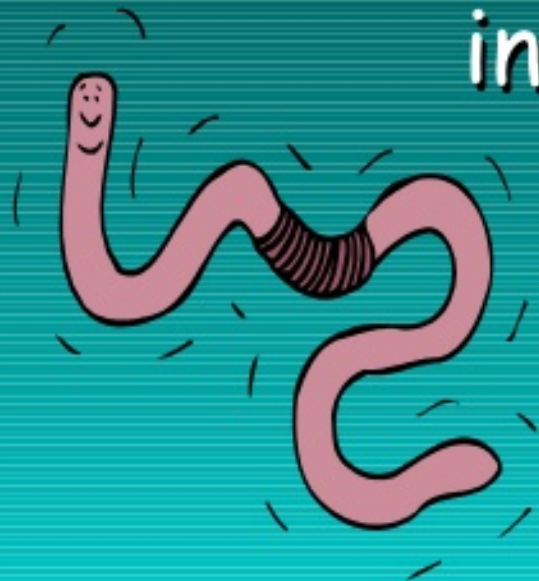


# CLASSIFICATION

Finding Order  
in Diversity



Kingdom  
Phylum  
Class  
Order  
Family  
Genus  
Species

# DEFINE TAXONOMY

- Discipline of classifying organisms and assigning each organism a universally accepted name.



TURKEY  
VULTURE  
(*Cathartes  
aura*)

Kingdom  
Phylum  
Class  
Order  
Family  
Genus  
Species

# WHY CLASSIFY?

1. How do biologists use a classification system to study the diversity of life?

**to name organisms and group them in a logical manner.**



Kingdom  
Phylum  
Class  
Order  
Family  
Genus  
Species

# WHY CLASSIFY?

2. How do taxonomists group organisms when they classify them?

Into groups that have biological significance.



Kingdom  
Phylum  
Class  
Order  
Family  
Genus  
Species

# WHY CLASSIFY?

3. How does classification make life easier?

grouping things makes them easier to find and work with

3a. What are some things we classify?



Kingdom  
Phylum  
Class  
Order  
Family  
Genus  
Species

# C. ASSIGNING SCIENTIFIC NAMES

1. Many organisms may have several different common names.

1a. The cougar is also known as the mountain lion, catamount, or puma ...thus the need for a scientific name.



*Felis concolor*

Photo courtesy Texas Parks and Wildlife Department © 2004

Kingdom  
Phylum  
Class  
Order  
Family  
Genus  
Species

# ASSIGNING SCIENTIFIC NAMES

2. A Swedish botanist named Carolus Linnaeus developed **Binomial Nomenclature**, a two-word naming system for naming all species on earth.

What do botanists study?



Kingdom  
Phylum  
Class  
Order  
Family  
Genus  
Species

# ASSIGNING SCIENTIFIC NAMES

2a. The first part of the scientific name is the genus.

This word is always written first and capitalized.

It appears in italics or is underlined.



*Homo sapien*



*Ursus arctos  
horribilis*

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[www.panda.org](http://www.panda.org).



Kingdom  
Phylum  
Class  
Order  
Family  
Genus  
Species

# ASSIGNING SCIENTIFIC NAMES

2b. The second part of the scientific name is the species name.

This word is always written second and is not capitalized.

It appears in italics or is underlined.



*Homo sapien*



*Ursus arctos*  
*horribilis*

Kingdom  
Phylum  
Class  
Order  
Family  
Genus  
Species

# LINNAEUS'S SYSTEM OF CLASSIFICATION



1. Linnaeus' hierarchical system of classification includes seven levels called taxa.

They are, from largest to smallest,  
**Kingdom, Phylum, Class,  
Order, Family, Genus,  
Species.**

