animals they study, how certain animals fly, where animals live, and that some animals go extinct. That's what I'm going to cover in this lesson.

Classification

Scientists who study animals are called **zoologists** (zoh awl' uh jists). They have a tough job, because there are a *lot* of animals in creation. In order to help them organize all of these animals, scientists put them into several groups based on how similar the animals are to one another. After they put animals in groups, they then name each animal. Do you remember one of the jobs that God gave Adam in the Garden of Eden? Adam had to name all the animals. Even today, people are still doing what Adam did. Whenever a new animal is discovered, it is put into several groups and then named. This process is called **taxonomy** (taks ahn' uh mee), and it is used to group and name all living things. The names they choose are not English "common" names, but Latin scientific names.

When scientists learn of a newly-discovered animal (there are new animals discovered every year, especially in the insect world), they study it to see how to classify, or group, it. If it has all the features of a butterfly, for example, it is put into the butterfly group, which is called **Lepidoptera** (lep uh dahp' tur uh). That's Latin for "scale wings." It gets even more specific than that, however. If it has tiny front legs, it's put in a special group of butterflies with tiny front legs. Then, if it also has orange coloration, it's placed with other butterflies having tiny front legs and similar colors. On and on it goes, so that the animal is put in smaller and smaller groups until all the butterflies in a group look almost exactly alike. That group is called a **species**, and it is the most specific grouping used when scientists classify animals.

Are you wondering why scientists do all of this grouping? There are many reasons, but one is because when you have animals divided into groups, it is easier to learn about them. If one species of butterfly lays eggs on a certain plant, maybe other similar species lay eggs on a similar plant. If you wanted to attract a certain species of butterfly, you would want to know what kind of food it eats. You might learn what food it eats by studying similar butterflies that are in the same group. In other words, it's easier to study animals when they are divided into groups based on their similarities. Since zoologists spend a lot of time classifying animals into groups, we need to learn about how they do this.

All animals are first put into one big group called the **Animal Kingdom**, or **Kingdom Animalia** (an' uh mahl' ee uh) in Latin. Then, each animal in the Animal Kingdom group is put into a smaller group, called a **phylum** (fye' lum), with other similar animals. That group is then given a scientific name. For example, all animals in the Animal Kingdom with a backbone (also called a "spine") are separated and placed into phylum **Chordata** (kor dah' tuh). Do you have a spine? Yes, you do. You can feel it if you run your fingers over the middle of your back. This means you are in phylum Chordata along with all creatures that have a spine. The easy way to remember this phylum name, Chordata, is to remember that inside of the spine is a special cord of nerves. That nerve cord is

so important that if you were to injure it badly, you might never be able to move your arms and legs. No wonder God put it inside the bones in your spine. That cord really must be protected!

