Chaos within the Living World? NOT!

Grade Level: 5th
Presented by: Patricia Johnson, Shelly Reaves, and E'Lisa Young, Hardy Oak Elementary, San Antonio, TX
Time Frame: Two weeks – five lessons

I.   **ABSTRACT**

This unit builds on and extends the scientific topic of Classification as found in the Core Knowledge sequence for Fifth grade. It utilizes a variety of investigations and research activities to explore the method of classification used by scientists today. The historical progression of classification systems will guide students to the understanding of the need for a uniform classification system, as well as the need for a single language within that system. Students will use their knowledge of the classification system to create and present a multimedia project.

II.   **OVERVIEW**
   A.   Concept Objectives for this unit:
      1.   Understand that scientists group living things in our world.
      2.   Understand how scientists have used a common language to ensure consistency in our world.
      3.   Understand the purpose of a uniformed classification system.
      4.   Understand that classification is a system of categorizing things according to similarities and differences
      5.   Understand that technology can be used as a means of research and communication.
   B.   Content covered from *Core Knowledge Sequence*:
      1.   Five large groups of kingdoms – plants, animal, fungus, protist, moneran
      2.   Kingdoms are dived into smaller groupings
      3.   Usage of Latin as common language for the classification system
      4.   Review of Grade 3 – classes of vertebrates
      5.   Linnaean Classification
      6.   Scientific Name
   C.   Skills – based on the Texas Essential Knowledge and Skills
      1.   Determine the characteristics that qualify a given set of objects.
      2.   The student uses logical reasoning to make sense of his or her world. (Math 5.16)
      3.   The student writes for a variety of audiences and purposes, and in a variety of forms. (LA 5.15)
      4.   The student composes original texts, applying conventions of written language, including capitalization, punctuation, and penmanship, to communicate clearly. (LA 5.16)
      5.   The student spells proficiently. (LA 5.17)
      6.   The student applies standard grammar and usage to communicate clearly and effectively in writing. (LA 5.18)
      7.   The student selects and uses writing processes for self-initiated and assigned writing. (LA 5.19)
      8.   The student uses writing as a tool for learning and research. (LA 5.2)
      9.   The student uses a variety of word identification strategies. (Reading 5.6)

III.   **BACKGROUND KNOWLEDGE**
   A.   For teachers
      1.   Hilmes, Kathleen, ed. *Our Living World.* St. Louis, MO: Milliken Publishing Company, 1993, ISBN 1-55863-059-7

2. Hirsch, E.D. Jr. *What Your 5th Grader Needs To Know.* New York, NY: Dell Publishing, 1993, ISBN 0-385-31464-7
3. Jon Rose, Kenneth. *Classification of the Animal Kingdom.* New York, NY: David McKay Company, Inc., 1980, ISBN 0-679-20508-X
4. Silverstein, Alvin, Virginia and Robert. *The Kingdoms of Life, Invertebrates.* New York, NY: Twenty-First Century Books, 1996, ISBN 0-8050-3518-4
5. Walker, Niki and Langille, Jacqueline, eds. *What is the Animal Kingdom?* New York, NY: Crabtree Publishing Company, 1998, ISBN 0-86505-8776
6. Zeman, Anne and Kelly, Kate. *Everything You ;Need To Know About Science Homework.* Irving Place Press, New York, NY: Scholastic Reference, 1994, ISBN 0-590-49356-6

B. For students:
1. The basic understanding of the classification system from 3rd grade

IV. RESOURCES:
A. Copies of Appendix A-E
B. PowerPoint program or Hyper Studio

V. LESSONS
Lesson One: Why Classify?
A. *Daily Objectives*:
   1. Concept Objective
      a. Understand the purpose of a uniformed classification system.
   2. Lesson Content
      a. Five large groups of kingdoms- plants, animal, fungus, protist, and moneran
   3. Skill Objectives
      a. The student uses logical reasoning to make sense of his or her world The student writes for a variety of audiences and purposes, and in a variety of forms.
      b. Determine the characteristics that qualify a given set of objects.
B. *Materials*:
   1. Die cuts of different animals (i.e. cow, cat, alligator, bird, flamingo, dolphin, dog, fish, snake, lizard, lobster, crab, whale, shark)
   2. Chart paper or chalkboard
C. *Key Vocabulary*:
   1. classify – to sort according to specific characteristics
   2. trait – an inherited trait or distinguishing quality
   3. characteristic – a distinguishing trait, quality, or property
D. *Procedures:*