Kingdom  
Phylum  
Class  
Order  
Family  
Genus  
Species

# LINNAEUS'S SYSTEM OF CLASSIFICATION

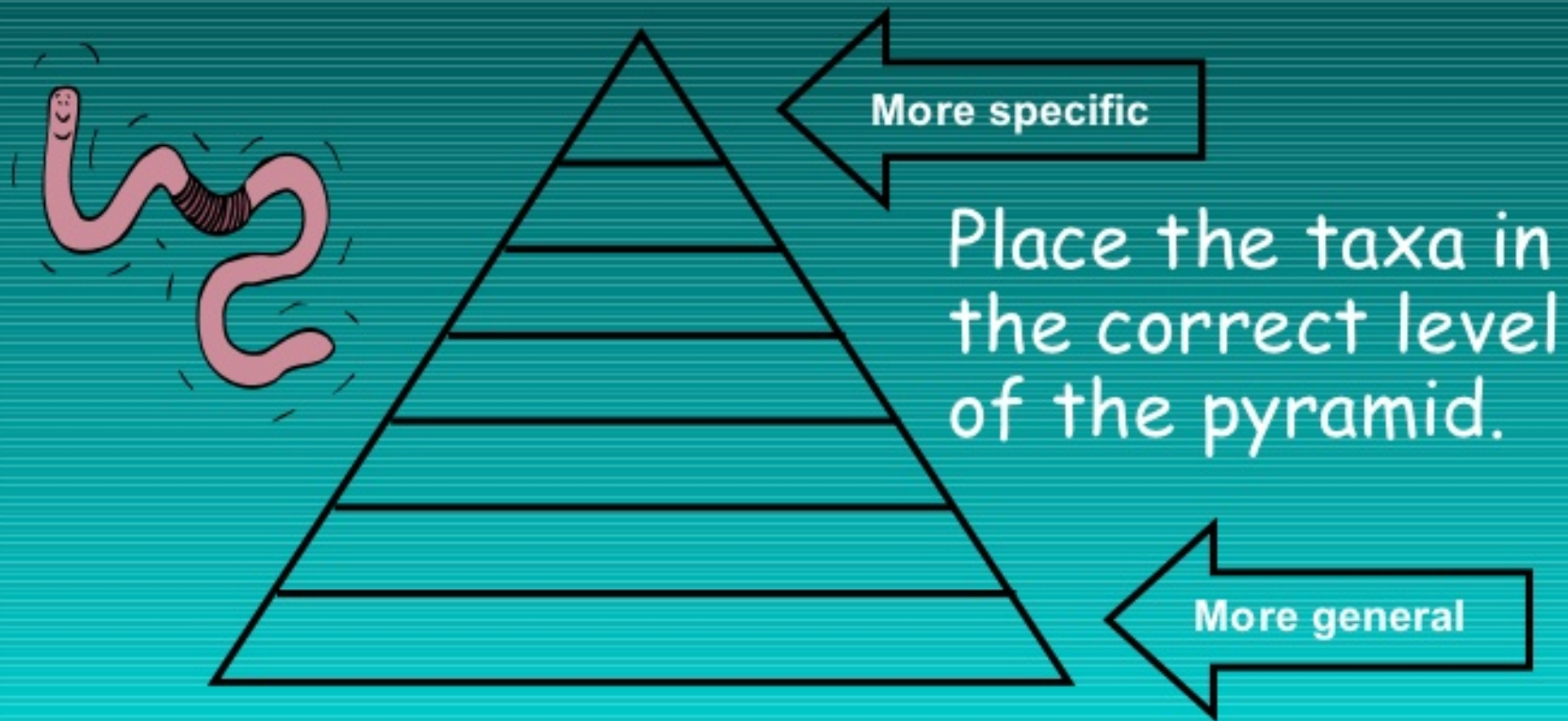
2. The Kingdom is the largest and most inclusive (includes) of the taxonomic categories.
3. Species is the smallest and least inclusive of the taxonomic categories.



Kingdom  
Phylum  
Class  
Order  
Family  
Genus  
Species

# LINNAEUS'S SYSTEM OF CLASSIFICATION

Kingdom, Phylum, Class, Order,  
Family, Genus, Species.



Kingdom  
Phylum  
Class  
Order  
Family  
Genus  
Species

# LINNAEUS'S SYSTEM OF CLASSIFICATION

4. The more taxonomic levels that two organisms share, the more closely related they are considered to be.



Kingdom  
Phylum  
Class  
Order  
Family  
Genus  
Species

# LINNAEUS'S SYSTEM OF CLASSIFICATION

What do the scientific names of the polar, grizzly and panda bears tell you about their similarity to each other?