Animals that have backbones are often called **vertebrates** (vur' tuh brayts), and animals without backbones (like insects) are called **invertebrates** (in vur' tuh brates). It turns out that there are *a lot* more invertebrates than vertebrates in the Animal Kingdom. Because of this, all vertebrates can be fit into one phylum, but there are so many invertebrates that they must be put in several phyla (plural of phylum). Look at the diagram below. **Arthropoda** (are thruh' pah duh) is one phylum of animals that don't have a backbone. Crabs, lobsters, spiders, and insects are in this phylum. Another phylum that contains animals without a backbone is phylum **Annelida** (an uh lee' duh). Earthworms are put in this phylum. There are other phyla of invertebrates, but I don't want to go into them now.
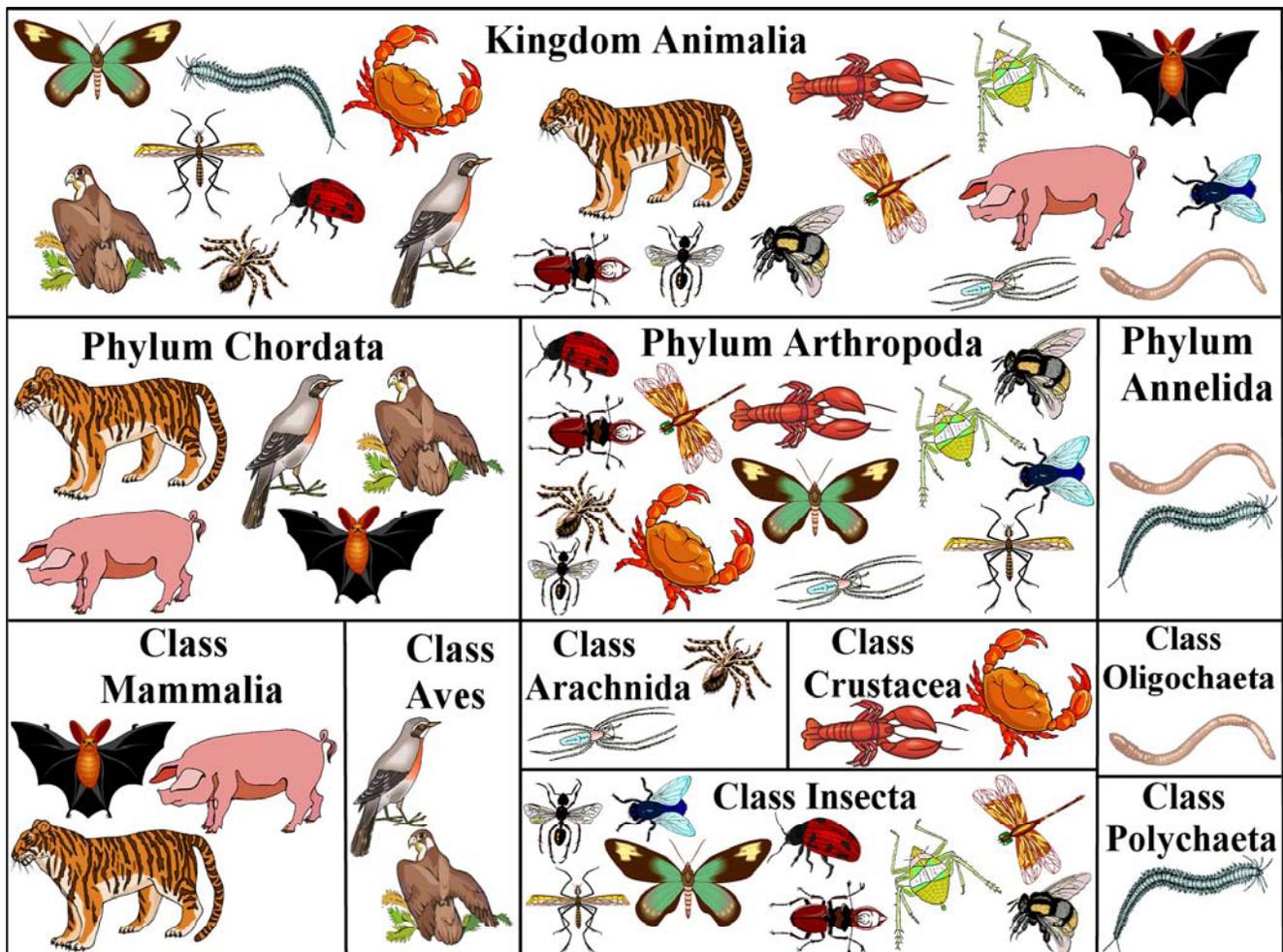
This drawing illustrates part of the process of classification. The creatures in the top box are all in the Animal Kingdom. They are then grouped into phyla based on their similarities. Then, they are grouped into classes. This is only a partial illustration, as there are many more groups, ending in species, which is the smallest of all the groups.

After being divided into phyla, the animals in each phylum are further divided into groups called **classes**. For example, birds are put in their own class, called **Aves** (aye' veez). Animals that have fur, give birth to babies, and nurse their babies with mother's milk are put into a class called

Mammalia (muh mail' ee uh). Each class is further divided into **orders**, so birds in class Aves are divided into orders based on the special characteristics of each bird. Birds of prey that have a hooked beak, like falcons, are in the order Falconiformes (fal' kuhn uh for' meez); birds that sing are in the order Passeriformes (pass' er uh for' meez); and birds that look like pelicans are in the order Pelecaniformes (pel ih kahn' uh for' meez).

