

NOTES 1.2

Chapter 1 - Classifying and Exploring Life
Lesson 2 - Classifying Organisms

Classifying Living Things

Q: What is classification?

A: the process of grouping things based on their similarities

Biologists use classification to organize living things into groups so organisms are easier to study called

taxonomy

Q: What is taxonomy?

A: the scientific study of how living things are classified



Early History of Classification



Aristotle

- Greek philosopher

Developed a system of classification 2,000 years ago that placed all living things into 2 groups -

Plants

classified by -

- Size
- Shape
- Tree, plant or herb?

Animals

classified by -

- Presence of "red blood"
- Animal's environment
- Shape & size
 - Fly?
 - Swim?
 - Walk, crawl or run?

Q: But what about frogs?



A: Frogs spend 1/2 their life in H₂O and 1/2 on land.

Where did they fit in?

By the mid- 18th century, Aristotle's system was becoming obsolete. Though the confusion remained and problems were on the rise -

- An organism could have a different name in each country it lived in and sometimes it was known by different names in the same country.
- The lengths of names for organisms were very long and frequently consisted of several words.

Carolus Linnaeus

- Swedish physician and botanist

& he had a solution!

- Grouped plants and animals into **kingdoms**
- Created a naming system for organisms called -

binomial nomenclature



Q: What is binomial nomenclature?

A: a system that gives every organism a two-part name

The first part of an organism's scientific name is its

genus

Q: What is a genus?

A: a group of similar, closely related organisms

The second part of an organism's scientific name is its

species

name.

Q: What is a species?

A: a group of organisms that have similar traits and can mate and produce fertile offspring

Ex.

Genus

Opheodrys
Terrapene
Lactrodectus
Ursus

Species

aestivus
carolina
mactans
horribilis

Common Name

Rough Green Snake
Eastern Box Turtle
Black Widow Spider
Grizzly Bear

NOTE - the complete scientific name is written in

italics

and the

genus

is always

CAPITALIZED

species

is always in lowercase.

Linnaeus used

Latin

words in his naming system because Latin was the language that scientists communicated in during that time.

Binomial nomenclature makes it easy for scientists to

communicate

about an organism

because everyone uses the same

name

for the same

organism



Q: What is the advantage of having scientific names for organisms?

A:

So, there is no confusion



Q: Which part of a scientific name is like your first name?

A:

species



Q: Which part of a scientific name is like your family name?

A:

genus

There are **4** functions of scientific names –

1. They help scientists avoid errors in communication.



Turdus migratorius
American Robin

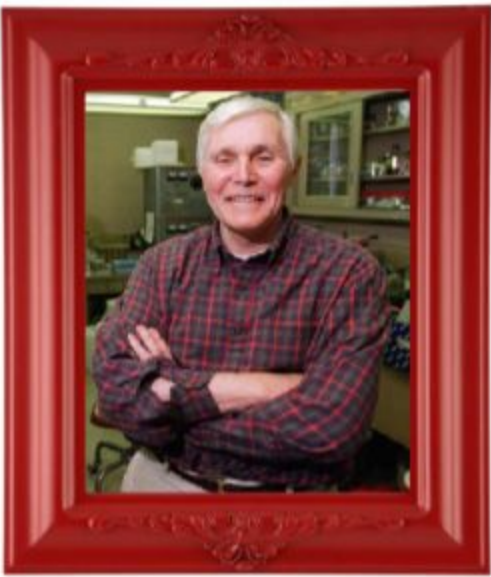


Eopsaltria australis
Yellow Robin

2. Organisms with similar evolutionary histories are classified together.
 - Organisms with the same genus are related.
3. Scientific names give descriptive information about the species.
4. Scientific names allow information about organisms to be organized and found easily & efficiently.

In 1969, **Robert H. Whittaker** proposed a 5-kingdom system – Monera, Protista, Plantae, Fungi, and Animalia.





In 1977, **Carl Woese** an American microbiologist and biophysicist discovered the group - **archaea** which lead

to the addition of the classification level known as a **domain**.

Today by studying more about animals and their traits scientists are able to determine an organism's **phylogeny**.

Q: What is phylogeny?

A: the evolutionary history of an organism, how it has changed over time

At the time that Linnaeus developed his classification system, people thought that species never change.

The **Theory of Evolution** changed the way biologists think about classification.