*Ursus maritimus*



*Ursus arctos  
horribilis*



*Ailuropoda  
melanoleuca*

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Kingdom  
Phylum  
Class  
Order  
Family  
Genus  
Species

# THINKING CRITICALLY

Organism	Cat	Wolf	Fly
Kingdom	Animalia	Animalia	Animalia
Phylum	Chordata	Chordata	Arthropoda
Class	Mammalia	Mammalia	Insecta
Order	Carnivora	Carnivora	Diptera
Family	Felidae	Canidae	Muscidae
Genus	<i>Felis</i>	<i>Canis</i>	<i>Musca</i>
Species	<i>F. domesticus</i>	<i>C. lupus</i>	<i>M. domestica</i>

Kingdom  
Phylum  
Class  
Order  
Family  
Genus  
Species

# THINKING CRITICALLY

1. What type of animal is *Musca domestica*?



Animal; insect

2. From the table, which 2 animals are most closely related?

Cat and Wolf

3. At what classification level does the evolutionary relationship between cats and wolves diverge (become different)?

Family Level





Kingdom  
Phylum  
Class  
Order  
Family  
Genus  
Species

# E. EVOLUTIONARY CLASSIFICATION



1. Biologists group organisms into categories that represent lines of evolutionary descent, or phylogeny, not just physical similarities.
2. Define Phylogeny: The study of evolutionary relationships among organisms.

