Unit: The Characteristics of Life

Lesson Plan 1: Classification

Objective(s):

Students will be able to:

- Define the following terms: 1) biodiversity, 2) classification, 3) taxonomy, 4) binomial nomenclature, and 5) specific epithet.
- Describe Aristotle's and Linnaeus' methods of classifying organisms.
- Explain the benefit of Linnaeus' method of classification.
- Identify correct and wrong ways of writing scientific names.

Materials:

- Random classroom items
- PowerPoint: "Organizing Life's Diversity"

Anticipatory Set:

Consider God as an artist. We, as the Bible claims, are His handiwork. All creation declares His glory and stands as a testament of intelligent design. As an artist may have many similarities among his varied works, so God has designed nature with similar qualities among certain species. These similarities can be used to group organisms in a way that simplifies their identification. In this unit, we will learn of some ways scientists organize living things.

Lesson:

I.   Classification of the Classroom:
Have students randomly choose different items in the classroom and create a list on the board. Explain that all the items have one thing in common: they are all found in the classroom. Separate the original list into two categories such as *living* and *non-living*. Take one of those lists and separate the items in that list into two or more categories based on similar qualities. Explain that this is what scientists do when they classify or organize living things into groups.

II.   PowerPoint presentation: Part 1 – "Classification"

III.   Scientific Names worksheet

Evaluation:

- Scientific Names worksheet
- Quiz

Classification of the Classroom (Example)

Have students randomly choose items found in the classroom.

Paper	Chair
Teacher	Pet Hamster
Desk	Eraser
Students	Textbook
Pencil	White Board

Break the original list into two categories.

Living Things	Non-Living Things
Teacher	Paper
Students	Desk
Pet Hamster	Pencil
	Chair
	Eraser
	Textbook
	White Board

Take one of the lists and break it up into two or more categories based on similar qualities.

Non-Living Things

Utensils	Furniture	Books
Paper	Desk	Textbook
Pencil	Chair	
Eraser	White Board	

Explain that each category can be broken down into more specific sub-categories based on the descriptive qualities of the items it contains until you are left with one item in each category, as with the textbook.

PowerPoint Notes:

Organizing Life's Diversity
Classification
Part 1

Slide Notes:
One of the most wonderful things about creation is its diversity. Studying nature requires that there be some type of order that simplifies the identification process of organisms. This lesson will delve into several techniques scientists use to classify organisms.

- **Biodiversity-** the variety of species in an area or the entire earth.

Slide Notes:
Biodiversity refers to the different numbers of species that exist. Biodiversity may refer to all different types of living organisms in a specific area, or it may refer to all the different types of living organisms on the entire earth.

- **Classification-** the grouping of objects based on similar qualities.

Slide Notes:
The identification process of organisms is known as *classification*. In the process of classification, scientists look at the similar qualities shared by different organisms and group them into categories that are based on those similarities.

- **Taxonomy-** the branch of biology in which organisms are classified and named based on studies of their different characteristics.

Slide Notes:
The branch of biology that focuses on classification is known as *taxonomy*. Taxonomists go through the process of classification to identify and name new species that are discovered.

Aristotle

- Developed the first widely accepted method of classification.
- Classified organisms into two groups
  - Plants: subdivided into herbs, shrubs, and trees
  - Animals: subdivided into characteristics based on habitat and physical *differences*

Slide Notes:
Aristotle was the first to come up with a standard method of classification. All living organisms were classified as either plant or animal. Plants were subdivided into groups based on their size. Animals were classified based on their habitat and physical differences. Classification based on differences seemed beneficial, but was proven not to be the best method.

Carolus Linnaeus

- Developed a method of classification still used today.
- Classified organisms based on their physical and structural *similarities*.

Slide Notes:
Aristotle's method of classification was later exchanged for that of Linnaeus. Linnaeus' system is the method still used today. His system proved to be more beneficial than Aristotle's because it looked at the similar qualities among species rather than their differences.

- What is the benefit of classifying organisms based on similarities versus differences?

Slide Notes:
Question students to see what ideas they may have to answer the question.

- Classification based on similarities requires a more detailed knowledge of the organism and those it is being compared to.
- According to Aristotle's method, birds and bats were classified together because both could fly. However, a bat has more in common with mammals: (hair, produces milk, etc)

Slide Notes:
The main benefit of classifying organisms based on similarities is that it requires a more detailed understanding of the different organisms. Taxonomists found that there was much more information to compare when looking at similarities as opposed to differences.

Modern Classification

Panther   Cougar

Puma   Catamount

Mountain Lion   Mountain Cat

Slide Notes:
Ask the students the question, "What are the differences among these six animals?" There is no difference. They are all the same species. The names are regional, but refer to the same animal. Having different names for the same species was an issue taxonomists had to deal with.

Modern Classification

- **Common Name-** regional name (nickname) given to a species.
  - A scientist reports on a specific species of bird found in America and several counties in Europe. He uses the common name most Americans are familiar with. The readers in Europe have no idea which bird he is referring to. Why?

Slide Notes:
Question students to see what ideas they may have to answer the question. When making scientific reports on species, scientist needed a universal naming system to limit confusion.