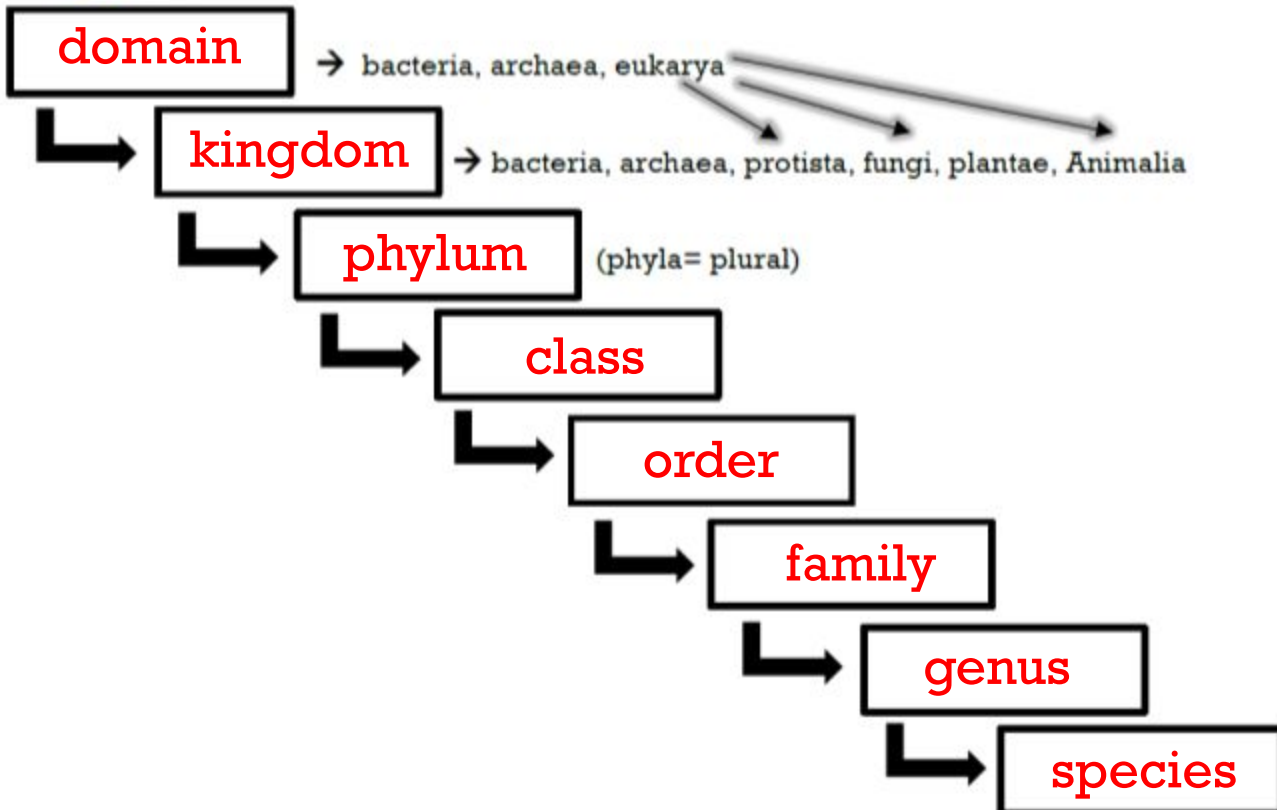
Today, scientists understand that certain **organisms** are similar because they share a

common ancestor thus sharing an **evolutionary history**.

Therefore, species with similar evolutionary histories are classified more **closely** together.



The more classification levels that two organisms share, the more characteristics they have in common.



Classification of a Dog

DOMAIN
Eukarya
eukaryotes



KINGDOM
Animalia
mostly multicellular
and heterotrophs



PHYLUM
Chordata
animals with a backbone



CLASS
Mammalia
have sweat glands and
produce milk for offspring



ORDER
Carnivora
most meat-eating animals



FAMILY
Canidae
wolves, foxes, coyotes, and
jackals



GENUS
Canis
dogs, wolves, coyotes, and
jackals



SPECIES
Canis lupus
dogs and wolves



SUBSPECIES
Canis lupus familiaris
domesticated dog



Classification Tools

Q: How do you identify an organism? What do you do first?

You can identify organisms with –

field guides

dichotomous (taxonomic) keys

& cladograms

Q: What is a field guide?

A: books with illustrations that highlight differences between similar looking organisms

Q: What is a dichotomous (taxonomic) key?