Kingdom  
Phylum  
Class  
Order  
Family  
Genus  
Species

# E. EVOLUTIONARY CLASSIFICATION

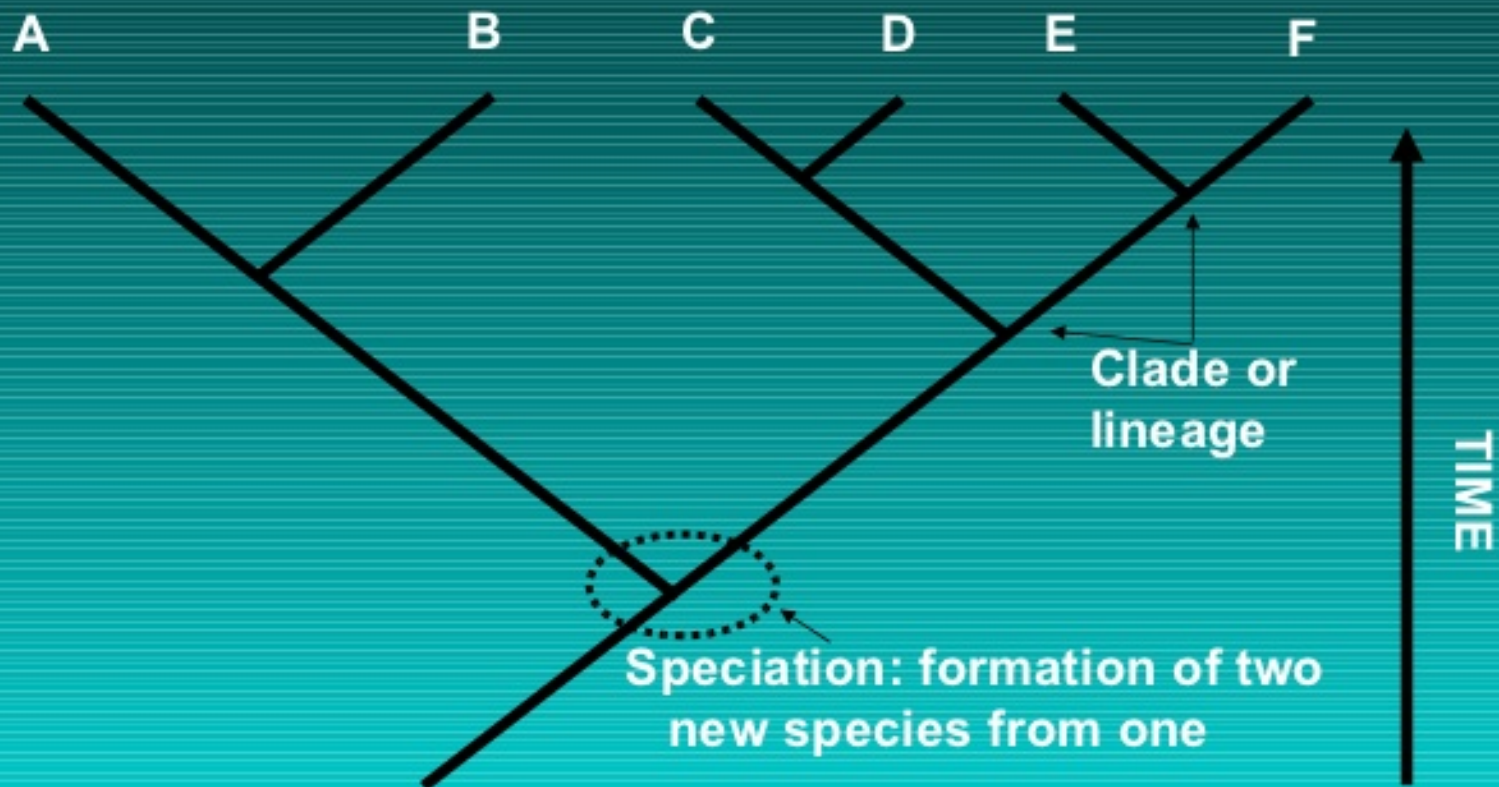
## 3. Classification using Cladograms

- a. Cladograms are diagrams that show the evolutionary relationships among a group of organisms.
- b. A phylogenetic tree is a specific type of cladogram.

Kingdom  
Phylum  
Class  
Order  
Family  
Genus  
Species

# E. EVOLUTIONARY CLASSIFICATION

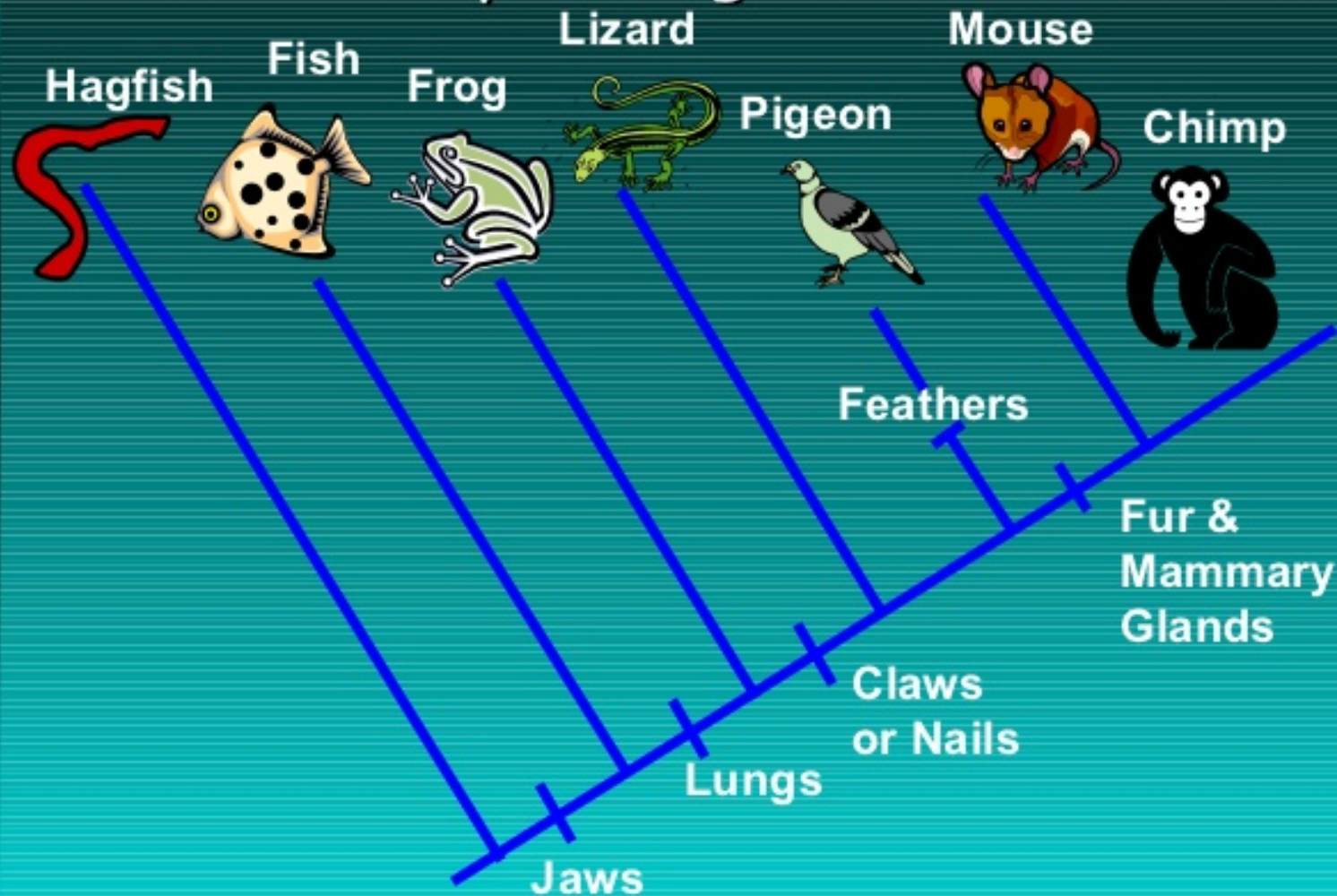
Example of a phylogenetic tree.



