DEPARTMENT OF EDUCATION
SCHOOLS DIVISION OF NEGROS ORIENTAL
REGION VII
Kagawasan Ave., Daro, Dumaguete City, Negros Oriental

DISTINCTIVE CHARACTERISTICS OF A SPECIFIC TAXON

for General Biology 2 Grade 11

Quarter 3 / Week 7

SELF-LEARNING KIT

NegOr_Q3_GenBio2_SLKWeek7_v2

FOREWORD

With so many organisms on Earth, it is important to classify or organize them in order to begin learning about them. The system in which scientists organize organisms is called hierarchical classification. It is a system where species are organized into groups that belong to more comprehensive groups.

This self-learning kit will help you identify a specific classification   where an organism belongs. Enjoy learning!

OBJECTIVES

At the end of the lesson, learners shall be able to:

K: identify the unique distinctive characteristics of a specific taxon relative to other taxa;

S: compare how species are related based on their classification; and

A: recognize the importance of classifying organisms.

LEARNING COMPETENCY

Identify the unique distinctive characteristics of a specific taxon relative to other taxa. **(STEMBIO11/12IIIhj-15)**

I. WHAT HAPPENED

PRE-ACTIVITY
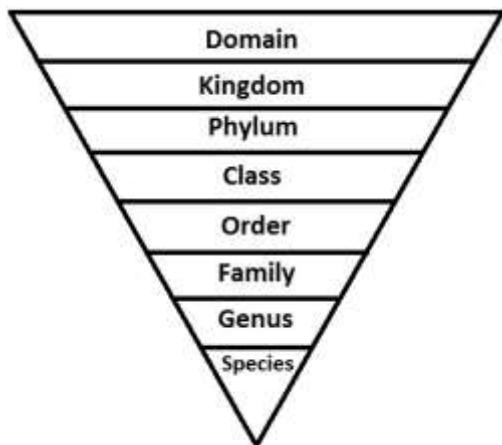
Directions: Match the organisms in column A with the groups in column B. Write your answers in your notebook.

A	B
1. Humans	A. Amphibians
2. Catfish	B. Insects
3. Turtle	C. Mammals
4. Bees	D. Reptile
5. Frogs	E. Fish
	F. Crustaceans

II. WHAT I NEED TO KNOW
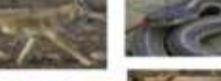
Taxonomy (which literally means "arrangement law") is the science of classifying organisms to construct internationally shared classification systems with each organism placed into more and more inclusive groupings. Think about how a grocery store is organized. One large space is divided into departments, such as dairy and meats. Then, each department further divides into aisles, then each aisle into categories and brands, and then finally a single product. This organization from larger to smaller, more specific categories is called a hierarchical system.

The level of classification

| Domain |
| Kingdom |
| Phylum |
| Class |
| Order |
| Family |
| Genus |
| Species |

Source: bioweb.uwlax.ed

In the eighteenth century, a scientist named Carl Linnaeus first proposed organizing the known **species** of organisms into a hierarchical taxonomy. In this system, species that are most similar to each other are put together within a grouping known as a **genus**. Furthermore, similar genera (the plural of genus) are put together within a **family**. This grouping continues until all organisms are collected together into groups at the highest level. The current taxonomic system now has eight levels in its hierarchy, from lowest to highest: **species, genus, family, order, class, phylum, kingdom, and domain**. Thus, species are grouped within genera, genera are grouped within families, families are grouped within orders, and so on (Figure below).

Taxonomic hierachy of the domestic dog

Species: *Canis lupus* Domestic dog	
Genus Canis: All domestic and wild dogs; wolves; jackals	
Family Canidae: All dogs and dog-like animals	
Order Carnivora: All animals that feed on flesh only	
Class Mammalia: All animals that produce milk to feed their young	
Phylum Chordata: All Animals that have a backbone	
Kingdom Animalia: All Animals	
Domain Eukarya: All organisms whose cells have a nucleus and organelles	

Source: https://courses.lumenlearning.com/wm-nmbiology1/chapter/reading-taxonomy

The kingdom Animalia stems from the Eukarya domain. For the common dog, the classification levels would be as shown in the figure above. Therefore, the full name of an organism technically has eight terms. For the dog, it is Eukarya, Animalia, Chordata, Mammalia, Carnivora, Canidae, *Canis,* and *lupus*. Notice that each name is capitalized except for species, and the genus and species names are italicized. Scientists generally refer to an organism only by its genus and species, which is its two-word scientific name, in what is called **binomial nomenclature**. Each species has a unique binomial nomenclature to allow for proper identification.

The name at each level is also called a **taxon**. In other words, dogs are in order Carnivora. Carnivora is the name of the taxon at the order level; Canidae is the taxon at the family level, and so forth. Organisms also have a common name that people typically use, in this case, dog. Note that the dog is additionally a subspecies: the "*familiaris*" in *Canis lupus familiaris*. Subspecies are members of the same species that are capable of mating and reproducing viable offspring, but they are considered separate subspecies due to geographic or behavioral isolation or other factors.

Scientists commonly use the **Three Domain System** to depict the evolutionary history of living things based on the idea that all cells share a **least universal common ancestor** (LUCA) that evolved into three umbrella domains: the prokaryotic **Archaea**, prokaryotic **Bacteria**, and eukaryotic **Eukarya**. Domains are divided further into kingdom, phylum, class, order, family, genus, and species.

