



## Everything In Its Place

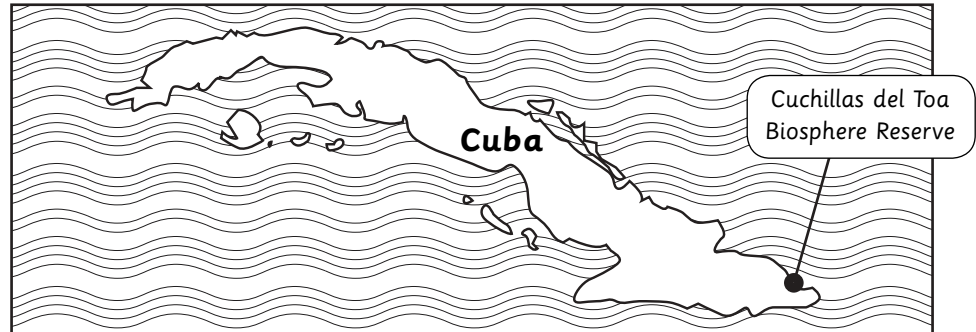
When you got dressed this morning, chances are that your clothes weren't all jumbled together in your closet. You probably keep them organized into groups: pants hanging in one area, shirts in another, sweaters on a shelf, and shoes on the floor. Getting dressed is much easier when your clothes are sorted like this.

**Conservationists** and biologists also group similar things to help them in their work. They call this classification, and it helps them to focus their thinking and to understand connections between living things.

For example, WWF is working to conserve many natural environments around the world. Protecting all of these different areas is an enormous task, so WWF classifies them by ecoregion. An ecoregion is a large area characterized by similar climate, habitats, species, and **ecological processes**. There are three main types: **terrestrial** ecoregions are areas on land, marine ecoregions are those in the ocean, and freshwater ecoregions are lakes and rivers. Although every natural environment is unique, those classified in the same ecoregion type share certain characteristics. For example, a desert ecoregion in the United States shares similar characteristics with a desert in China. Organizing them in this way helps WWF work more effectively.

When dealing with a large number of items, it's usually not enough to simply classify them into a few broad categories. WWF has named more than 825 terrestrial ecoregions, so it must divide these into specific types of habitats, including forests, grasslands, and deserts. The forests are divided into even more specific groupings. That's because forests in **tropical** regions, such as those in the Cuchillas del Toa Biosphere Reserve in Cuba, are quite different from those in northern countries such as Canada.

**Canon**



The forests of Cuchillas del Toa are called moist broadleaf forests because they receive a good deal of rainfall and feature many **deciduous** trees. This type of forest supports the widest variety of life on Earth: towering trees, mosses and ferns, orchids and other wildflowers, as well as countless reptiles, mammals, birds and insects. Further north, the huge band of forest that extends across northern Canada is a boreal forest (boreal means “northern”). These feature mostly **coniferous** trees, such as pine and spruce. They also support many animal species, but not as many as moist broadleaf forests. It’s equally important to protect both types of forest, and conservationists are careful to treat each of these forests and their needs differently when drawing up their plans.

Just like conservationists, biologists use classification to organize all the living things they study. Again, they start with a small number of broad categories and then divide these into smaller groups.

Biologists first classify all life into three domains: Bacteria, Archaea, and Eukarya. Bacteria and Archaea include mostly microscopic **organisms** too small to see without a microscope. The Eukarya domain is divided into four kingdoms: Plantae (plants), Animalia (animals), Fungi, and Protista (protists). Fungi are organisms such as moulds and mushrooms that resemble plants, but do not make their own food by photosynthesis. Protists are small, simple organisms like algae.