Kingdom  
Phylum  
Class  
Order  
Family  
Genus  
Species

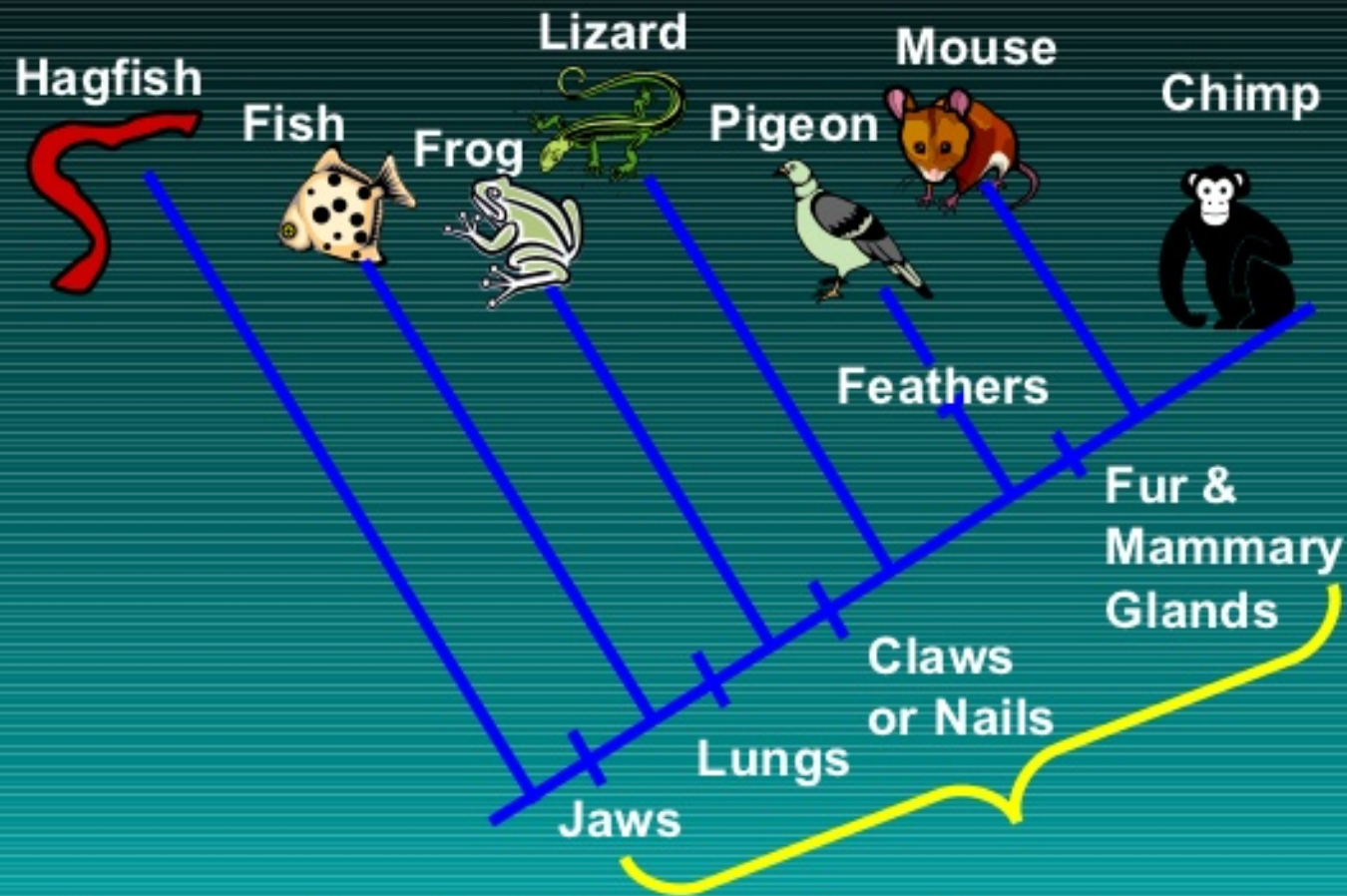
# 3. CLADOGRAMS

c. This cladogram shows the evolutionary relationship among several vertebrates.



