

# Classification of Vertebrates

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Grade Level: Middle School

## Overview

This lesson works well as an introduction to the topic of classification or as a mid-unit assessment activity. Students brainstorm a list of animals and then categorize them by classes of vertebrates. Students are introduced to (or review) the characteristics of fish, amphibians, reptiles, birds and mammals.

## Objectives

Upon completion of this activity, students will be able to:

- Describe the difference between vertebrate and invertebrate animals.
- Describe the characteristics of fish, amphibians, reptiles, birds and mammals.
- Identify which vertebrates are warm-blooded (endothermic) and which are cold-blooded (ectothermic).

## Important Words

- Vertebrate
- Invertebrate
- Endothermic
- Ectothermic
- Taxonomy

## Materials

Handout entitled **Classification of Vertebrates**, paper, pencils, colored pencils or crayons, chart to show color coding (blue=fish, green=reptiles, purple=amphibians, red=birds, orange=mammals), handout on characteristics of vertebrates.

## Time Needed

30 minutes

## Teacher Preparation

1. Gather materials.
2. Create color-coding charts for use by students or make a large poster for the front of the room.

## Background Information

Scientists classify animals using a Linnean system of taxonomy, where animals with similar characteristics are grouped together. The order of classification, from most broad to most specific,

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is Kingdom, Phylum, Class, Order, Family, Genus and Species. (A mnemonic device that can be used to remember this order is King Philip Came Over For Good Spaghetti.) Animals belong to the animal kingdom. They are then split into two phyla (vertebrates and invertebrates). There are five classes of vertebrates (fish, amphibians, reptiles, birds and mammals).

One of the characteristics used to group animals into the five classes is the way they regulate their body temperature. Fish, amphibians and reptiles are cold-blooded or ectothermic. This means that their body temperature is controlled by the temperature of the environment since they can't regulate it internally. Birds and mammals are endothermic. They regulate their own body temperatures which stay fairly constant regardless of outside temperature.

## Activity 1: Brainstorming

10 minutes

1. Give each student a blank sheet of 8"x11" paper and a pencil or pen. Tell them to fold the sheet of paper in half vertically.
2. Tell students they will have two minutes to brainstorm and write down all the animals they can think of. Tell them they can be both general and specific. (For instance, they can write bug, and then write kinds of bugs, i.e. ladybugs, millipedes, etc.) NOTE: Students who have difficulty writing quickly can be teamed up with another person. Students who want an extra challenge can make an alphabetical list.
3. When two minutes have passed, ask them if they want one more minute. If yes, give them one more minute to work. If not, move on.
4. Let students count how many animal types they wrote down and ask them to share this information. Ask them to share animals they wrote down that they think others may not have written down.

## Activity 2: Classification

15 minutes

1. Tell students they are now going to classify these animals. Give out colored pencils or crayons. Tell them to look at the color-coding chart hanging at the front. Circle or underline each animal based on the type of animal it is. Tell students we will go over characteristics of each AFTER this activity. If they don't know what type of animal something they wrote down is, tell them to put a checkmark next to it and they can go back to it later. Encourage them to discuss among themselves what an animal might be if they don't know. Circulate around the class clarifying misconceptions, i.e. a jellyfish isn't a fish.
2. When they have finished, ask them about their lists, such as:
  - a. Do you have more of one type of animal than another?
  - b. What about the animals that you didn't circle? (These will probably be invertebrates. Mention that invertebrates make up 99% of all animal species, but often make up very little of someone's brainstormed list)
  - c. What else do you notice about your lists?
  - d. What questions do you have? Were there animals for which you couldn't decide on their class?
  - e. Which animals are endothermic and which are ectothermic? Review these terms.
3. Hand out sheet entitled **Classification of Vertebrates**. Have students look over their list in comparison with this sheet. They might remember cold-blooded and warm-blooded animals because they used "cold" colors for those animals and "warm" colors for the warm-blooded animals.
4. Review vocabulary.

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## Conclusion

5 minutes

1. Ask students for any final observations.
2. Make a list of questions that students ask about the different classes and encourage them to look up the answers in books or on the internet.
3. Tell students that this is an activity they can do on their own to test and challenge themselves. Can they list more invertebrates the next time, or a more evenly-distributed list among the classes of vertebrates?