Taxonomy

Classification of living organisms

How long would it take you to find an outfit?

How long would it take to find an outfit in this room?

I. The classification of living things

A. <u>Aristotle</u>- first to create a system of classification

...Plant or Animal??

B. "<u>PLANT</u> or <u>ANIMAL</u>"
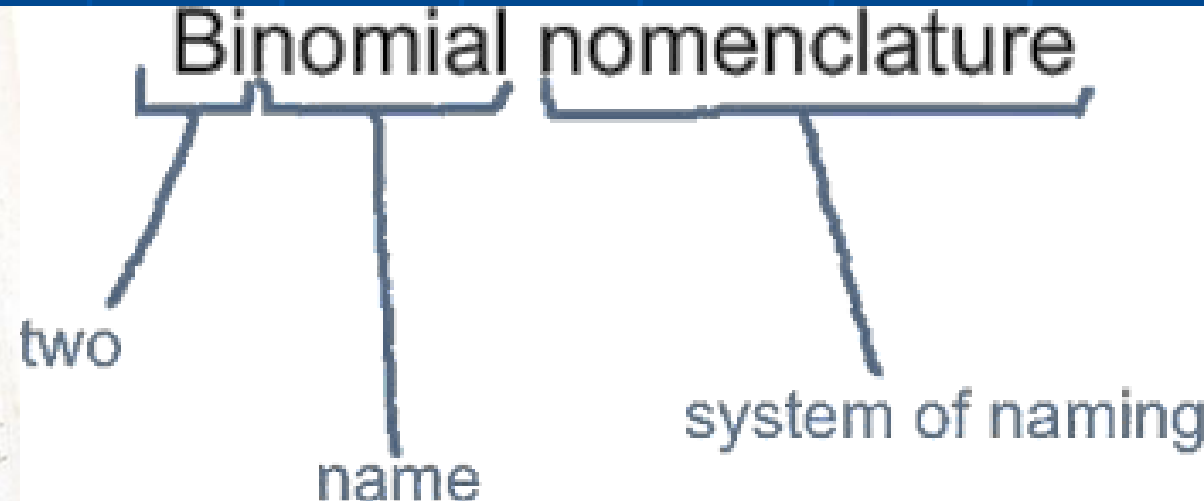
- C. Carl <u>Linnaeus</u>

"Father of Modern <u>Taxonomy</u>"

- D. His classification system is based on <u>structural similarities</u>

- E. Naming system is called <u>Binomial Nomenclature</u> (Two names)

Binomial nomenclature

two — name — system of naming

II. Categories of modern taxonomy (or Taxons)

A. Domains:

i. Eukaryota – Protists, Fungi, Plants, & Animals (have a nucleus)

ii. Bacteria – Eubacteria are unicellular & prokaryotic EX: bacteria that make you sick, live in intestines & in food

iii. Archaea – Archaebacteria are unicellular & prokaryotic, live in extreme environments EX: hot springs, brine pools and mud