Kingdom  
Phylum  
Class  
Order  
Family  
Genus  
Species

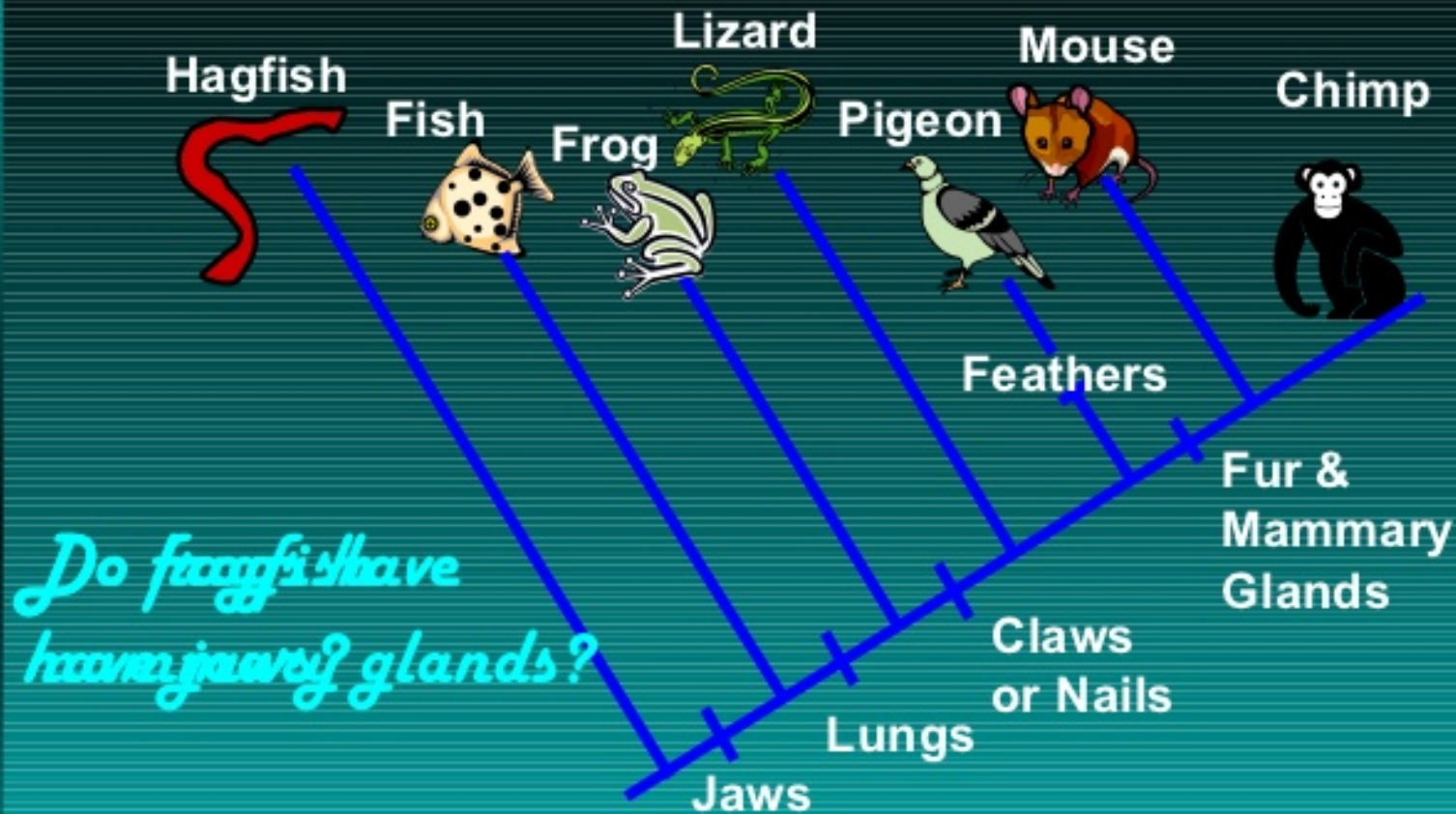
# 3. CLADOGRAM



d. Characteristics listed below the line are called derived characters (traits).