Day One
   1. Brainstorm with class to answer the question: "Why do we classify?" Chart responses on board or chart paper. Guide discussion/responses for common goals, unity, and organization.
   2. Discuss with class the example of organization of our school community.
      a. district - certain areas attend specific schools
      b. school – each grade level has a specific hallway
      c. grade level – all students are about the same age
      d. classroom – desk arrangement
      e. notebooks – dividers, subject areas
      f. agenda – monthly, daily weekly
   3. Brainstorm how we use organizational skills at home, guiding for specifics –furniture, kitchen, garage. Students with partner create chart showing an organization system of their home.

4. Homework**:** Bring a list of 20 items found in student's pantry, refrigerator, or freezer.

Day Two
1. In small groups, students will discuss the lists from previous assignment. Students compile their individual lists into a group list/poster. Students need to pinpoint specific items – ex. Fruits are in the fruit drawer, ice cream is located in the freezer, soup cans stacked in the pantry… Students present list to whole group.
2. When groups are presenting lists, identify commonalities found in each group, and relate to the organization of a grocery store.
3. Review characteristics that qualify a given set of objects. Review the definition of classify. Introduce the library as an example of classification in our lives. (Can take a tour of the library to connect)
4. Activity: Animal die cut scramble
    a. Divide students into 4 groups.
    b. Give each group will receive an envelope containing the animal die cuts (don't let them look until you give instructions).
    c. Instruct students that the object is for them to sort the objects in the envelope into three groups. The first time, give no guidance. Have them, as a group, write a paragraph that supports their grouping.
    d. After completion, the students will regroup the objects for the second time and again, support their thinking through a written paragraph.
    e. Share paragraphs with class and discuss similarities and differences found among the groups in the class.
E. Assessment/Evaluation: Allow students to select three of the following questions to answer. Answers must be in complete sentences.
    1. Why do we classify?
    2. What are the benefits of classification?
    3. What determines how we classify?
    4. Write an independent paragraph explaining how your group classified the animals in the activity.

Lesson Two: Kingdoms Rule
A. *Daily Objectives*:
    1. Concept Objective:
        a. Understanding that scientists group living things in our world.
    2. Lesson Content:
        a. Five large groups of kingdoms-plants, animal, fungus, protist, moneran
    3. Skill Objectives:
        a. The students will understand why do scientists group living things.
        b. The students will identify and describe the specific kingdoms.
        c. The students will identify characteristics of each kingdom.

B. *Materials*:
    1. *What is the Animal Kingdom?* book
    2. Notebook paper for vocabulary chart
C. *Key Vocabulary*:
    1. animals: many cells, has a nucleus, feeds on other living things
    2. plants: many cells or one-celled, produces own food
    3. moneran: one-celled, no nucleus
    4. protist: one-celled, has a nucleus
    5. fungus: living things that can not make their own food

D. *Procedures:*
1. Review "Why we classify?" from previous lesson.
2. Discuss how scientists classify all living things in a systematic way. Scientist group living things into five groups based on cell structure and how it receives food. The five kingdoms are: animals, plants, moneran, protist, and fungus.
3. Intro vocabulary to the students.
4. Students will create a vocabulary chart for each term.

