

TABLE OF CONTENTS

Lessons

Vertebrates and Invertebrates	2
Warm Blooded and Cold Blooded Animals	12
Mammals and Reptiles	22
Fish and Amphibians	32
Carnivores, Herbivores, and Omnivores	42
Types of Birds.....	52
Camouflage.....	62
Review	70
Glossary	76
Activity Answers	78

Important Information!

Science Mind Bender® books teach young students important scientific terms and problem-solving skills using interesting animals. Most of these scientific terms are taught at a much older age, so these lessons and activities are designed for use with a parent or teacher—they are not designed for independent student work. This is also a book that most students will enjoy, but find challenging. For these reasons, many students are open to working through the book more than once.

Students working through these activities will often become curious about the interesting animals in the pictures. This is a great opportunity to introduce some research skills, so students learn how easy it is to find answers to their questions.

Before beginning the first lesson, it is important to work students through the practice problem, so they learn the importance of marking false answers in the Mind Bender® activities. Students who do not mark the false answers will find the Mind Benders® much more challenging.

Vertebrates and Invertebrates

Touch your elbow and your knee. Feel those hard things? Those are your bones! Feel the bones down the middle of your back. Those back bones are called your spine, or **vertebrae**. You are a vertebrate!

A **vertebrate** is an animal that has a backbone inside its body.



Point to the skeleton of the dog, fish, bird, snake, turtle, and human.

An **invertebrate** is an animal that has no backbone. It can have a soft body...



Or, it can have a hard, outer shell called an **exoskeleton** that protects its inner body.



Can you name two invertebrates with soft bodies? Can you name two invertebrates with exoskeletons?

Activity 1: Vertebrates and Invertebrates

1. What do you call an animal with a backbone inside its body?
2. Point to the animals that are vertebrates.



cats



insects



birds



lizards



shellfish



fish

3. What do you call an animal that has no backbone?
4. Point to the invertebrates with an exoskeleton.



insects



octopus



crabs



snails



spiders



jellyfish



worms



slugs



shellfish

5. Point to the invertebrates without an exoskeleton.

Activity 2: Vertebrates and Invertebrates

Directions: Fill in the chart using **X** for yes and **—** for no as you solve the puzzle.



fewer

many

most



	fewer	many	most
			
			
			

A ladybug, an octopus, and a sea turtle lay eggs. Find how many eggs each animal lays.

1. The invertebrate with 8 arms covered with suckers lays more eggs than the animal with a backbone inside of its a shell.
2. The animal with an exoskeleton has more legs than the vertebrate but lays fewer eggs.

Activity 3: Vertebrates and Invertebrates

Directions: Listen to the clues and match them to the animal they describe.



snail



tortoise



shrimp



centipede



elephant



rhinoceros

1. I hatch with my shell and it grows with me. My eyes are on the ends of my antenna. I am an invertebrate.
2. I have more than 10 legs. My exoskeleton is made of many segments. I can be found in moist soil.
3. I cover my skin in mud to cool off and avoid getting a sunburn. I am a vertebrate with a large backbone. I do not have horns on top of my head, but I do have tusks made of bone which help me to defend myself.

Activity 4: Vertebrates and Invertebrates

Directions: Listen to the clues and match them to the animal they describe. Then decide if the animal is a vertebrate or an invertebrate.



butterfly



crab



bird



beetle



fish



newt

1. exoskeleton, 3 body segments, 6 legs, hidden wings
2. lives in water, soft skin, long flexible tail
3. wings, long tail, 2 legs
4. no tail, lives in water, crawls sideways, exoskeleton

Interesting Animals in This Lesson



radiated tortoise

These land animals are found on the tropical island of Madagascar. Their name comes from the yellow stripes that “radiate” down their shell, like the sun’s rays. They spend their days grazing on grasses, fruits, and cacti. They have long lives and can live to be about as old as great-grandparents!



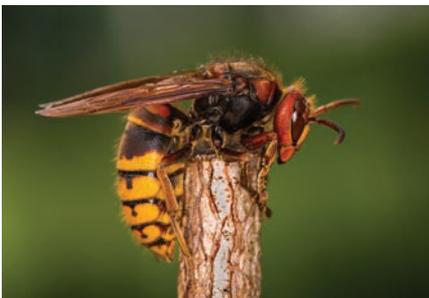
corn snake

These snakes can be found in the woods and meadows of the eastern U.S. Although they look similar to a more dangerous snake, corn snakes are not **venomous** (they don’t inject poison when they bite). They catch their prey by wrapping around and squeezing it. They are good at hiding and like to slither through underground tunnels.



ladybug

Ladybugs (or lady beetles) can be red, orange, yellow, pink, blue, or grey! They can even have different numbers of spots. Their different colors are to warn predators that they taste bad and are toxic. People like ladybugs because they help in gardens by eating other bugs that hurt plants.



European hornet

This type of large wasp is most likely to attack and sting you if you are within 6 feet of their nest which looks like a brown paper ball. They eat sugar from fruits and other insects (especially honey). Only the 1 queen is allowed to lay eggs which they keep safe inside their nest.



blue tang

These fish live in coral reefs in the ocean and clean algae off the coral, sea turtles, and other fish. By cleaning other animals, the tang helps them to stay healthy. Some tangs live in groups called schools, and others swim alone. They protect themselves with sharp spines along their backs.



Northern cardinal

Male cardinals are bright red, but the females’ brown color helps them to blend in with the tangled shrubs where they build their nests. They eat seeds, fruits, and insects. After their eggs hatch, both parents feed the chicks by giving them partly eaten food.

Review: Vertebrates and Invertebrates

Directions: Use a word from the choice box to describe each group.

Choice Box
 vertebrates
 exoskeleton
 animals
 invertebrates
 no exoskeleton

1. _____

2. _____

3. _____

4. _____

5. _____

Research Question:
 What is the largest invertebrate in the world?

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