Kingdom  
Phylum  
Class  
Order  
Family  
Genus  
Species

# 3. CLADOGRAM

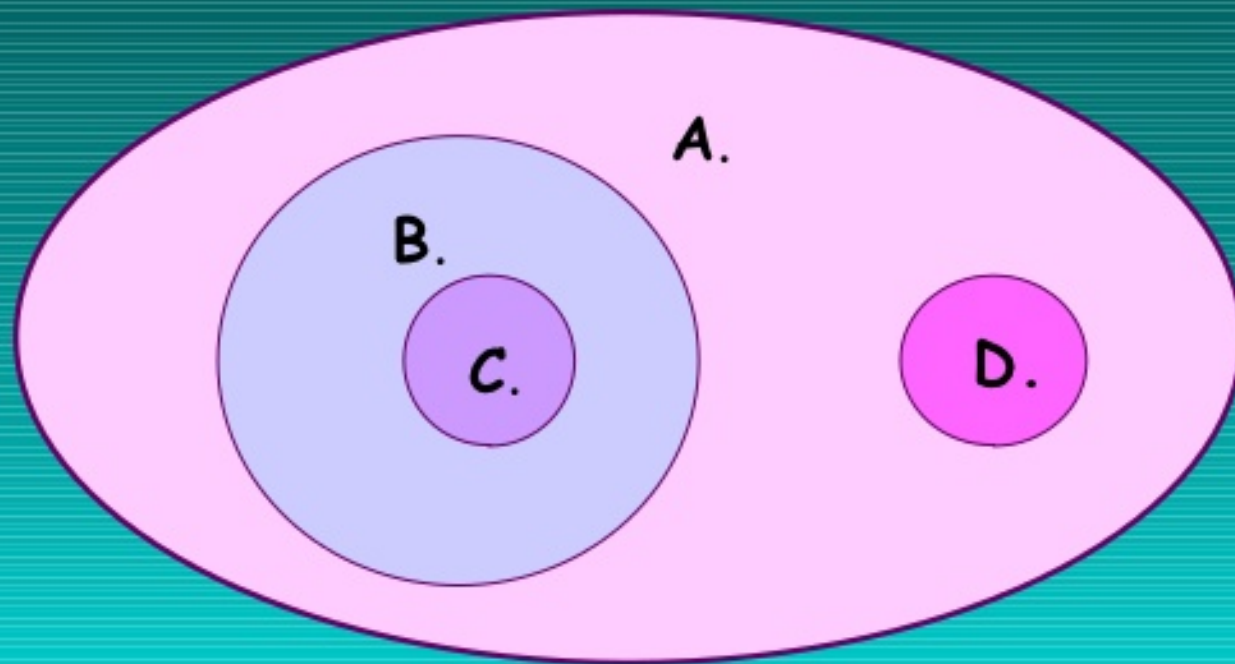


e. When the derived character is above an organism, the organism lacks that derived character.