Modern Classification

- **Binomial Nomenclature-** a two word naming system that identifies a specific species.
  - First word is the genus
  - Second word is the specific epithet

- **Genus-** group of species that have similar features and are closely related.

- **Specific Epithet-** describes a characteristic unique to the species.

Slide Notes:
The system used in modern classification for naming species is called binomial nomenclature. It uses two words to identify the species' genus and a major characteristic unique to the species.

Scientific Names

- The species name for Humans (common name) is *Homo sapiens* (scientific name).

- **Scientific Names-** names given to species using binomial nomenclature.
  - Latin language (dead language; does not change)
  - Italicized in print and underlined when handwritten
  - First letter of genus name is uppercase
  - First letter of specific epithet is lowercase

Slide Notes:
Using binomial nomenclature, taxonomists are able to create a scientific name for each species. A scientific name must have the four listed identifiable marks.

Scientific Names   Name: _____

Date: _____   Class: _____

Write the correct scientific name for each species.

	Genus	Specific Epithet	Scientific Name
1	Homo	Sapiens	
2	Rosa	Californica	
3	Ursus	Americanus	
4	Haliaeetus	Albicilla	
5	Canis	Lupus	
6	Geospiza	Fortis	
7	Carduelis	Carduelis	

Identify what is wrong with the scientific names below.

8. Ailuropoda Melanoleuca   _____

9. *Ursus Arctos*   _____

10. procyon lotor   _____

11. Ailurus fulgens   _____

12. *Brassica oleracea*   _____

Circle the correct scientific name.

13. Pan Troglodytes   *Pan troglodytes*   *Pan troglodytes*

14. *Gorilla Gorilla*   *Gorilla gorilla*   Gorilla gorilla

15. *Rosa canina*   *Rosa Canina*   *rosa canina*

Scientific Names   Name: **Key**

Date: _____   Class: _____

Write the correct scientific name for each species.

	Genus	Specific Epithet	Scientific Name
1	Homo	Sapiens	* <u>Homo sapiens</u>
2	Rosa	Californica	* <u>Rosa californica</u>
3	Ursus	Americanus	* <u>Urus americanus</u>
4	Haliaeetus	Albicilla	* <u>Haliaeetus albicilla</u>
5	Canis	Lupus	* <u>Canis lupus</u>
6	Geospiza	Fortis	* <u>Geospiza fortis</u>
7	Carduelis	Carduelis	* <u>Carduelis carduelis</u>

Note: Scientific names should be underlined when handwritten by students. Answers above reflect student answer as if it was handwritten.

Identify what is wrong with the scientific names below.

8. Ailuropoda Melanoleuca   *not italicized; specific epithet should not be capitalized*

9. *Ursus Arctos*   *specific epithet should not be capitalized*

10. procyon lotor   *not italicized; genus should be capitalized*

11. Ailurus fulgens   *not italicized*

12. *Brassica oleracea*   nothing wrong

Circle the correct scientific name.

13. Pan Troglodytes   *<u>Pan troglodytes</u>*   *Pan troglodytes*

14. *Gorilla Gorilla*   *Gorilla gorilla*   Gorilla gorilla

15. *Rosa canina*   <u>*Rosa Canina*</u>   *rosa canina*

Quiz: Classification   **Name:** _____

Date: _____   **Class:** _____

Matching:

_____1. Biodiversity   a) the grouping of objects

_____ 2. Classification   b) the variety of species

_____ 3. Taxonomy   c) two word naming system

_____ 4. Binomial Nomenclature   d) characteristic unique to one species

_____ 5. Specific Epithet   e) branch of biology that classifies organisms

Answer the following questions:

6. Describe Aristotle's method of organizing organisms.

7. Describe Linnaeus' methods of classifying organisms.

8. Explain the benefit of Linnaeus' method of classification.

Circle the correct scientific name:

9. *Rosa Banksiae*   *Rosa banksiae*   Rosa banksiae

10. *Ursus maritimus*   Ursus Maritimus   ursus maritimus

11. Brassica oleracea   *Brassica oleracea*   Brassica Oleracea

Quiz: Classification   **Name: Key**
Date: _____   **Class: _____**

Matching:

b   1. Biodiversity   a) the grouping of objects

a   2. Classification   b) the variety of species

e   3. Taxonomy   c) two word naming system

c   4. Binomial Nomenclature   d) characteristic unique to one species

d   5. Specific Epithet   e) branch of biology that classifies organisms

Answer the following questions:

6. Describe Aristotle's method of organizing organisms.
Aristotle had two groups, plants and animals. Plants could be divided into herbs, shrubs, and trees.
Animals could be divided into sub-groups based on habitat and physical differences.
7. Describe Linnaeus' methods of classifying organisms.
Linnaeus classified organisms based on their physical and structural similarities.

8. Explain the benefit of Linnaeus' method of classification.
The benefit of Linnaeus' method was that it required a more in-depth knowledge of the organism and
that to which it is being compared.

Circle the correct scientific name:

9. *Rosa Banksiae*   *Rosa banksiae*   Rosa banksiae

10. *Ursus maritimus*   Ursus Maritimus   ursus maritimus

11. Brassica oleracea   *Brassica oleracea*   Brassica Oleracea