Of course, this happens with all phyla. The creatures in phylum Arthropoda, for example, are further divided into classes like **Insecta** (arthropods with similar features, such as six legs) or **Arachnida** (uh rak' nih duh – arthropods with similar features, such as eight legs). These classes are also further broken down into orders. Can you believe that we are not done yet?

Scientists divide the animals in each order into groups called **families**. For example, in order Falconiformes, we have hawks, eagles, falcons, and other birds of prey.   Well, hawks and eagles are in one family because they are pretty similar, while falcons are put in another family. After animals are divided into families, they are then each put in a group called a **genus** (jee' nus). Hawks and eagles are in the same family, but they are each put into their own genus.

Finally, scientists divide the animals in a genus into different **species**. For example, the picture to the right shows two falcons. Because they are so similar, they both belong in genus *Falco*. However, they are not similar enough to be in the same species. As a result, they each belong to separate species. The important thing to remember about animals in the same species is that a male and female from the same species can mate and have babies. Even though the two falcons in the picture have a lot of things in common, they cannot mate with one another, so they belong in different species.

These two birds are very similar and therefore belong to the same genus (Falco). However, they cannot mate and have babies, so they belong to different species.

Latin

You might have noticed that the names for many of the classification groups are long and hard to pronounce. That's because a lot of them come from a language called Latin. Why do scientists use Latin? Well, Latin is a language that no one speaks but many people learn. Therefore, it never changes. English, on the other hand, changes all the time. Several years ago, the word "cool" was only used to describe the temperature. Now, "cool" also means "neat," or "great." The word "neat" once meant "tidy and clean." Now the word "neat" also means "great."

Latin is helpful to scientists because the Latin words they use to name things do not change. So scientists all over the world can work together to try to understand nature even though the scientists may not all speak the same language. For example, a butterfly that we call the "mourning cloak" is called the "Camberwell beauty" in England, and in Germany it is called the "trauermantel." Its scientific name, however, is *Nymphalis antiopa* (nihm' fuh lus an tee oh' puh). Since this name comes from Latin, it doesn't change from country to country. Scientists from every country will know what butterfly is being discussed if it is called by its scientific name.

Binomial Nomenclature

Did you notice that the butterfly I talked about had two names? It turns out that all animals have two names, because when a scientist talks about an animal, he uses the animal's genus and species to name it. This helps scientists know the classification, because by just seeing an animal's name, you know what genus and species it is in. The butterfly I was talking about above, then, is in genus *Nymphalis* and species *antiopa*. Notice that its name is written in italics and that the genus name is capitalized but the species name is not. This is the way all scientists write the scientific names of animals. This two-name system is called **binomial nomenclature** (bye no' mee ul no' mun klay chur).

Try This!

To help you remember the system of classification that scientists use, you can remember this sentence: "**K**ings **P**lay **C**hess **O**n **F**ine **G**lass **S**ets." That's a mnemonic (nih mahn' ik) phrase. It helps you remember the order of classification groups because the first letter in each word is the same as the first letter of each classification group from the largest to the smallest: **K**ingdom, **P**hylum, **C**lass, **O**rder, **F**amily, **G**enus, and **S**pecies.

Can you make your own mnemonic phrase to help you remember the order of the classification system? You will want to make a sentence that makes sense to you and will be easy to remember. The sentence must have seven words that start with the letters given in the diagram below:

Kingdom	Phylum	Class	Order	Family	Genus	Species
K	P	C	O	F	G	S

If you have an animal field guide (or a set of encyclopedias), look up some animals that you already know. Look at the Latin name for each animal and try to pronounce it. Notice that it is written in italics and that the first word (the genus) is capitalized but the second word (the species) is not.

Explain what you have learned about taxonomy and binomial nomenclature.