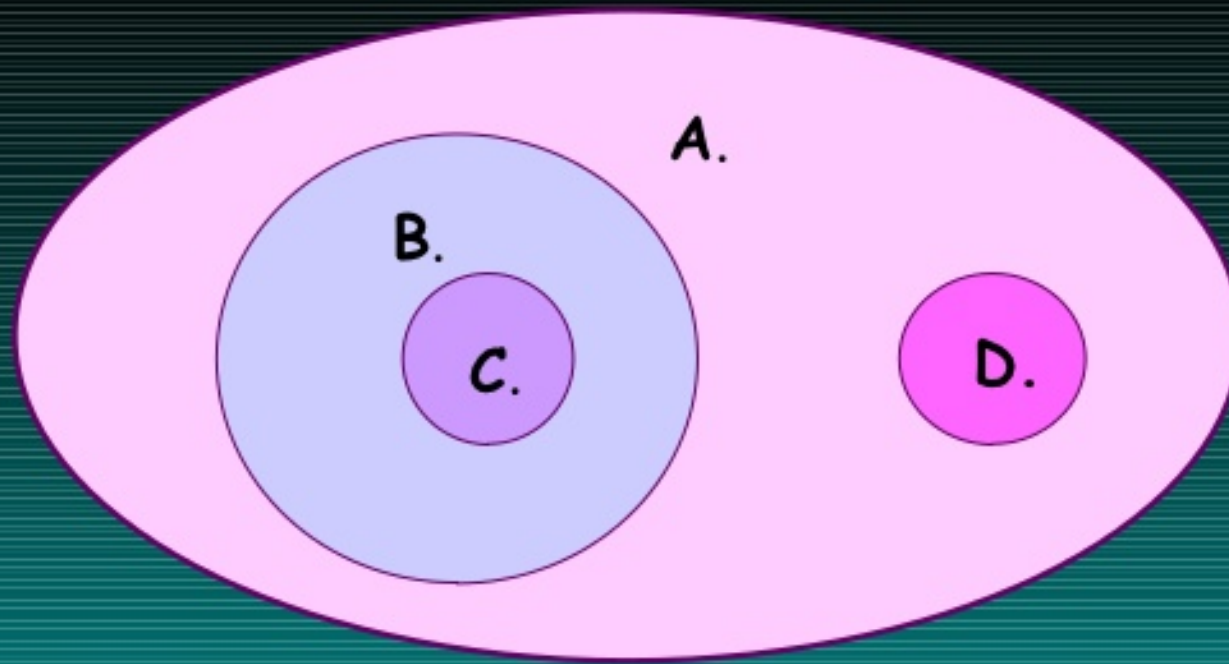
## 4. VENN DIAGRAMS

Venn Diagrams can be used to make models of a classification scheme.

- Venn diagrams show hierarchy and grouping relationships of organisms.



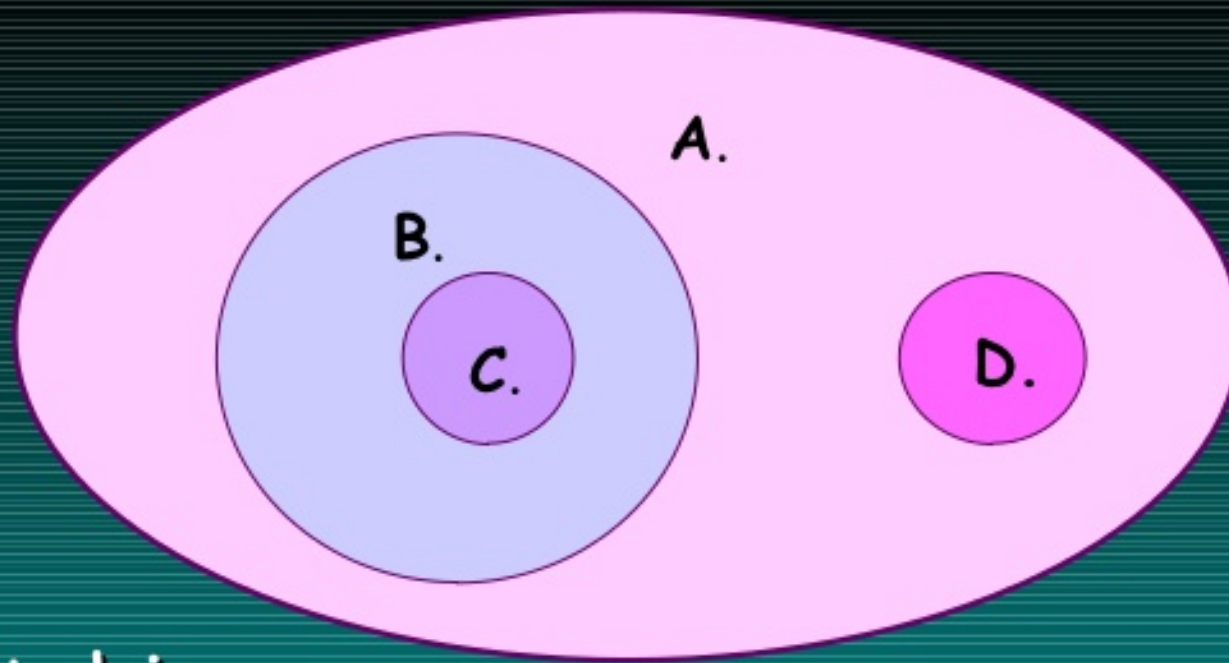
Kingdom  
Phylum  
Class  
Order  
Family  
Genus  
Species



- Four groups are represented by circular regions
- Each region represents different taxonomic levels.
- Regions that overlap, share common members.
- Regions that do not overlap do not have common members.



Kingdom  
Phylum  
Class  
Order  
Family  
Genus  
Species



Matching:

- ❖ Mammals **C**
- ❖ Animals with backbones **B**
- ❖ Insects **D**
- ❖ All animals **A**