Word	Prediction	Definition

5. Students will fill out the prediction part of the chart. At the end of the discussion, students will complete the chart.
6. Read page 6 and 7 from *What is the Animal Kingdom?* Chart the information on the chalkboard or overhead. Ask questions during the reading. For example, are cells alive? What is the difference between the Monera and Protista kingdoms?
7. Read Appendix A.
8. Homework: Letter/Descriptive Writing
    You are on a "mission" and have stumbled across a new species of living things. You are very excited about your discovery and you want to let your class know about it. Write a letter to your class describing you new species. Remember to include details pertaining to the characteristics, eating habits, habitat, and the kingdom it belongs to. Don't forget to name the species!
E. *Assessment/Evaluation:*
1. Student participation
2. Completion of writing assignment

Lesson Three: Specific Groups
A. *Daily Objectives*:
1. Concept Objective:
    a.   Understand scientists group living things in our world.
2. Lesson Content:
    b.   Kingdoms are divided into smaller groupings
3. Skill Objective
    a.   The student will compare the five kingdoms.
    b.   The student will present information on the five kingdoms to the class.
    c.   The student will understand the characteristics of the kingdoms.
    d.   Then student uses writing as a tool for learning and research. (LA 5.21)
B. *Materials*:
1. http://www.encarta.msc.co
2. Handouts from Encarta Learning Zone on each kingdom (Appendix B)
3. Construction Paper (12x18)
4. Poster board
C. *Key Vocabulary*:
    See procedures: each small group will share vocabulary from the handouts.

D. *Procedures*:
1. Divide class into five groups. Each group will be responsible for returning to the whole class and presenting specific information on one of the kingdoms. (Appendix B) Students will use the computer lab to gather and print information. The small groups will then study the information to locate facts needed for their presentation. Groups will need to present the information on a poster board using the following format:
2. Title of kingdom
3. 10 facts about the kingdom
4. 5 key vocabulary words related to the kingdom with a brief definition
5. (Students can add vocabulary to their vocabulary chart)
6. After group discussions, students will individually make a flap book using the information presented by small groups.
7. Directions for the flap book:
8. Use a 12x18 sheet of construction paper, fold in ½ length wise

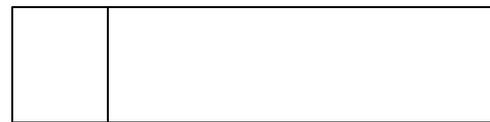students fold the folded sheet into fifths
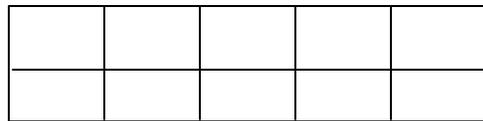
students cut the folded fifth parts up to the half fold
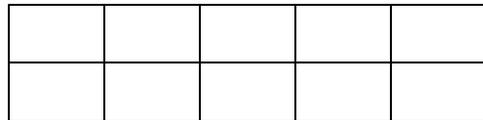
9. Each flap will represent one kingdom. Students need to draw a picture related to the kingdom on the front of the flap and label with the kingdom. Inside the flap, students write 6-8 facts about the kingdom.

Inside

E. *Assessment/Evaluation*:
1. Flap books completed with title, picture, and facts

Lesson Four: A Common Language
A. *Daily Objectives*:
1. Concept Objectives:
    a. Understand how scientists have used a common language to ensure consistency in the world
    b. Understand the purpose of a uniformed classification system
2. Lesson Content:
    a. use of Latin as common language for the classification system