Note that only genus and species names are italicized:

- **Domain**: Eukarya
- **Kingdom**: Animalia
- **Phylum**: Chordata
- **Class**: Mammalia
- **Order**: Primates
- **Family**: Hominidae
- **Genus**: *Homo*
- **Species**: *sapiens*
- **Scientific name**: *Homo sapiens* (modern human)

Importance of Taxonomy in Biology

Identifying taxonomic groups shows how living things relate to one another. Scientists use behavior, genetics, embryology, comparative anatomy, and fossil records to classify a group of organisms with shared characteristics. A **universal nomenclature system facilitates communication** between researchers conducting similar studies.

In the western world, Aristotle and his protégé, Theophrastus, are credited with being the first scholars to use taxonomy to make sense of the natural world. Aristotle's classification system grouped animals with comparable features into genera (this is the plural of *genus*), similar to the current division of vertebrates and invertebrates.

Advances in Taxonomy

According to the <u>Linnean Society of London</u>, Carolus (Carl) Linnaeus is known as the "father of taxonomy" and is considered a pioneer in the field of ecology. Linnaeus authored the well-known *Systema Naturae*, the first edition of which was published in 1735. Linnaeus established the uniform naming hierarchy still used today with that two-word system of binomial nomenclature.

The Linnaean (also written as Linnean) system divided life into two kingdoms: **Animalia** and **Vegetabilia**, largely based on morphology.

Charles Darwin's famous work *On the Origin of Species* expanded the 18th century Linnaean classification system to include phyla (singular: phylum) and evolutionary relationships. French zoologist Jean-Baptiste Lamarck made the distinction between vertebrates and invertebrates.

German scientist Ernst Haeckel (also sometimes spelled as Haeckl) introduced a **tree of life** with three kingdoms: **Animalia**, **Plantae**, and **Protista**.

In the 1940s, Ernst Mayr, an ornithologist and curator at the American Museum of Natural History, made a groundbreaking discovery in evolutionary biology. Mayr observed that isolated populations evolve differently as the result of random mutations and natural selection. Eventually, the differences give rise to a new species. His findings shed new light on the process of *speciation* and taxonomic classification.

Classification Task

Directions: Analyze the table on levels of classification. Then, answer the guide questions. Write your answers in your notebook.

Group Name	Organism		
	Chimpanzee	**House cat**	**Housefly**
Domain	Eukarya	Eukarya	Eukarya
Kingdom	Animalia	Animalia	Animalia
Phylum	Chordata	Chordata	Arthropoda
Class	Mammalia	Mammalia	Insecta
Order	Primates	Carnivora	Diptera
Family	Hominidae	Felidae	Muscidae
Genus	*Pan*	*Felis*	*Musca*
Species	*troglodytes*	*catus*	*domestica*
Scientific name	*Pan troglodytes*	*Felis catus*	*Musca domestica*

Guide questions:

1. Which organisms belong to the same phylum and class?

2. What level of classification(s) makes the three organisms different from each other?

3. Give at least three reasons why the organisms are classified as animals.

III. WHAT I HAVE LEARNED

POST-TEST

I. MULTIPLE CHOICE. Read and understand each item carefully. Write yours answers in your notebook.

1. Which of the following shows a decreasing order in the levels of classification?
A. species, genus, family, phylum
B. genus, species, kingdom, phylum
C. kingdom, phylum, genus, species
D. genus, kingdom, phylum, species

2. Which is an acceptable way in writing the scientific name for humans?
A. *Homo Sapiens*
B. Homo Sapiens
C. homo sapiens
D. *Homo sapiens*

3. Who originated the system of binomial nomenclature?
A. Charles Darwin
B. Carl Linnaeus
C. Robert Hooke
D. Aristotle

4. The science of classifying organisms to construct internationally shared classification systems with each organism placed into more and more inclusive groupings is called_____.
A. Botany   C. Taxonomy
B. Paleontology   D. Zoology

5. The following are the domains of life, *except*_____.
A. Escherichia   C. Bacteria
B. Archaea   D. Eukarya

II. List down at least two importance of classifying organisms.

1._____

2._____

REFERENCES

General Biology 2 textbook, pp 130-131.

https://courses.lumenlearning.com/wm-nmbiology1/chapter/reading-taxonomy

https://sciencing.com/taxonomy-biology

http://www.hawaii.edu/gk-12/evolution/pdfs/classification.highschool.pdf

bioweb.uwlax.ed

SYNOPSIS

Taxonomy is the science of classifying organisms to construct internationally shared classification systems with each organism placed into more and more inclusive groupings.

There are three domains of classification, namely Bacteria, Archaea, and Eukarya. The organization is being arranged from a more specific classification. This organization from larger to smaller is called hierarchical system.

The hierarchy is as follows:
Domain
Kingdom
Phylum
Class
Order
Family
Genus
Species

Identifying taxonomic groups shows how living things relate to one another.
Other importance includes easier communication for other scientists who conducted similar organism/species as used in their studies.

ABOUT THE AUTHOR

HENDELBERT P. BARNIDO is a graduate of Bachelor of Science in Nursing at University of Negros Occidental-Recolletos. He earned his Bachelor in Secondary Education at St. Joseph College of Canlaon. Inc. He is currently assigned as a Senior High School teacher at Jose B. Cardenas Memorial High School, Main Campus. He is designated as a Grade 11 HUMSS C adviser, Culture and Arts coordinator, P.E. coordinator, and DRRM coordinator. He pursued his Master's Degree at Central Philippines State University.