

# Animal Diversity

## The Classification of Living Organisms

### Objectives

1. Students will learn to use a dichotomous key.
2. Students will key out a variety of invertebrates and vertebrate animals.

### Classification

*What is classification?* **Classification** is the process of grouping organisms together on the basis of the features they have in common. We use classification systems as a way of summarizing what we know into an organized filing system. Biological classification helps us to organize the enormous diversity of living things. We usually classify organisms based on the features that they have in common. However, which of the organisms' features one uses to classify can greatly alter the "filing system" results. Organisms can be grouped by external anatomy, internal anatomy, behavior, chromosomes or even molecules.

*How do we name organisms?* **Carl Linnaeus** (the "father of taxonomy") proposed a system of scientific naming called **binomial nomenclature**, which assigns a unique two-word scientific name to each organism. Linnaeus gave each organism a scientific name with two parts: The genus name followed by the species name. The names tend to be based on Latin (or Ancient Greek) words.

**Dashing King Philip Came Over For Grandma's Soup.**  
**Domain Kingdom Phylum Class Order Family Genus Species**

**Following are typical classifications:**

	<u>Human</u>	<u>Bee</u>	<u>Yeast</u>	<u>Cyanobacteria</u>
Domain:	Eukarya	Eukarya	Eukarya	Bacteria
Kingdom:	Animalia	Animalia	Fungi	Monera
Phylum:	Chordata	Arthropoda	Ascomycetes	Cyanobacteria
Class:	Mammalia	Insecta	Hemiascomycetes	*
Order:	Primate	Hymenoptera	Saccharomycetales	*
Family:	Hominidae	Apidae	*	*
Genus:	<i>Homo</i>	<i>Apis</i>	<i>Saccharomyces</i>	<i>Anabaena</i>
Species:	<i>sapiens</i>	<i>mellifera</i>	<i>cerevisiae</i>	<i>oscillarioides</i>

\*It is important to note that "there is considerable reluctance among many contemporary systematic prokaryotic biologists to place new species and genera into higher taxa, especially at the intermediate levels (family, order, and class) because of uncertainty of phylogenetic models" (see Garrity *et al.* 2004:

<http://141.150.157.80/bergeysoutline/main.htm>).

\*\*You should be aware that species are sometimes divided into smaller groupings, for example: subspecies, races, breeds, varieties, strains. Subspecies groups are capable of successful interbreeding.

*How do we write Latin names?* When we use the Latin name for an organism, we capitalize the genus but not the species name. We also print the name in italics or underline them.

**Example 1:** *Acer rubrum* (also written *A. rubrum*) – Red Maple Tree

*Acer* is the Latin name for maple (genus)

*rubrum* is the Latin word for red (species)

**Example 2:** *Homo sapiens* – Modern Humans

*Homo* is the Latin word for man (meaning human)

*sapiens* is from the Latin *sapientia* referring to our intelligence and wisdom.

*How do we identify organisms?* Taxonomists determine the genus and species names for new organisms and develop keys to identify organisms. Most taxonomic keys are **dichotomous** (having two branches) and use a succession of paired, mutually exclusive choices, to enable the key user to identify the organism. *Keys are not meant to be read from start to finish.* Instead, you should read the choices, determine which best applies to the organism you are studying, and then skip ahead to the number listed, skipping the non-applicable steps along the way.

*What are we doing today?* In today's lab, there are twenty different animals displayed on the laboratory tables. Each specimen is identified by a number. You may work individually or in pairs. You will carefully examine the animals on display and identify them to only to the level of class. An answer sheet is provided and before leaving you will complete it with appropriate determinations. A simplified key is supplied to assist you in your identifications. The use of the key will be explained by your TA. If you have questions about certain characteristics of any of the organisms, ask your laboratory TA for assistance. However, first try to make your own determinations without any outside help.

## Vocabulary for Dichotomous Key

**appendages** – Any part of an animal coming from the main body, trunk, such as arms, legs, antennae

**asymmetry** – Having no symmetry.

**bilateral symmetry** – Having a body displaying two similar halves.

**colonial** – A group of organisms of the same species living together.

**digits** – A finger or toe.

**dorsoventrally** – From back to front.

**endoderm** – The innermost, of the three layers, of the skin.

**epiderm** – The outermost, of the three layers, of the skin.

**exoskeleton** – An external skeleton, shell.

**flagellum** – A long, threadlike appendage, especially a whip-like extension of certain cells or unicellular organisms that functions as an organ of locomotion.

**gelatinous** – Looks like jelly.

**integument** – Skin.

**mesoderm** – The middle, of the three layers, of the skin.

**nematocyst** – The stinging barb of coelentrates.

**pentaramous symmetry** – Divided into five even parts.

**pseudopodia** – “False feet”, temporary projections of eukaryotic cells.

**porous** – Full of tiny holes.

**radial symmetry** – Having similar parts radiating from a central point.

**radula** – A tongue-like toothed structure used in chewing and rasping.

**segmented** – The division of the body into similar parts.

**sessile** – Attached to one place.

**siphon** – An extension of the mantle in molluscs for drawing water into the mantle cavity.

**solitary** – By oneself.

**tentacles** – Long cylindrical tubes for sensory reception or food capture.

Name: \_\_\_\_\_

Station Number	Common Name	Phylum	Class
1			
2			
3			
4			
5a			
5b			
5c			
6			
7			
8			
9			
10			
11			
12			
13			
14			
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20			