Objectives

- **Explain** how to classify organisms.
- **List** the seven levels of classification.
- **Explain** scientific names.
- **Describe** how dichotomous keys help in identifying organisms.

I. Why Classify?

A. Answering Questions The classification of living things makes it easier for biologists to answer many important questions such as:

1. How many known species are there?
2. What are the defining characteristics of each species?
3. What are the relationships between these species?

I. Why Classify?

B. Classification systems are used to group organisms in a logical manner.

C. Taxonomy: The science of describing, naming, and classifying organisms.

Agkistrodon piscivorus

Common names

Water moccasin, cottonmouth, black moccasin, black snake, blunt-tail moccasin, congo, copperhead, cottonmouth water moccasin, cotton-mouthed snake, gapper, highland moccasin, lowland moccasin, mangrove rattler, moccasin, North American cottonmouth snake, North American water moccasin, North American water viper, pilot, rusty moccasin, saltwater rattler, rattler, stub-tail, stump moccasin, stump-tail moccasin, stump-tail viper, swamp lion, Texas moccasin, trap jaw, Troost's moccasin, true horn snake, true water moccasin, viper, water mokeson, water pilot, water rattlesnake, water viper

Critical Thinking Time!

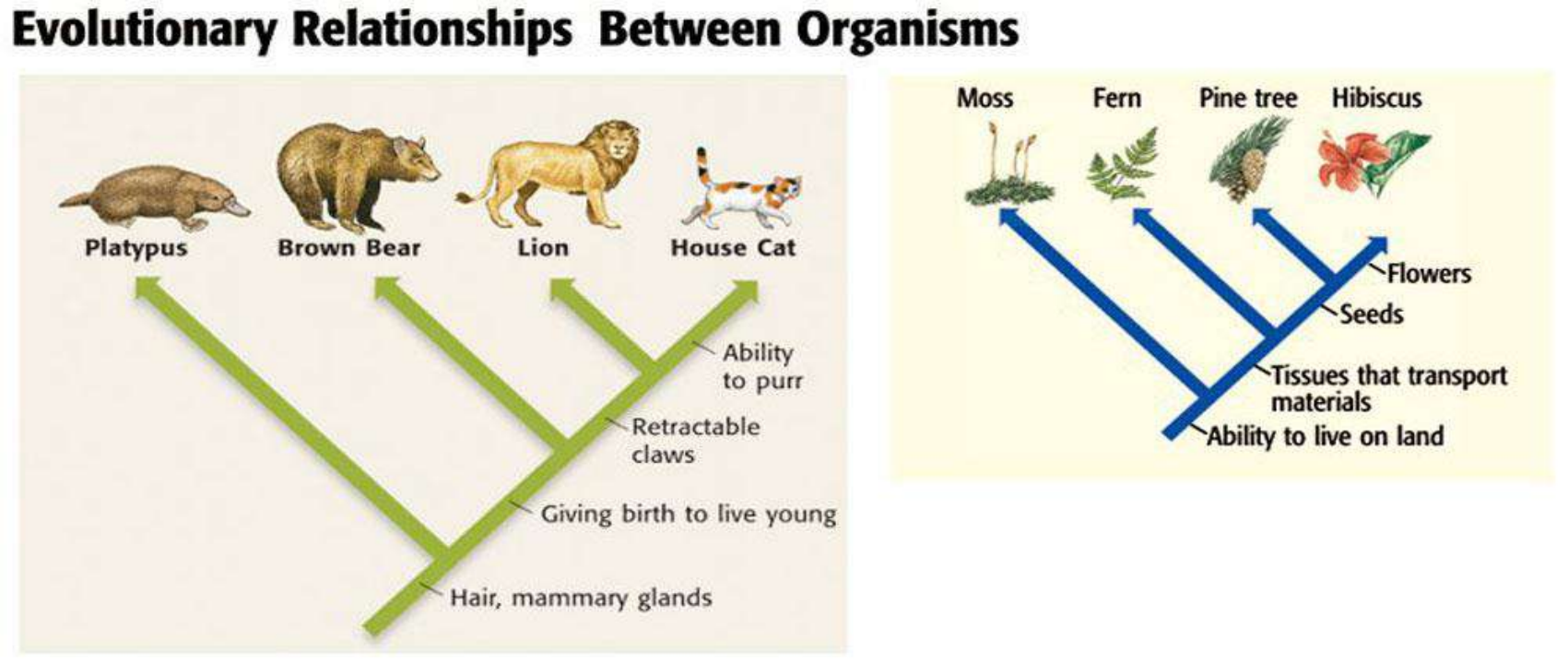
- Think about the different ways humans classify things. List at least five things that humans classify.