3. Skill Objectives:
   a. Students will understand why do scientists use a common language.
   b. Students discover why it is important that we classify living things in a sequential order
   c. The student uses a variety of word identification strategies and composes original texts, applying conventions of written language, including capitalization, punctuation, and penmanship, to communicate clearly.
   d. The student spells proficiently.
   e. The student applies standard grammar and usage to communicate clearly and effectively in writing.
B. *Materials*:
   1. Vocabulary Chart
   2. Appendix C
C. *Key Vocabulary*:
   1. taxonomy – the science of classification: laws and principles covering the classifying of objects.
   2. Carolus Linnaeus – a Swedish naturalist who was the first to put taxonomy into widespread use; known as the "Father of Taxonomy"
   3. Aristotle – Greek philosopher and botanist who classified living things according to physical characteristics.
   4. Hierarchy – a group of persons or things arranged in order of rank, grade, class, etc.
   5. Phylum – a direct line of descent within a group; one of the primary divisions of the animal kingdom
   6. Class – a group with common interest
   7. Order – a class of things grouped according to quality, value, or characteristic s
   8. Family- a group with like qualities, higher than genus; more specific than the order group
   9. Genus – a class of things marked by common characteristics or by one common characteristic.
   10. Species – a category of biological classification compromised of related organisms, and being designated by a binomial that consists of the name of a genus followed by a Latin noun or adjective.
   11. Binomial – a biological species name consisting of two terms.
D. *Procedures*:
   1. Review previous lesson objectives – Lesson 3
   2. Discuss how Aristotle grouped animals by what they had in common – actions, body parts, habits. Aristotle did not always group animals correctly. He felt that some animals were more perfect than other living things. Aristotle made a scale/list of animals in order of perfection. Carolus Linnaeus devised a system of classification that scientists still use today. He created a binomial system of naming an animal or plant. The binomial name is the scientific name for the animal or plant. (genus + species) The language of Latin was used to ensure that scientists are using a common language to name living things.
   3. Introduce the concept of a hierarchy, and brainstorm with the students where they see things grouped in a hierarchical manner.
      Suggestions:
      Music store - CD's and cassettes grouped according to music type: pop, rock, soul, country. Within the types, items are placed in order according to artist name.
      Book Store – Books are placed according to type: adult fiction, children section, self-help, references. The breakdown continues to authors. Both examples break down to a binomial naming system: Last name, First name.
   4. Introduce the vocabulary to the students. Write the words on the board in a stair step (see below) and students can add them to their vocabulary chart from lesson two.

<div align="center">

Kingdom

Phylum

Class

Order

Family

Genus

Species

</div>

5. Discuss the Linnaean System of classification. Be sure to have students discover the movement from big groups to smaller groups. Also introduce the concept of a scientific name being the genus and the species.
6. Share with students the mnemonic devise "King Phillip Came Over For Great Spaghetti" Students will create their own mnemonic devise to remember the order of the Linnaean system. Have them share with the class.

E. *Assessment/Evaluation*:
1. Short answer quiz (appendix C)

Lesson 5: Culminating Activity

A. *Daily Objectives*
1. Concept Objectives:
   a. Understand that classification is a system of categorizing things
2. Lesson Content
   a. Linnaean Classification
   b. Scientific Name
   c. Understand that technology can be used as a means of research and communication.
2. Skill Objectives
   a. Students will research a selected animal and organize information to produce a media project.
   b. Students will use Power Point to create and present their project.

B. *Materials*:
1. Variety of research sources including online encyclopedias, internet, animal research programs, books
2. Power Point – Hyper Studio program
3. Note Cards

C. *Vocabulary*:
1. Taxonomy – classification of plants and animals
2. Habitat – the region where a plant or animal naturally lives
3. Adaptations – changes made to accommodate new circumstances
4. Diet – what a person or animal usually eats

D. *Procedures*:
1. Introduce research project. Allow students to self-select an animal they are   interested in researching. (It is important to have no duplications within a class for presentation purposes)
2. Explain that the project will be organized into 6 cards/Power Point slides, and that each student will make hard copies of their slides on note cards before transferring the information to the computer.

CARD 1- Title card: The student will create a creative title for their presentation that includes the common name for their animal. (example—The Hopeful, Healthy, Humorous, Heroic, Happy Human)

CARD 2 - Taxonomy: This card will contain a photograph of the animal, the complete taxonomy as well as is available, and the scientific name.

CARD 3 – Habitat: This card will contain the specific area where the animal lives. They will represent this in two ways. First, in a paragraph, and second on a map of the world. Both contained on the slide.

Card 4 – Adaptations: While researching, students will look for specific adaptations their animals have made to stay alive. (camouflage, poison, thick, thin skin) On the slide this should be a short, but complete paragraph, along with a picture or two.

Card 5 – Diet: What does the animal eat. Is it an herbivore, carnivore, or omnivore? How does it get its food? When is it most active?

Card 6 – "A Day in the Life": This card will contain a creative story written from the point of view of the animal (1st person). The student will use I in place of the animal name. The story should include key information about the animal. Does it live in a nest, hole, tree etc? Is it nocturnal? How does it get food? It must be a complete day awakening to sleeping. They may include offspring.