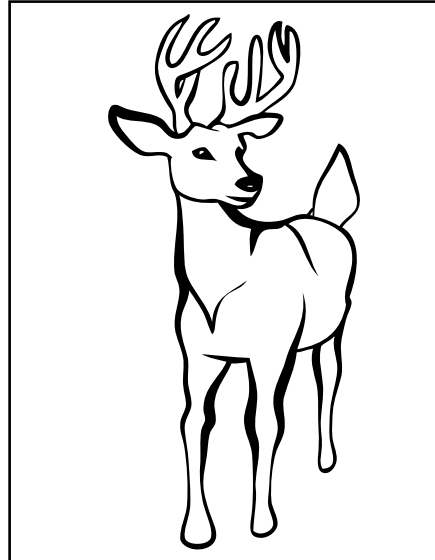


To see how biologists classify living things into smaller groups, let's look at a species commonly found in the Canadian boreal forest: the white-tailed deer. Obviously, this organism is part of the kingdom Animalia (Latin for animals). The next step is placing the animal in a category called a phylum – in this case, the phylum Chordata. This grouping includes all the vertebrates, which are animals with a spinal column, or backbone. Vertebrates that are **endothermic** (often referred to as warm-blooded) belong in the class Mammalia (mammal). Most animals in this class give birth to live young that are nursed by their mothers. Plant-eating mammals with even numbers of toes on their hooves make up the order Artiodactyla. Deer, caribou, and moose are all in the family Cervidae. Animals that are very closely related – such as horses and zebras – are placed together in the same genus. Finally, each animal is assigned a unique species name. Scientists usually identify a living thing by its genus and species. If you look in a field guide, the white-tailed deer will be listed both by its common name and its scientific name: *Odocoileus virginianus*.

### **Writing Scientific Names**

When writing scientific names, we always follow special rules. This is called binomial nomenclature. Here are a few of the key rules:

- Always capitalize the first letter when writing the name of a domain, kingdom, class, order, and family. Example: Chordata
- Always write genus and species in italics (or underline if handwriting). Example: *Homo sapiens*
- Always capitalize genus names. Example: *Homo sapiens*
- Always use lowercase for species names. Example: *Homo sapiens*



### **White-tailed Deer**

(*Odocoileus virginianus*)

Domain: Eukarya

Kingdom: Animalia

Phylum: Chordata

Class: Mammalia

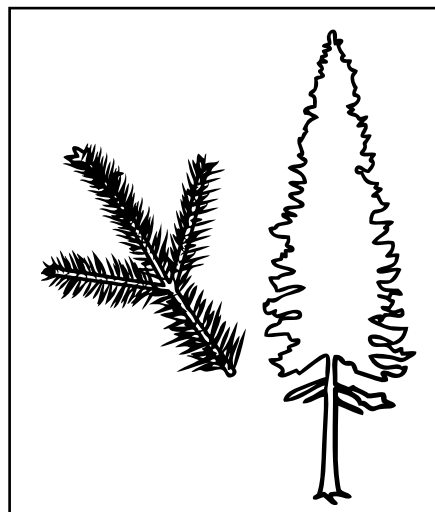
Order: Artiodactyla

Family: Cervidae

Genus: *Odocoileus*

Species: *virginianus*

Plants are organized in a similar way. One of the most common trees in the boreal forest is the coniferous balsam fir. It is classified in the division (plant equivalent to phylum) Pinophyta and the class Pinopsida, which include all the cone-bearing evergreen trees. It's then grouped in the order Pinales and the family Pinaceae with all the pines, spruces and firs. All species of fir are in the genus *Abies*, but only the balsam fir is *Abies balsamea*.



### **Balsam Fir** (*Abies balsamea*)

Domain: Eukarya

Kingdom: Plantae

Division: Pinophyta

Class: Pinopsida

Order: Pinales

Family: Pinaceae

Genus: *Abies*

Species: *balsamea*

When **botanists** classify trees, they look at several **characteristics**. For example, some trees have broad leaves, while others have needles. Some bear fruit, while others have cones. A tree's bark may be



thick and tough, or it may be thin and papery. These characteristics can help botanists determine whether different tree species have the same distant relative, known as an **ancestor**.

Biologists have already classified approximately 1.5 to 1.8 million species to date. However experts estimate there are five to 30 million species on Earth, with new ones being discovered all the time. That's a big job – something to remember the next time you're asked to sort out the clothes in your closet.

**Canon**



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## Glossary

**conservationist:** a person who works to protect nature.

**ecological processes:** interactions between both living and non-living things that are necessary to sustain an ecosystem. For instance: the water cycle's effect on climate, or how flowers rely on insects to spread pollen.

**terrestrial:** relating to land.

**tropical:** located near the Earth's equator, with a climate that is usually warm year-round.

**deciduous:** a variety of tree (such as oak and maple) with broad leaves that usually drop off in autumn.

**coniferous:** a variety of tree (such as pine and spruce) with needle-like leaves that usually remain green year-round.

**organism:** any type of living thing.

**endothermic:** a system that absorbs energy in the form of heat from its surroundings. In Greek, "endo" means inside and "thermic" means heat.

**botanist:** a biologist who studies plant life.

**characteristic:** something that makes one thing different from others, such as size, shape or structure.

**ancestor:** a distant relative, that is biologically related to the species or individual.