II. How do scientists classify organisms?

A. Classification Today: Taxonomists use the seven-level system to classify living things based on shared characteristics.

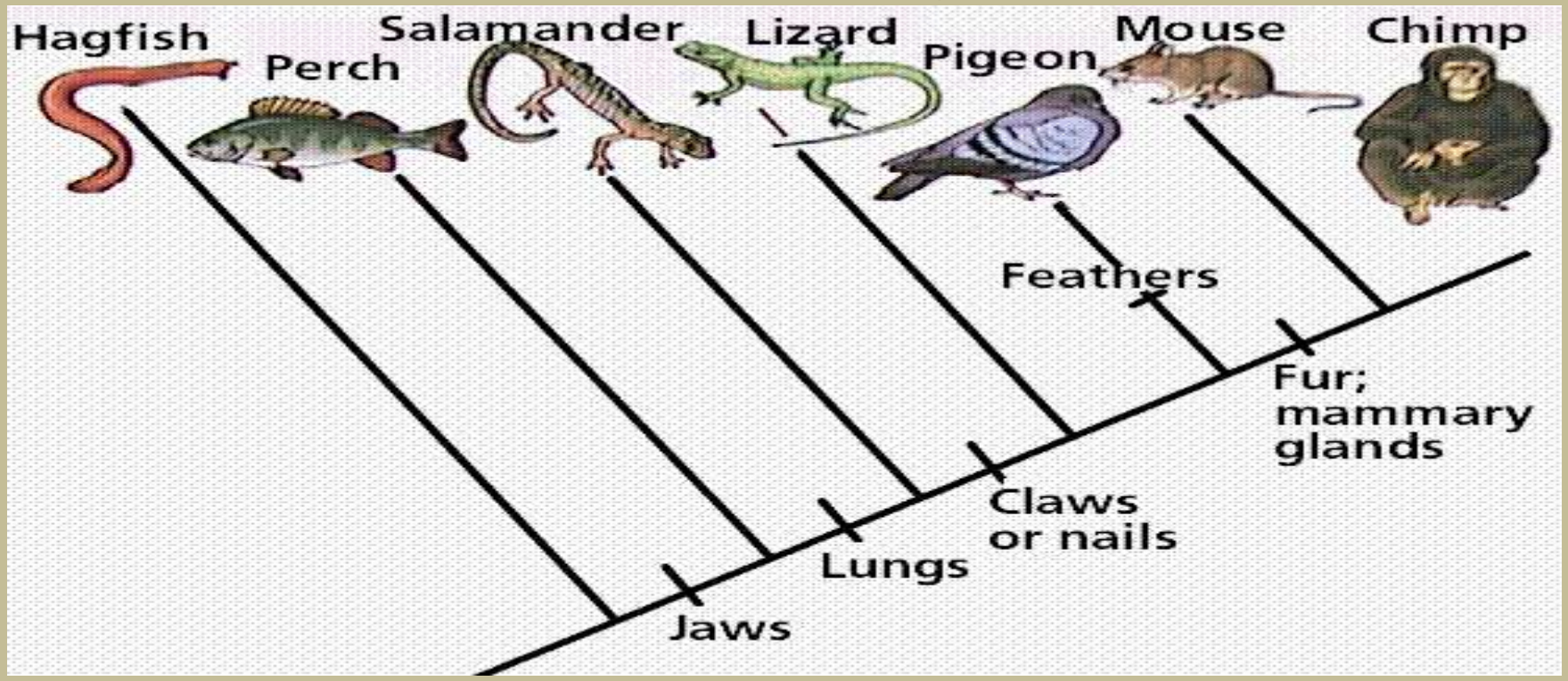
B. Branching Diagrams: On a branching diagram, several characteristics are listed along the line that points to the right. Each characteristic is shared by the animals to the right of it.