DOMAINS
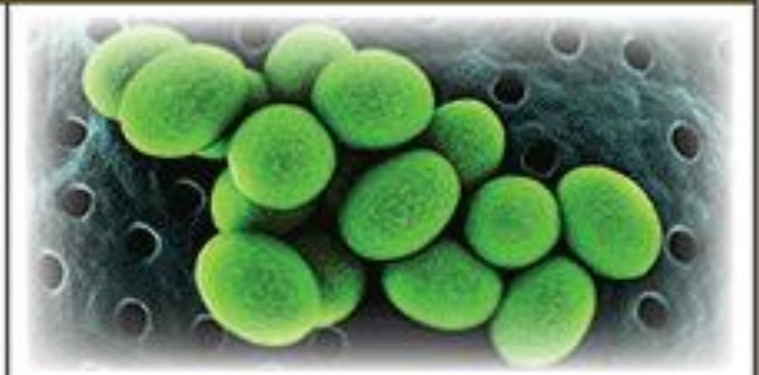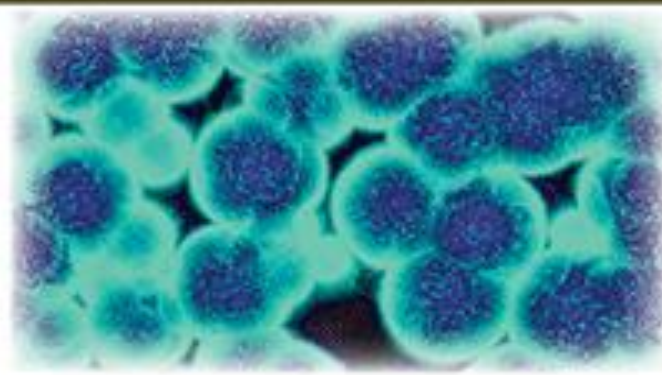