

# Rattenborough's Guide to Animals

## Unit 2 Reader



Core Knowledge Language Arts® • Skills Strand



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GRADE 3





# Rattenborough's Guide to Animals

## Unit 2 Reader

Skills Strand

**GRADE 3**

Core Knowledge Language Arts®



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**Unit 2 Reader**

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# Introduction: Meet Rattenborough

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Greetings! Rattenborough, the famous explorer and **animal** expert here! Remember me? I taught you all about **animals** and **habitats** when you were just little kids in first grade. I've been busy since then traveling around the world. But, I'm back now to teach you everything I've learned about **animals** during my travels.

First, let's take a quick look at what you learned in first grade. Do you remember what a **habitat** is? A **habitat** is the place where **animals** and plants live. We learned that there are different **habitats** all over the world with different kinds of **animals** and plants living there.

We visited a desert **habitat** where it was very hot and dry. It hardly ever rains in a desert so the plants and **animals** that live there have to be able to get by with very little water. I bet you remember that cactus plants live in the desert, along with snakes and lizards.





*Rattenborough in two **habitats***

We also visited an African **savanna**. A **savanna** is also called a grassland. There were lots of interesting **animals** living there—zebras, elephants, and even lions! To be perfectly honest, I was always a little nervous while we were in the **savanna**!

Next, we checked out some different kinds of forests. We went to a hardwood forest full of trees with leaves that change color and drop off in the fall. We saw squirrels, deer, and even bears. We saw lots of different kinds of birds in those tall trees.

Then, we visited a tropical rainforest that was very hot, humid, and wet. There were lots of birds in this forest, too. These birds were colorful, tropical birds like toucans and parrots.



*Rattenborough in three **habitats***

Last, but not least, we visited freshwater and saltwater **habitats**. In the freshwater **habitat**, we saw fish, turtles, ducks, and beavers. In the saltwater **habitat** of the sea, we saw starfish, crabs, lobsters, and sharks!



*Rattenborough in two water **habitats***

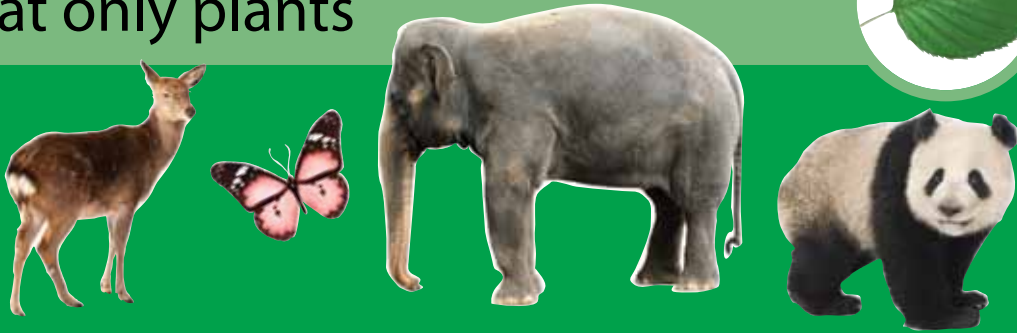
Besides learning about **habitats** in first grade, we also studied the different kinds of things that **animals** eat. Do you remember talking about **herbivores**, **carnivores**, and **omnivores**? We learned that you can sort **animals** by what they eat.

So, get ready because we are going to learn a lot more about how to sort **animals**. Rattenborough, your personal **animal** expert, at your service!

See you next time!

## HERBIVORES

Eat only plants



## OMNIVORES

Eat plants and meat



## CARNIVORES

Eat mainly meat



*Different animals eat different things.*

Chapter

1

# Classifying Living Things



Rattenborough here! Do you remember who I am? I'm here now to help you learn about how **scientists** sort, or **classify**, living things into groups. Since I am an expert on animals, we will focus mainly on animals.

First, I'm going to ask you two very important questions. How do you know if something is living or nonliving? What important **characteristics** do all living things have?

- All living things create energy from food.
- All living things can have babies or make other living things just like themselves.
- All living things have a **life cycle**. They start out small and then grow.
- All living things change to fit in better with their habitat.