Cladograms



1. Which organism is the closest relative to the common ancestor of all of the organisms?
2. Which organism shares the most traits with the house cat? The Hibiscus?
3. Does both the lion and the platypus have retractable claws? Explain your answer.
4. What characteristics do pine trees have that the mosses do not?

Critical Thinking Time!



1. Which organism is the closest relative to the common ancestor of all of the organisms?
2. Which organism shares the most traits with the chimp?
3. Does both the mouse and the lizard have fur? Explain your answer.
4. What characteristics do salamanders have that hagfishes do not?
5. What characteristic does the pigeon have that no one else has?

III. Levels of Classification

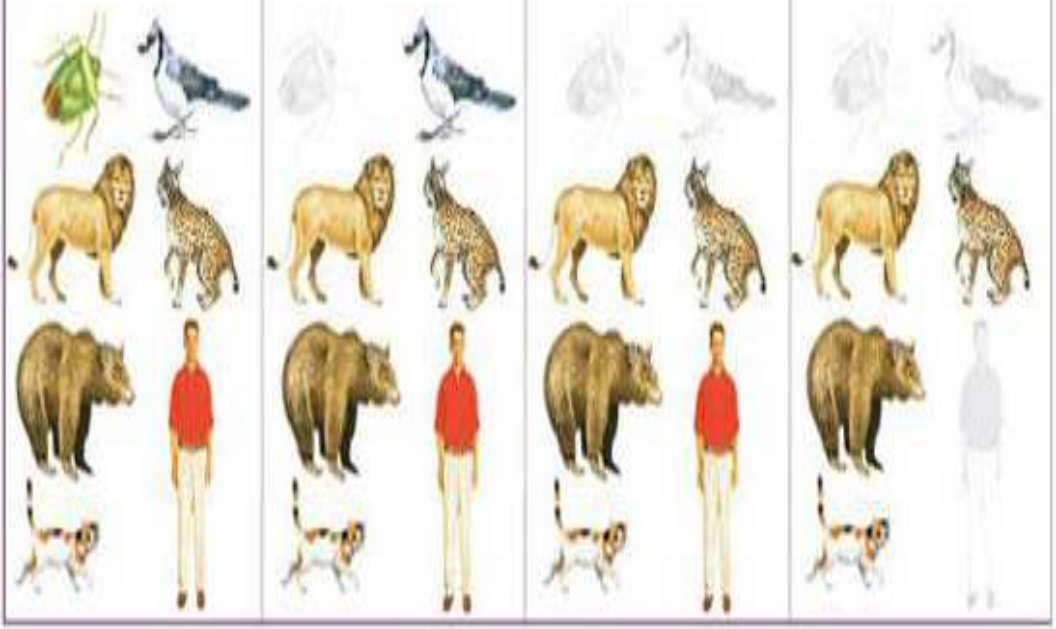
A. Kingdoms and Beyond The seven levels of classification are:

1. Kingdom
2. Phylum
3. Class
4. Order
5. Family
6. Genus
7. Species

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

Levels of Classification

Kingdom Animalia	Phylum Chordata	Class Mammalia	Order Carnivora	Family Felidae	Genus *Felis*	Species *Felis domesticus*
All animals are in the **kingdom Animalia.**	All animals in the **phylum Chordata** have a hollow nerve cord. Most have a backbone.	Animals in the **class Mammalia** have a backbone. They also nurse their young.	Animals in the **order Carnivora** have a backbone and nurse their young. They also have special teeth for tearing meat.	Animals in the **family Felidae** are cats. They have a backbone, nurse their young, have special teeth for tearing meat, and have retractable claws.	Animals in the **genus *Felis*** have traits of other animals in the same family. However, these cats cannot roar; they can only purr.	The **species *Felis domesticus*** is the common house cat. The house cat shares traits with all of the organisms in the levels above the species level, but it also has unique traits.