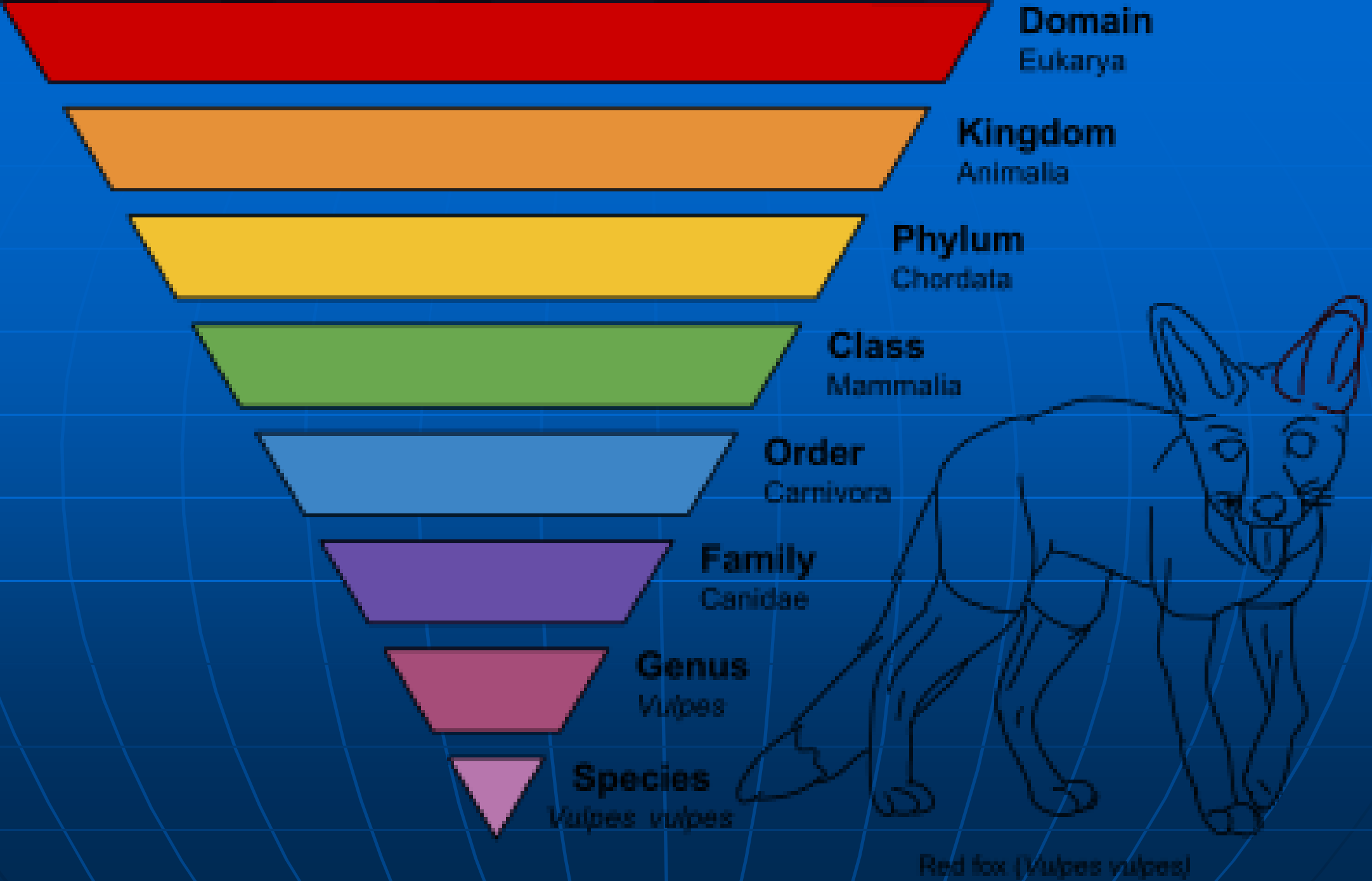
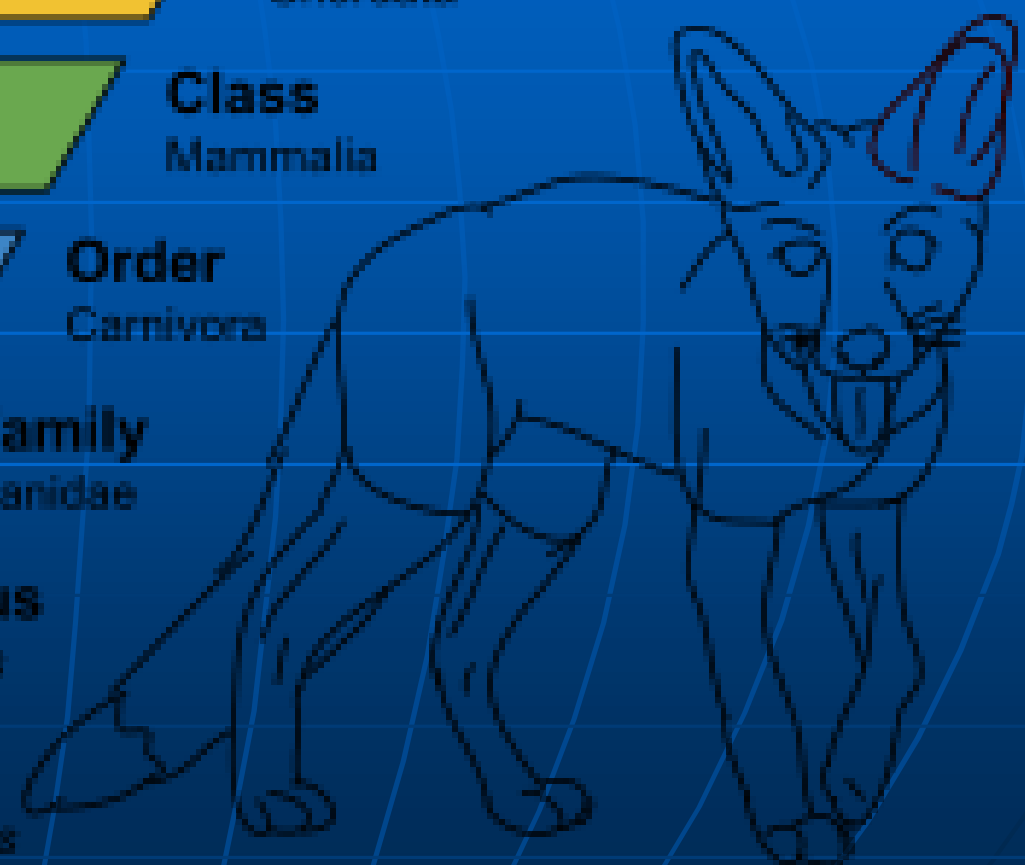Domain
Eukarya

