3rd Grade Lesson Plan: Kingdom Animalia: Classifying Animals

Overview

This series of lessons was designed to meet the needs of gifted children for extension beyond the standard curriculum with the greatest ease of use for the educator. The lessons may be given to the students for individual self-guided work, or they may be taught in a classroom or a home-school setting. This particular lesson plan is primarily effective in a classroom setting. Assessment strategies and rubrics are included. The lessons were developed by Lisa Van Gemert, M.Ed.T., the Mensa Foundation's Gifted Children Specialist.

Introduction

This lesson explores the classification system used to identify animals. Most children are fascinated by animals and often have an animal that is a particular favorite, possibly even an animal the child has never seen before. Children also like to order and sort things, and this lesson melds both of these interests. This lesson is specifically designed to move quickly beyond the knowledge level to high-level thinking. This lesson can be taught to an entire classroom or given as a self-directed extension activity.

Learning Objectives

After completing the lessons in this unit, students will be able to:

- Know and understand the seven levels of classification.
- Apply that knowledge as they practice classifying animals.
- Evaluate and compare the classification of animals.
- Devise a classification system for the objects in their homes.
- Create a new species and classify it according to the principles of classification.

Preparation

- Print the lesson plan on a color printer.
- Have access to the Internet for student(s).
- Gather supplies including paper, pen or pencil, crayons, colored pencils and/or fine-tip markers.

Lesson 1: Beginnings

Look at the pictures of these animals, then fill in the chart below: (We've given you an example.)

Animal	Lives where? (Land/sea/air)	Type of skin?	Size? (Bigger/smaller than a person)	Kind of babies? (Living or eggs)
cow	land	hide with short fur	bigger	live babies
bear				
fish				
bird				
whale				
horse				

Choose the two animals from your chart that you think are most similar and justify your choice in one sentence:

_____

_____

_____

_____

_____

Lesson 2: Organizing the animals – how it happened

Back in the 18th century, a Swedish man named Carolus Linnaeus thought it was important to organize living things, and he developed a system to do just that. He started out interested in plants, but he ended up ordering all life as he knew it. We still use the essence of his system today. Scientists are constantly refining the system based on new knowledge. Who knows? Maybe you will make a change in how animals are organized!

Putting animals in order like this is called taxonomy. The taxonomists — people who name animals — use a book called the *International Code of Zoological Nomenclature*, or ICZN, to tell them the rules for classifying animals.

Linnaeus's system has seven levels:

1. Kingdom
2. Phylum
3. Class
4. Order
5. Family
6. Genus
7. Species

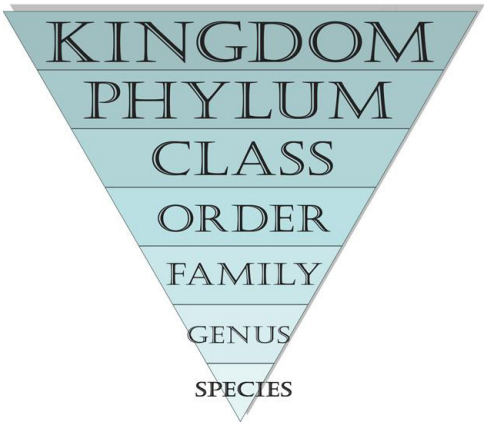
Every animal on the planet, down to the most microscopic creature you can imagine, can be classified according to this system. You can remember the order the system comes in with one of the following phrases. The first letter of each word is the first letter of the level of classification. Pick the one you like the best and practice saying it five times.

K*ing* **P***hillip,* **c***ome* **o***ut,* **f***or* **g***oodness'* **s***ake!*

K*ing* **p***enguins* **c***ongregate* **o***n* **f***rozen* **g***round* **s***ometimes.*

K*eep* **p***onds* **c***lean* **o***r* **f***rogs* **g***et* **s***ick.*

Let's look at each level and an example using one common animal.



These levels start out broadly — that means the top levels have the most animals, and they get narrower and narrower as you go down. So, by the time you get to the species, there is only one animal in the group. You can imagine these levels as an upside-down triangle.

Kingdom: Generally, scientists agree there are six kingdoms. The animal kingdom (called Kingdom Animalia) is just one of those. In case you're interested, the others are Achaebacteria, Eubacteria, Protists, Fungi and Plants. Originally, Linnaeus only identified two kingdoms: plant and animal. Some scientists think that viruses should have their own kingdom, but currently they are not included under this system.