A: a series of paired statements that describe the physical characteristics of different organisms

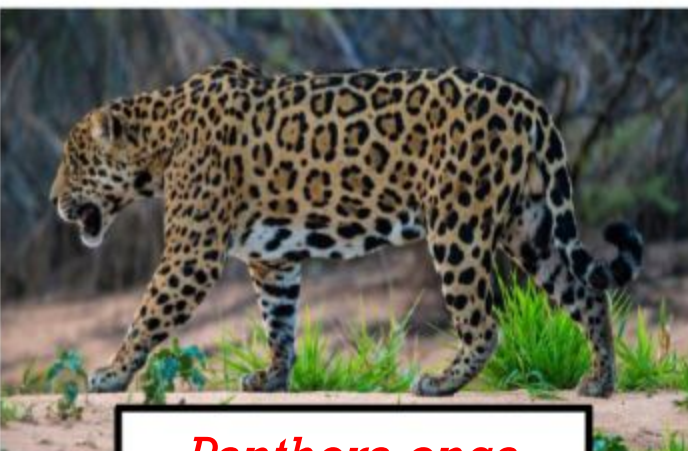


Dichotomous Key to Native Cats of North America



Felis concolor

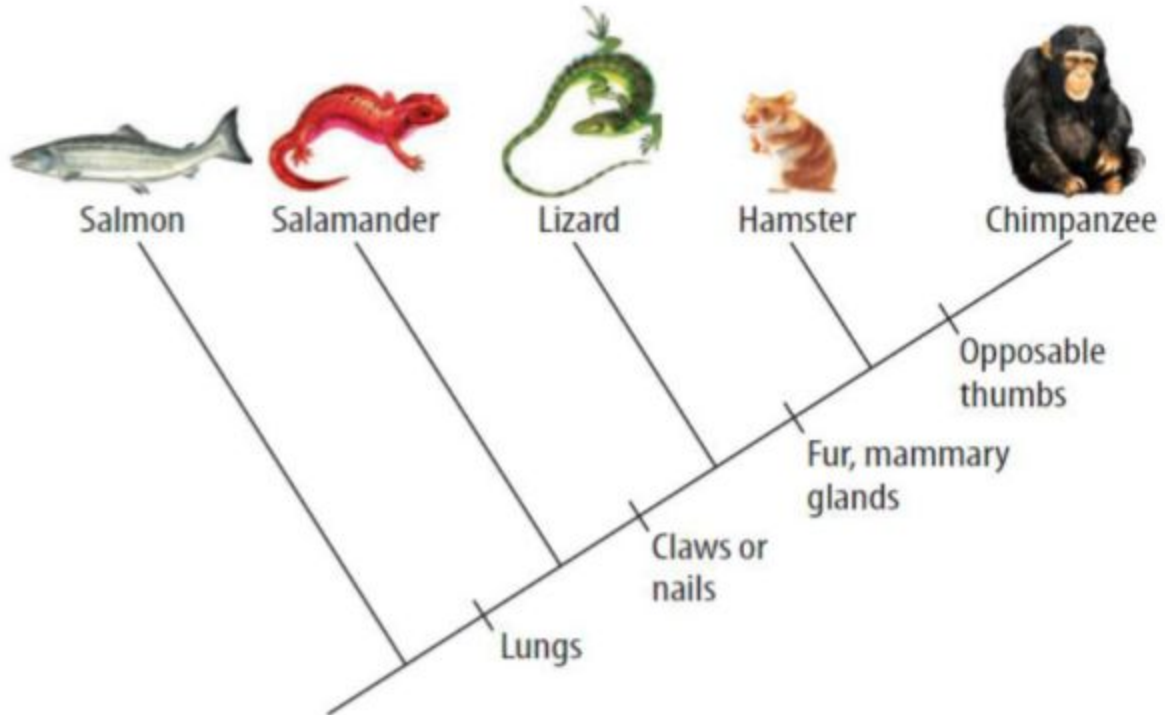
1. Tail Length
 - a. short, go to 2
 - b. long, go to 3
2. Cheek ruff
 - a. no cheek ruff; long ear tufts tipped with black:
Lynx canadensis
 - b. broad cheek ruff; ear tufts short:
Lynx rufus
3. Coat
 - a. plain colored, go to 4
 - b. patterned, go to 5
4. Coat color
 - a. yellowish to tan above with white to buff below:
Felis concolor
 - b. all brown or black:
Felis yagouaroundi
5. Coat Pattern
 - a. lines of black-bordered brown spots:
Felis pardalis
 - b. irregular tan and black, go to 6
6. Animal Size
 - a. large cat; rows of black rings unevenly distributed:
Panthera onca
 - b. small cat; 4 dark-brown stripes on back and one on the neck: *Felis wiedii*



Panthera onca

Q: What is a cladogram?

A: a branched diagram that shows the relationships among organisms, including common ancestors



Q: Which animals shown have lungs? Which do not?

A:

everyone but the salmon