Kingdom
Animalia

Phylum
Chordata

Class
Mammalia

Order
Carnivora

Family
Canidae

Genus
Vulpes

Species
Vulpes vulpes

Red fox (Vulpes vulpes)

B. Kingdoms - highest level and most general

6 total Kingdoms =
- Eubacteria= True bacteria
- Archaebacteria = Oldest and extreme-living bacteria
- Protista = Protozoans, 'junk' kingdom
- Fungi = Mushrooms, Mold, Mildew
- Plantae = Trees, shrubs, flowers… autotrophs
- Animalia = Insects, mammals, reptiles, multicellular and heterotrophs

III. Taxon Order

A. Domain

B. Kingdom

C. Phylum

D. Class

E. Order

F. Family

G. Genus

H. Species - most <u>specific</u>, similar in appearance and structure, same <u>number</u> <u>of chromosomes</u>, can mate and produce <u>fertile</u> offspring

I. Breeds or Races

Delighted **K**ing **P**hillip **C**ame **O**ver **F**or **G**ood **S**paghetti

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*

IV. Binomial Nomenclature

A. A <u>2</u> part <u>naming system in Latin</u>
B. Scientific Name

i. Genus - <u>first</u> part of name
    1. Always use a <u>capital letter</u> and <u>underline</u>
    2. Examples: <u>Homo</u> - humans
                  <u>Felis</u> - cats, tigers, lions, etc
                  <u>Canis</u> - dogs, wolves, coyotes