Phylum: Within the animal kingdom, the animals are divided into more than 30 phyla (which is the plural of "phylum"). You might be interested in Phylum Chordata – it's the one humans and all animals with backbones are in (do you see how "chordata" looks like the word "cord" – like spinal cord?). Phylum Arthropoda contains insects, spiders and other animals with segmented bodies, like shrimp. Arthropods have their skeletons on the outside of their bodies (think of the hard shell of a lobster) and other characteristics in common.

Class: The third level of classification is class. For example, Phylum Chordata has classes in it like birds, mammals (Mammalia) and reptiles.

Order: The next level, or rank, is order. Orders are smaller groups within the different classes. Lepidoptera is the order of moths and butterflies. Carnivora is the order within Mammalia that has the most diversity in animal size.

Family: The fifth rank of classification is family. (When you get to this rank, people sometimes disagree about which family an animal belongs to, so you may find that different sources tell you different things. This can even happen with orders.) The family for dogs is Canidae.

Genus: This rank looks like "genius," doesn't it? It's the second-to-last rank, and a genus may have only one or two animals in it. If animals are in the same genus, they are really closely related. In fact, you may not be able to tell them apart just by looking at them! When we write the name of the genus, we capitalize it and italicize it. For example, the genus of dogs (and wolves, too!) is *Canis*.

Species: If animals can breed together successfully, they are a species. When an animal is called by its scientific name, then that means it is being identified by its genus and species. We use a lowercase letter and italics for the species. The scientific name of dogs is *Canis familiaris*; however, the scientific name of wolves is *Canis lupus*.

Lesson 3: Using what you've learned

Look back at your chart of the animals that you did in Lesson 1. Let's see how they fit into what we've just learned. Using that chart and the chart on the last page of this lesson, answer the following questions:

1. Why do you think we left Kingdom off of the chart? What kingdom does each of these animals belong to?

_____

2. Look at the class of the Chilean flamingo. All birds belong to that class. Do you see why we call things to do with airplanes "aviation?" Using that same idea, and looking at the order of the blue whale, can you make up a word that means "as big as a whale?"

_____

3. Do you agree or disagree with this statement? If two animals are the same genus, then they must also be the same family, order, class, phylum and kingdom. Why did you make that choice?

_____

_____

_____

4. Why do you think that we had to be more specific about the animals in this chart? Why can't we just put "bear"? Why did we have to say "grizzly bear?"

_____

5. Whales actually have suborders depending on whether they have teeth or baleen (comblike sieves that let water out but keep their food in). Think about the name of the kind of doctor who puts braces on people's teeth. Now think about the name of the whale suborder Odontoceti. Do you think these are whales with teeth or whales with baleen?

_____

6. The family that horses belong to, Perissodactyla, means "odd toed." Think about what a horse's hoof looks like. Can you think of any other animals not on this chart that might belong to that family?

_____

_____

Common name	Phylum	Class	Order	Family	Genus	Species
Cow	Chordata	Mammalia	Artiodactyla	Bovidae	Bos	taurus
Grizzly bear	Chordata	Mammalia	Carnivora	Ursidae	Ursus	arctos horribilis
Clown fish	Chordata	Actinopterygii	Perciformes	Pomacentridaie	Amphiprion	ocellaris
Chilean flamingo	Chordata	Aves	Ciconiiformes	Phoenicopteridae	Phoenicopterus	chilenis
Blue whale	Chordata	Mammalia	Cetacea	Balaenopteridae	Balaenoptera	musculus
Horse	Chordata	Mammalia	Perissodactyla	Equidae	Equus	caballus

7. Using the chart above, write the scientific names of the cow, the flamingo and the whale.

Cow: _____

Chilean flamingo: _____

Blue whale: _____

Did you put the genus first with a capital letter? Good for you! When you see a species' name written, it will be the genus and the species, so the scientific name is sometimes just called "species." Sometimes the genus will just be listed as a capital letter with a period after it, like this: B. musculus.

Lesson 4: Working with your favorite animal

Go to animaldiversity.ummz.umich.edu/site/index.html. In the search box, put in your favorite animal. Now write out its classification:

Kingdom: _____ _____

Phylum: _____ _____

Class: _____ _____

Order: _____ _____

Family: _____ _____

Genus: _____ _____

Species: _____ _____

Look on the chart of animals in the previous lesson. Are there any animals on the chart in the same phylum as your animal? Same class? Which animal do you think is the most closely related to your animal?