    E.   *Evaluation***:**
       1.   Evaluate the presentations using the rubric in Appendix E.

VI.   CULMINATING ACTIVITY
    (See lesson five)

VII.   HANDOUTS/WORKSHEETS
    Appendices A-E

VIII. BIBLIOGRAPHY

Hilmes, Kathleen, ed. *Our Living World.* St. Louis, MO: Milliken
    Publishing Company, 1993, ISBN 1-55863-059-7

Hirsch, E.D. Jr. *What Your 5th Grader Needs To Know.*
    New York, NY: Dell Publishing, 1993, ISBN 0-385-31464-7

Jon Rose, Kenneth. *Classification of the Animal Kingdom.* New York, NY: David
    McKay Company, Inc., 1980, ISBN 0-679-20508-X

Silverstein, Alvin, Virginia and Robert. *The Kingdoms of Life, Invertebrates.* New
    York, NY: Twenty-First Century Books, 1996, ISBN 0-8050-3518-4

Walker, Niki and Langille, Jacqueline, eds. *What is the Animal Kingdom?* New York,
    NY: Crabtree Publishing Company, 1998, ISBN 0-86505-877-6

Zeman, Anne and Kelly, Kate. *Everything You Need To Know About Science*
   Homework . Irving Place Press, New York, NY: Scholastic Reference,
    1994, ISBN 0-590-49356-6

Appendix A
Chaos within the Living World? Not!

Grouping Living Things
Classification

When you go to the airport are all airlines in the same area? Are departing and arriving flights located in a central location? Airport engineers have designed a well-established plan that allows an airport to function. Which ways have engineers designed the airport to run smoothly?

Scientists use a similar system of grouping to find things easily. Scientists identify living things and classify them based on characteristics. Classification is a set of rules used for grouping things.

Questions to ponder:
Why would scientists want to classify living things?
How do scientists classify?

Scientists use the Linnaean System, which was developed by Carolus Linnaeus. He classified all living things into two large groups: animals and plants. Scientists have expanded this system to what scientist use today. There are five kingdoms in this system. A kingdom is the largest group of living things that share a common characteristic.

Kingdoms:
Monerans are single celled, which some can make their own food or feed off other living things. **Protists** are single celled and can also make their own food or feed off other living things. The difference between the two kingdoms is that the protist has a nucleus and the moneran does not. **Fungi** are many celled and contain a nucleus. Fungi can not make their own food but absorbs nutrients from other living or non-living things. The **Plant Kingdom** makes their own food and are many celled. The **Animal Kingdom** receives food from other living things and are many celled.

What are some examples for each kingdom?

The Linnaean System allows scientist to break down the kingdoms into smaller groups. Scientist continue to break down the characteristics until the living thing has a scientific name (genus + species) and stands on it's own.

Appendix B
Chaos within the Living World? NOT!

Web Site List

The things that you are looking for: 10 facts about the kingdom
                                                  5 related vocabulary words

Your group can include examples (2-3) on living things that are part of your
kingdom. Facts could consist of information on how many species, how many
separate subgroups, and certain similar characteristics in the kingdom.

Use these web sites to research your group's kingdom.   Organize your research
into a presentation where you will teach your classmates about the kingdoms.

www.britannica.com

www.encyclopedia.com

www.encarta.msn.com

Classification
System Quiz

1. List the Linnaean System of classification in order from biggest to smallest.

2. Write your mnemonic devise for the classification system.

3. Who was Carolus Linnaeus? Why was his work important?

4. What language is used in the Linnaean System and why do they use only one language?

Classification

Scientist use a classification system to help them identify all living things. Without this classification system it would be extremely hard to discuss a particular animal with another person and know for sure that the other person knew exactly what you were talking about. Likewise, if a bookstore stocked all their books randomly on the bookshelf, without any kind of system, it would be almost impossible to locate a specific title when a customer came in. Scientist and storeowners alike need to be able to identify and find items easily. It is for this reason that scientist developed a classification system.