Binomial Nomenclature

ii. Species - second part of the name
  1. Always with a lower case letter and underlined

Ex: sapien - human   familiaris - dog
     domesticas - cat   lupus - wolves
     tigris - tiger   latran - coyotes

Binomial Nomenclature

iii. Full binomial nomenclature: <u>Genus species</u>

(can also be *italicized* ONLY when typed*)*

1. Human: <u>Homo sapiens</u> or *Homo sapiens*

2. Dog: <u>Canis familiaris</u> or   *Canis familiaris*

3. Cat: <u>Felis domesticas</u> or *Felis domesticas*

**Notice:
capital
letter**

**Notice:
lower case
letter**

**Both words
are
<u>underlined</u>**

Universal Language

- Uses SAME language (Latin) for all scientific names

Seahorse... or Sea"horse"?

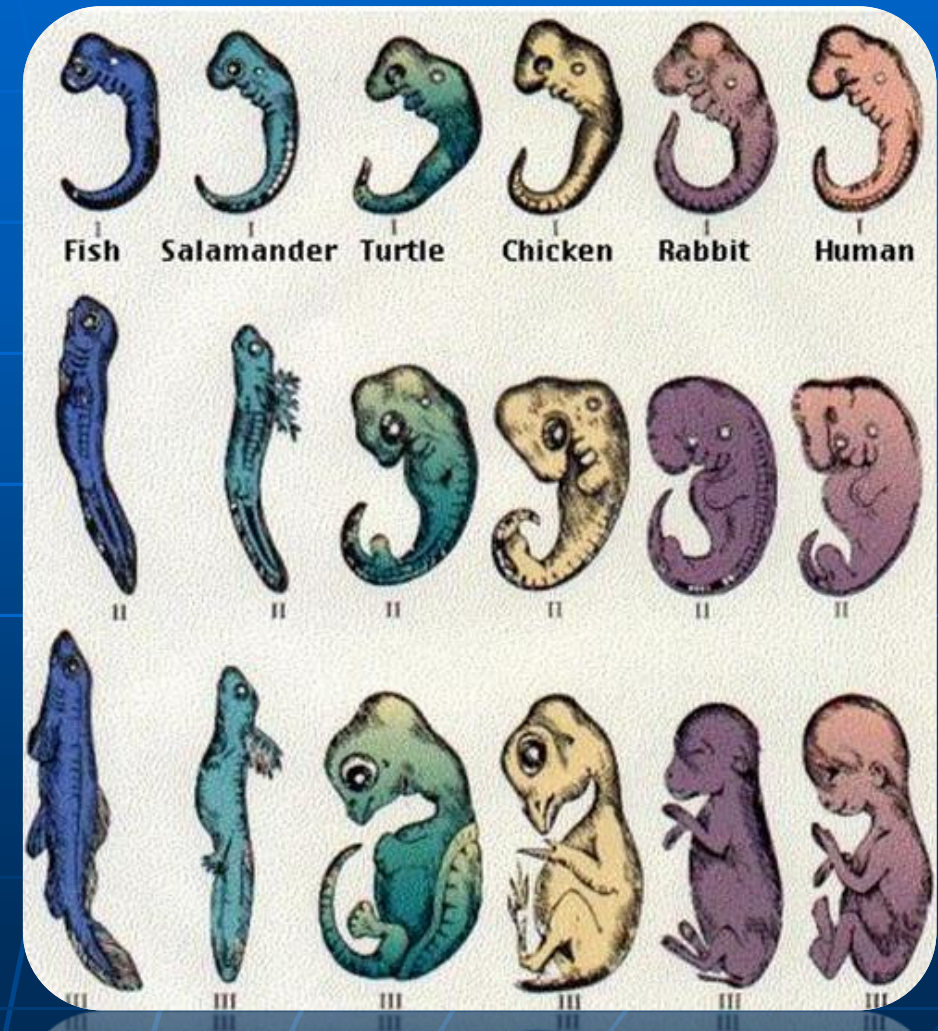# Confusion in Using Different Languages for Names
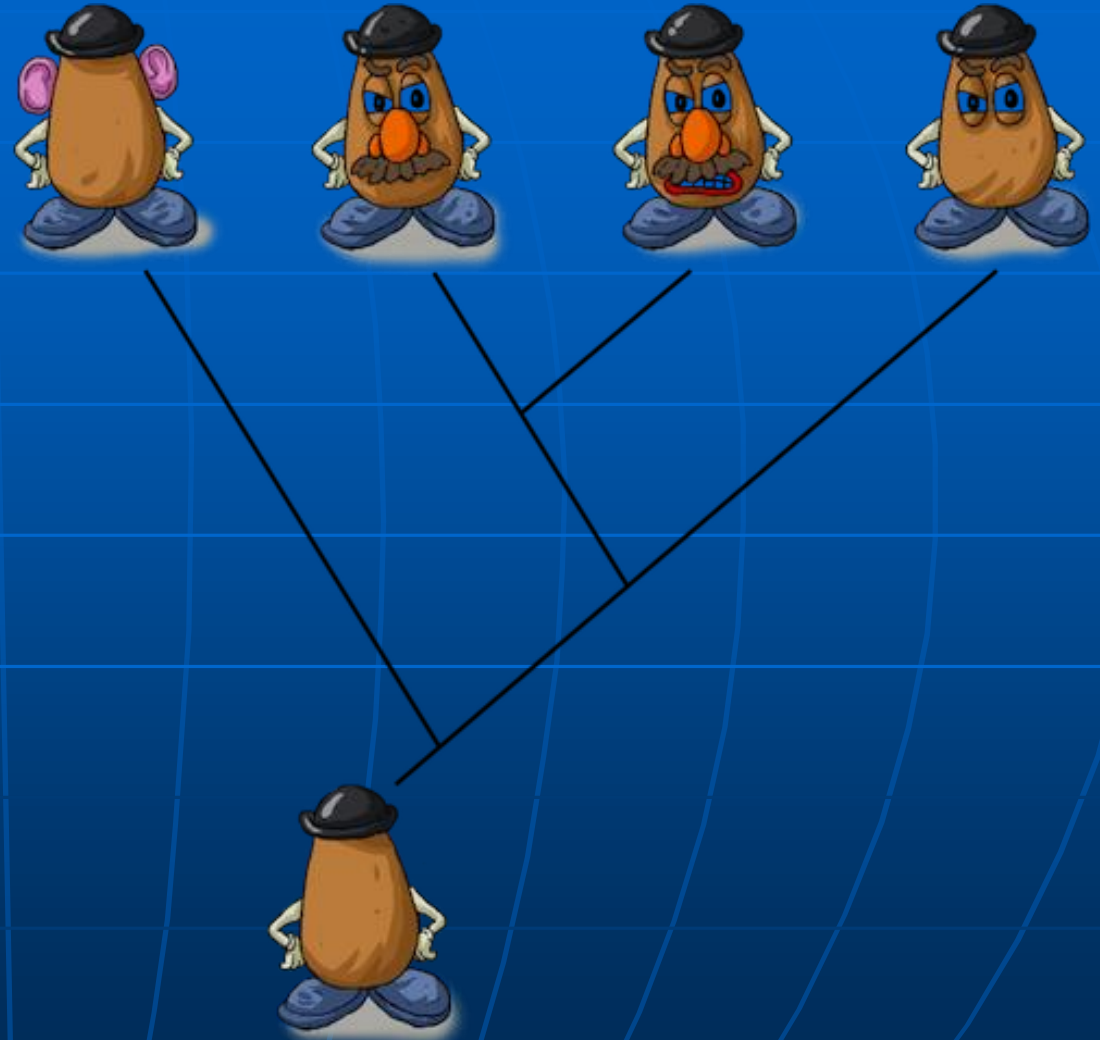
Latin Names are Understood by all Taxonomists

V. Guidelines for classification

- A. Fossils - organisms that evolve from common ancestors

- B. Biochemistry - sequence of amino acids in proteins

- C. Genetics - strongest evidence, DNA

- D. Structure of organism - bones, muscles, petals, roots

- E. Embryology - compare fetuses

VII. What happens when a new organism is 'discovered'?

- If it cannot be classified then continue to <u>gather</u> observations and <u>compare</u> to other known organisms.