_____

Go back to the website and try to think of a few animals that would be very closely related to the first animal you chose and classified above. For example, if you chose "tiger," try "lion" and "panther." How close can you get? Can you get down to the same family? How about genus?

What animal could you find that was closest to yours? _____

Lesson 5: Classifying your house

It's not just animals that get organized. Think about the grocery store; is the cereal in the same area as the fruit? No, each type of food is in its own space. You can easily tell how the grocery store classifies its items for sale by looking at the signs above the aisles.

Now think about your house. Imagine that you needed to classify every item in your house. One way would be to use the ideas that Linnaeus had – to start out with broad categories and get narrower. Let's try it!

You are going to devise a seven-level system for classifying the things in your house. If you get confused at any time as you are doing this, you can look at the examples on Page 11 of the lesson.

1. First, let's think about the broadest level. Is everything inside your house or do you have some things outside, too? Maybe your first level needs to be the Kingdom Inside and the Kingdom Outside. If your family has other places that you keep things you own (like a separate house or a storage unit), that might be a third kingdom. You may want to have kingdoms based on sides of the house or things for parents and things for kids.

List your kingdoms here:

_____

_____

_____

2. Next, you need the next level down, phylum. Think about the things you have in one of your kingdoms. Can you think of a few categories you could divide them into? You may want to choose phyla based on rooms (such as Phylum Living Room, Phylum Kitchen). You may want to choose phyla based on the items' size or what they are made of. It's up to you. Choose just one kingdom from your list above and create three phyla for it on the next page (remember that phyla is the plural of phylum).

Kingdom: _____ ■ Phylum _____

■ Phylum _____

■ Phylum _____

3. Pick one of the three phyla you created above and put it on the line below. Write the kingdom that phylum belongs to on the line next to Kingdom. Think about the phylum you picked. In your mind, break it down into some categories. For example, if your phyla were broken down by rooms, and you picked "Living Room" as your phylum, how could you divide the things in your living room into categories? Could you break them down by what you do with them? How about who uses them? How about what they are made of or where they are (wall, floor, closet)? Don't try to make the categories too small, because you have several levels left! These categories are your classes. Think of three classes and list them on the diagram below:

Kingdom: _____

Phylum: _____

- Class _____
- Class _____
- Class _____

4. Now you are going to repeat this until you get to species. After class comes order (remember your sentence!), so choose one class from above, list in on the line below and create three orders to go underneath it. Just keep thinking about how you could narrow that group of things even more. Remember to look at the example at the end of this section if you get stuck. List the kingdom and phylum, too, so you can keep track.

Kingdom: _____

Phylum: _____

Class: _____

- Order _____
- Order _____
- Order _____

5. You only have a few levels to go! After order comes family, so choose one of your orders from above and do the same thing you've been doing. Break it down into smaller categories.

Kingdom: _____

Phylum: _____

Class: _____

Order: _____

- Family _____
- Family _____
- Family _____

6. You only have two levels left! You are almost to a single item! Wow! Choose one family from your list above and then break it down into three smaller groups. Remember that the next level will be an individual item, so be sure to make the genera (that's plural for more than one genus) very narrow.

Kingdom: _____

Phylum: _____

Class: _____

Order: _____

Family: _____

- Genus _____
- Genus _____
- Genus _____

7. You are at the last step! You are down to individual items! Choose a genus from your list above, and name three different species, or items, within that genus.

Kingdom: _____

Phylum: _____

Class: _____

Order: _____

Family: _____

Genus: _____

- Species _____
- Species _____
- Species _____

8. Now choose one of your species listed above and list its entire scientific classification from kingdom on down:

Kingdom: _____ **Family:** _____

Phylum: _____ **Genus:** _____

Class: _____ **Species:** _____

Order: _____

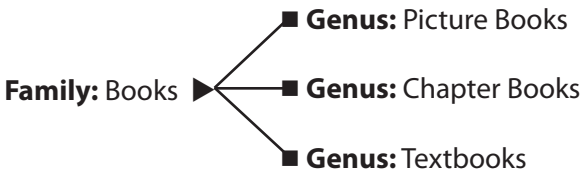
Examples

Look here for ideas if you get confused. There is an example of how to break things down into smaller categories, and then there is an example of a scientific classification for an item. So that you don't get stuck trying to copy the example, we've used a school instead of a house for the example.