Scientist begin the classification system by looking at living things and identifying their characteristics. Then, based on these characteristics, they break the living things into different groups with similar, or like, features. Scientist have identified five different **kingdoms**, or groups, they can use to classify all living things, they are: **monerans, protists, fungi, plants, and animals**. Each of these kingdoms have characteristics that are unique to only their own kind. The features are as follows:

Moneran- every member of the moneran kingdom is made of only one cell that has no nucleus, or control center. Examples: Bacteria

Protist- every member of the protist kingdom is made of only one cell that has a nucleus. Examples: Algae, amoebas and diatoms

Fungi- every member of the fungi kingdom has many cells and absorbs their food from other living or dead things. Examples: mushrooms, yeast and molds.

Plants- every member of the plant kingdom has many cells and they produce their own food. Examples: Grass, trees, flowers, and vegetables.

Animals-every member of the animal kingdom has many cells and feed on other living things. Examples: People, bugs, fish, snakes, and birds.

Scientist do not stop classifying with the kingdoms. They take each kingdom and break them down into smaller and smaller groups by common features. This continues until the group has only one type of living thing, called a species. These groups are: Kingdom, phylum, class, order, family, genus, and species. We have given most living things a common name and this works wonderfully when we are talking to someone that speaks the same language and is from the same area, but these common names may be different in another language or in a different part of the world. Because of this, scientist realized that they needed to label all living things so that scientist all over the world could communicate. It was decided that the names would come from the second smallest group, the genus, and the smallest group, the species. For example, the scientific name for a house cat is *Felis domesticus.* The order of classification for a domestic house cat is as follows:

Kingdom---Animalia

      Phylum---Chordata (Vertebrate-animal with backbone)

          Class---Mammalia

              Order---Carnivora

                  Family---Felidae

                      Genus---Felis

                          Species---Catus

This classification system allows scientist all around the world to work together and discuss and study all living thing.

Animal Classification

One of the 5 kingdoms is the animal kingdom. The animal kingdom is made up of living things that have more than one cell with a nucleus and must eat other living things to survive. As you can well imagine, this is a huge kingdom! Scientist realized that this kingdom must be broken down. They decided to divide the kingdom into two groups, **vertebrates** (animals with a backbone) and

invertebrates (animals no backbone). These two groups are then divided even further.

The vertebrates are broken down into 5 groups. They are:
 Mammals—mammals are warm blooded, have hair, produce milk for their
 young and give live birth.
Birds—birds are warm blooded, have hollow bones, lay eggs and have feathers.
Reptiles—reptiles are cold blooded, breath with lungs, lay eggs and have dry, scaly skin.
Fish—fish are cold blooded, breath with gills and lay eggs.
Amphibians—amphibians are cold blooded, breath with both lungs and gills, have moist skin (no scales) and lay eggs.

The invertebrates are broken into three groups. They are:
Sponges—sponges have no body openings, and live in water
Stinging Cells—stinging cells have one body opening, have tentacles with stinging cells and live in water
Worms—worms have two body openings, and a simple nervous system. (There are three different types of worms: flatworms, roundworms and segmented worms.
Mollusks—mollusks have soft bodies, and three body parts (a head, a body, and a foot
Enchinodermata—enchinodermata have external skeletons made of lime, bodies arranged in five parts (or multiples of five) and bodies covered in spikes or spines
Arthropods—arthropods have legs with several joints, more than one body section and an exoskeleton (hard body covering).

There are many more invertebrates than vertebrates in the world. 97 % of the animal kingdom are invertebrates while only 3 % are vertebrates. Of all the different subgroups the arthropods is the largest with more than 80,000 known species.

Reading Material adapted from *What is the Animal Kingdom?* and *Classification of the Animal Kingdom.*

Classification Project
Evaluation Rubric

1. Title Card   **(10 points)**   _____

2. Taxonomy   **(20 points)**   _____
   *scientific name
   *Linnean System

3. Habitat   **(20 points)**   _____
   *map

4. Adaptation   **(10 points)**   _____
   *includes photos

5. Diet   **(10 points)**   _____

6. Creative story   **(30 points)**   _____
   *grammar
   *descriptions
   *activities

Total Points Earned   _____
(out of 100)