Human Classification

- **Kingdom** Animalia
- **Phylum** Chordata
- **Class** Mammalia
- **Order** Primata
- ***Family*** *Hominidae*
- **Genus** *Homo*
- **Species** *H. sapiens*

IV. Binomial Nomenclature

A. Naming system where each species has a two-part scientific name.

B. Developed by Carolus Linnaeus in the 18th century

V. Scientific Names

A. One Species, One Name A scientific name is always the same for a specific kind of organism no matter how many common names there might be.

B. Two-Part Names The first part of a species' name is the genus name. It is always capitalized. The second part of the name is the species name.

V. Scientific Names

C. The first word is the genus

D. The second word is the species

E. The second word is unique to that species.

F. Ex. *Homo sapiens*

VI. Naming System Rules

A. Scientific name is ALWAYS written in italics or underlined.
B. The first word is capitalized
C. Then second word is lowercased.
D. Correct ways
    1. *Homo sapiens*
    2. <u>Homo sapiens</u>
    3. *H. sapiens*

**What is the other correct way to write it?

Cat species in the same genus

- Chinese Mountain Cat, *Felis bieti*
- Pallas's Cat, *Felis manul*
- Black-footed Cat, *Felis nigripes*
  - Domestic Cat, *Felis silvestris catus*
- Jungle Cat, *Felis chaus*
- Sand Cat, *Felis margarita*
- Wildcat, *Felis silvestris*





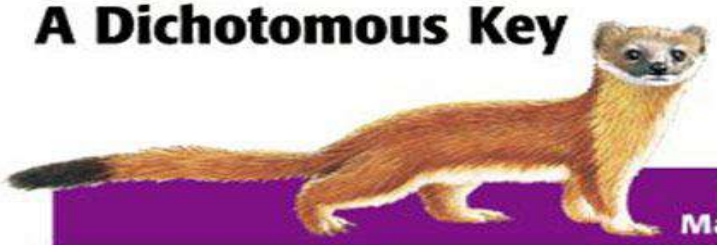


VII. Dichotomous Keys

A. What Is a Dichotomous Key? A dichotomous key is an identification aid that uses sequential pairs of descriptive statements.

B. Two-Part Names By working through the statements in a dichotomous key in order, a person can eventually identify an unknown organism.

A Dichotomous Key



Dichotomous Key to 10 Common Mammals in the Eastern United States

1. a. This mammal flies. Its "hand" forms a wing. b. This mammal does not fly. It's "hand" does not form a wing.	little brown bat Go to step 2.
2. a. This mammal has no hair on its tail. b. This mammal has hair on its tail.	Go to step 3. Go to step 4.
3. a. This mammal has a short, naked tail. b. This mammal has a long, naked tail.	eastern mole Go to step 5.
4. a. This mammal has a black mask across its face. b. This mammal does not have a black mask across its face.	raccoon Go to step 6.
5. a. This mammal has a tail that is flat and paddle shaped. b. This mammal has a tail that is not flat or paddle shaped.	beaver opossum
6. a. This mammal is brown and has a white underbelly. b. This mammal is not brown and does not have a white underbelly.	Go to step 7. Go to step 8.
7. a. This mammal has a long, furry tail that is black on the tip. b. This mammal has a long tail that has little fur.	longtail weasel white-footed mouse
8. a. This mammal is black and has a narrow white stripe on its forehead and broad white stripes on its back. b. This mammal is not black and does not have white stripes.	striped skunk Go to step 9.
9. a. This mammal has long ears and a short, cottony tail. b. This mammal has short ears and a medium-length tail.	eastern cottontail woodchuck

Describe this mammal.

The mammal does not fly.

Has no black mask on its face

Has a hairy tail

The mammal does not have a white underbelly, but it does have broad white stripes on its back.

VIII. A Growing System

A. Still Discoveries to Make People are still discovering and classifying organisms.

B. Discovery Unique Organisms Sometimes new organisms are found that are so different from other known organisms that new classes, phyla, and so on must be formed.