Do you see how the groups get smaller and smaller, ending in a single item? That is what you are trying to do.

Kingdom: Classroom
Phylum: Students' Supplies
Class: Language Arts
Order: Reading Center
Family: Books
Genus: Chapter Books
Species: "Tales of a Fourth Grade Nothing"

Here is an example of how one level could be broken down into several smaller categories. We'll use the level family from above for our example. Notice how each genus is a smaller part of the family of Books.



Lesson 6: Create and classify your own animal

Imagine that you are a biologist studying animals in the wild. One day, while lying in your viewing spot, you see an animal you have never seen before. You rush back to your tent and look through your encyclopedia of animals, growing more and more excited as you realize that you have discovered a new species! As the discoverer of this new species, you get the honor of naming it. Of course, being a fantastic scientist, you will follow the classification system in place. That means that the only part of the animal's name you will make up yourself is the actual species name.

You go back to animaldiversity.ummz.umich.edu/site/index.html to find the closest animal you can find to the one you discovered. For example, if the animal you have discovered looks a lot like a panther, look up "panther" on the website.

So get a clear picture of your animal in your mind. Is it a mammal? a fish? a bird? This works best if you create an animal that is similar to your favorite animal you chose earlier, but yet slightly different. Draw a picture of your new animal here:

List the animal's classification below. Remember, its classification should be the same as the animal you found that is almost the same as this one. The only difference will be the species.

Look at several other species within the genus so that you can think of something that makes your animal slightly different than any other species in the genus. For example, it could be a different color or eat something different or live on a different continent.

What is your species' distinguishing characteristic? _____

Kingdom: _____ **Family:** _____

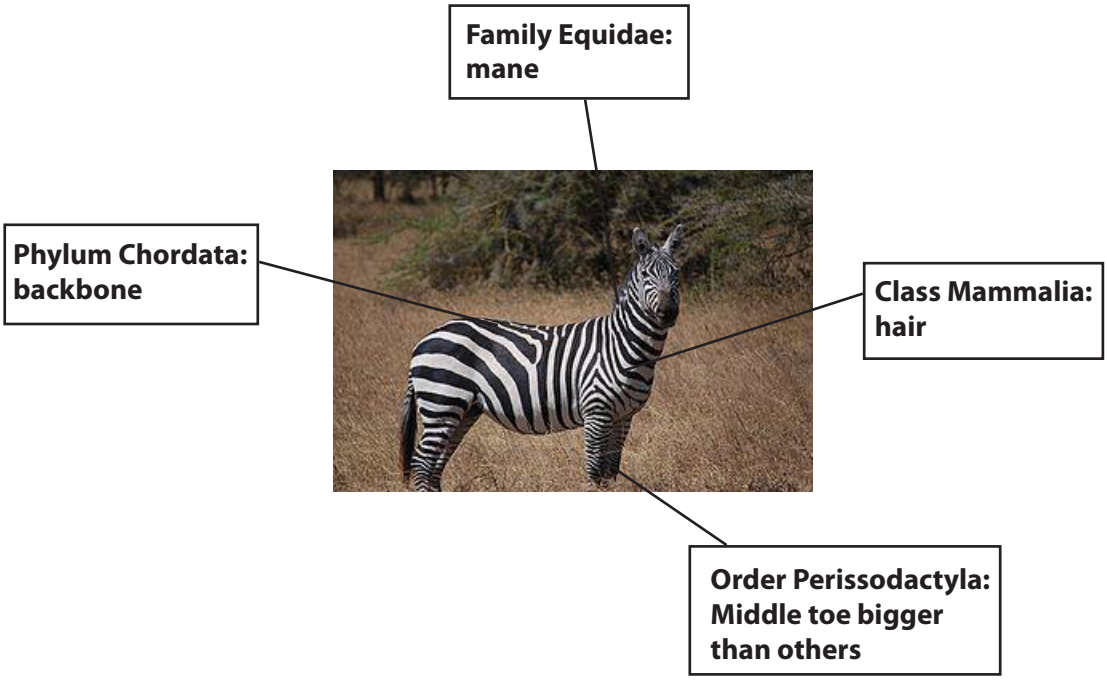
Phylum: _____ **Genus:** _____

Class: _____ **Species:** _____

Order: _____

After you have classified your animal, including creating a species name, go back and label your picture with one thing from each level that is unique to that classification. For example, if your animal is in Phylum Chordata, draw a line to the animal's backbone and write, "Phylum Chordata – backbone." Do this for at least four levels. Look back to the Animal Diversity website you used before to search each of those levels. It will tell you what characteristics are typical of that classification. You may also use an encyclopedia to help you.

