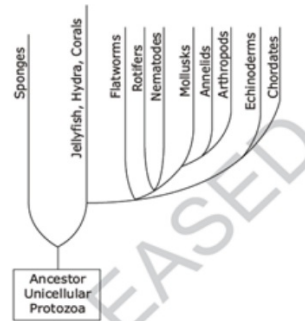**8. Scientists use all of the following to create cladograms and classify animals except which method?**
A. Biochemical (DNA)   B. Embryology   C. Amino acid analysis   D. Evolutionary Phylogeny

9. A tree identification area on the school grounds was developed for biology classes. Which method of identification would use a series of questions comparing two traits about the tagged trees?
A. a dichotomous key for trees   B. a questionnaire on trees
C. a field guide to trees   D. an Internet search on trees

10. Which two groups of organisms have the most genetic differences?
A. rotifers and nematodes   B. mollusks and annelids
C. mollusks and chordates   D. echinoderms and chordate

Sponges | Jellyfish, Hydra, Corals | Flatworms | Rotifers | Nematodes | Mollusks | Annelids | Arthropods | Echinoderms | Chordates

Ancestor
Unicellular
Protozoa

Practice: Classification

FLIP	FLOP
Bacteria are unicellular organisms. They are prokaryotic and have thick cell walls. Some are autotrophs, while others are heterotrophs. There are so many bacteria in the world that Bacteria can receive their own domain.	How are Bacteria different from Eukarya?
After scientists established broad categories, they had to get more specific to describe ALL of the life on Earth. To do this, they developed a system called **Binomial Nomenclature**. Bi=two, and nom= name. Essentially it means "Two names." The two names are its **GENUS** (Capitalized) and **SPECIES** (lower case). Both names are *italicized* if typed or <u>underlined</u> if written by hand. **Example**: *Homo sapiens* is the name for humans *Canus lupus* is the name for wolves	In the following binomial names, CIRCLE the GENUS. Then UNDERLINE the species. *Felis domesticus* (house cat) *Taraxacum officinale* (dandelion) *Tyrannosaurus rex* (T rex dinosaur) *Mus musculus* (mouse) How should someone correct this name to make it consistent with binomial nomenclature? troglodytes aedon
As new technologies develop, scientists can more accurately classify organisms. This system is always changing because we always get new information! New technologies that help us expand our knowledge include: 1. Similarity of **genes** (Chromosomes) 2. **Biochemistry** (DNA or amino acid sequences) 3. **Embryology**: Closely related species look similar as embryos 4. **Morphology**: Shared structure= closely related 5. **Phylogeny**: grouped according to how close they are related evolutionarily	How are evolution and classification dependent on each other? With what information can we conclude that organisms evolved from a common ancestor? What is phylogeny? *OWN WORDS!*

Reflect...

1. If viruses are not considered living, do you think they are assigned a place in this classification system? Why or why not?

2. Of the following organisms, circle the one that is least like the other two:
   Canis familiaris   *Canis lupus*   *Felis domesticus*

3. Number the eight classification groups in order from the group that contains the most closely related organisms (1) to the group with the least closely related organisms (8)
   ___ class   ___ family   ___ genus   ___ kingdom
   ___ order   ___ phylum   ___ species   ___ domain

4. If your name was a scientific name, which part would be the genus? _____ Which part would be the species? _____