See the example below.



Extension

Books on Animals

Because animals nearly universally interest children, there are myriad books on them geared to young readers. Included here are a few high-quality volumes that are distinguished due to quality of illustration, comprehensiveness of material, interest to gifted learners or classic nature.

Nonfiction:

- *Animal: The Definitive Visual Guide to the World's Wildlife* by David Burnie
- *National Geographic Encyclopedia of Animals* by Karen McGhee
- *The Encyclopedia of Animals: A Complete Visual Guide* by George McKay
- *A Life in the Wild: George Schaller's Struggle to Save the Last Great Beasts* by Pamela Turner

Fiction:

- *Mr. Popper's Penguins* by Richard Atwater
- The *Dr. Dolittle* series by Hugh Lofting
- *Charlotte's Web*, *Stuart Little* and *Trumpet of the Swan* by E.B. White

Online Information

- Strong readers may like these articles on issues in biodiversity: actionbioscience.org/biodiversity/index.html
- For students intrigued by these Latin names, check out capewest.ca/pron.html, which explains Latin pronunciation:

Assessment

Answers to Lesson 3: Using what you've learned

1. Why do you think we left "Kingdom" off of the chart? What kingdom does each of these animals belong to? Kingdom was left off because all animals belong to Kingdom Animalia.

2. Look at the class of the Chilean flamingo. All birds belong to that class. Do you see why we call things to do with airplanes "aviation?" Using that same idea, and looking at the order of the blue whale, can you make up a word that means "as big as a whale?" Answers will vary, but should include at least the root of "cetacean."

3. Do you agree or disagree with this statement? If two animals are the same genus, then they must also be the same family, order, class, phylum and kingdom. Why did you make that choice? Answers will vary, but the correct answer is "Agree." The classification system is top down, so if the animal is the same as another at a lower level, they must be in the same higher levels.

4. Why do you think that we had to be more specific about the animals in this chart? Why can't we just put "bear?" Why did we have to say "grizzly bear?" Again, answers will vary, but the key idea is that there is more than one species of bear.

5. Whales actually have suborders depending on whether they have teeth or baleen. Think about the name of the kind of doctor who puts braces on people's teeth. Now think about the name of the whale suborder Odontoceti. Do you think these are whales with teeth or whales with baleen?
Suborder Odontoceti are whales with teeth.

6. The family that horses belong to, Perissodactyla, means "odd toed." Think about what a horse's hoof looks like. Can you think of any other animals not on this chart that might belong to that family?
There are many possible answers, including zebras and rhinos. For more information on this order, check out animaldiversity.ummz.umich.edu/site/accounts/information/Perissodactyla.html

7. Write the scientific names of the cow, the flamingo and the whale.
Cow: Bos taurus
Chilean flamingo: Phoenicopterus chilensis
Blue whale: Balaenoptera musculus

Answers to Lesson 4: Working with your favorite animal

The correct classification will depend upon the animal chosen. Use either
http://animaldiversity.ummz.umich.edu/site/index.html
or any encyclopedia to verify that the student has chosen the correct classification.

Rubric for Lesson 5: Classifying your house

_____ / 20 Completed all levels

_____ / 20 System makes sense (higher points should be given if system is obviously reasonable and clear, or if student can explain a less obvious classification system that demonstrates expanded thinking)

_____ / 10 Levels are progressively narrower

_____ / 10 Species is a single, distinguishable item

_____ **/ 60 Total**

Rubric for Lesson 6: Creating your own animal

_____ / 20 Correct classification

_____ / 10 Distinguishing characteristic of new species

_____ / 10 Picture demonstrates care and appropriate skill level (clear lines, appropriately drawn for ability)

_____ / 20 Picture is labeled with at least four levels

_____ / 10 Labels reflect understanding of classification

_____ **/ 70 Total**