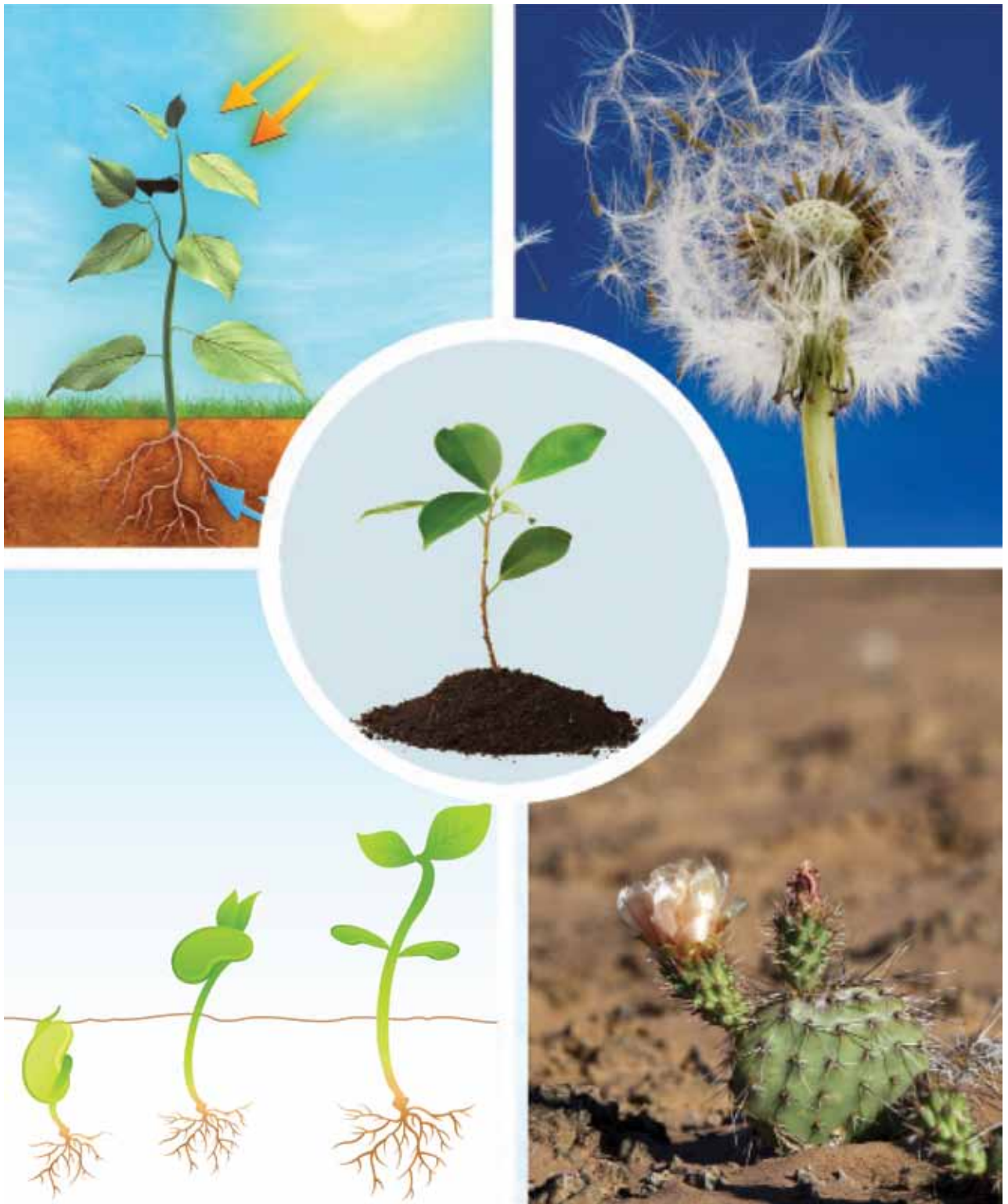




*All living things are **classified** by their **characteristics**.*

Plants make up one group of living things. We know this because plants have the same **characteristics** that all living things have.

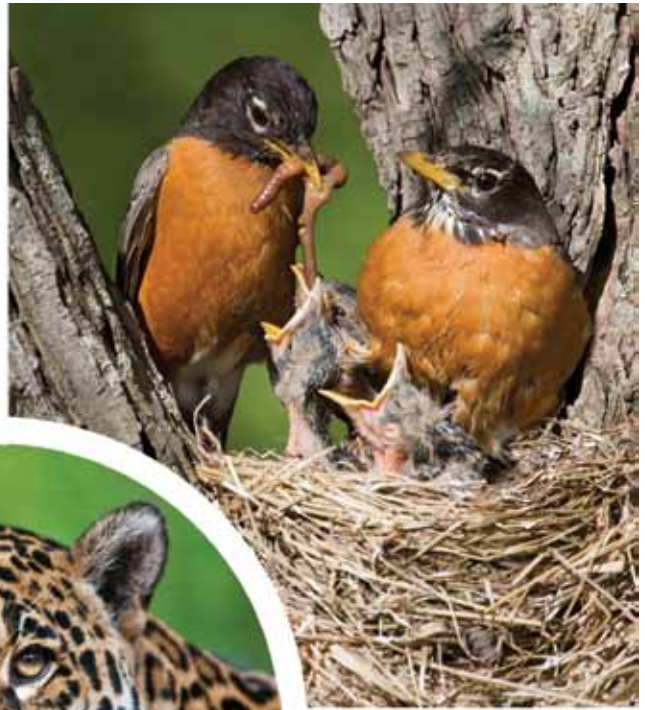
- Plants create energy from food. They make their own food using the sun, water, and gases in the air.
- Plants make seeds that become new plants.
- Plants grow from small seeds into seedlings and become **adult** plants.
- Plants can **adapt** to their habitat. For example, all plants need water, but a cactus in a dry desert does not need as much water as other plants.



*Plants have the **characteristics** that all living things have.*

Animals of all shapes and sizes are living things, too. So, animals also have the same **characteristics** that all living things have.

- Animals get energy from the food they eat.
- Animals can have babies.
- Baby animals are small but grow into **adult** animals.
- Animals can **adapt** to their habitat. For example, the fur of polar bears looks white so they can blend in with the snow where they live.

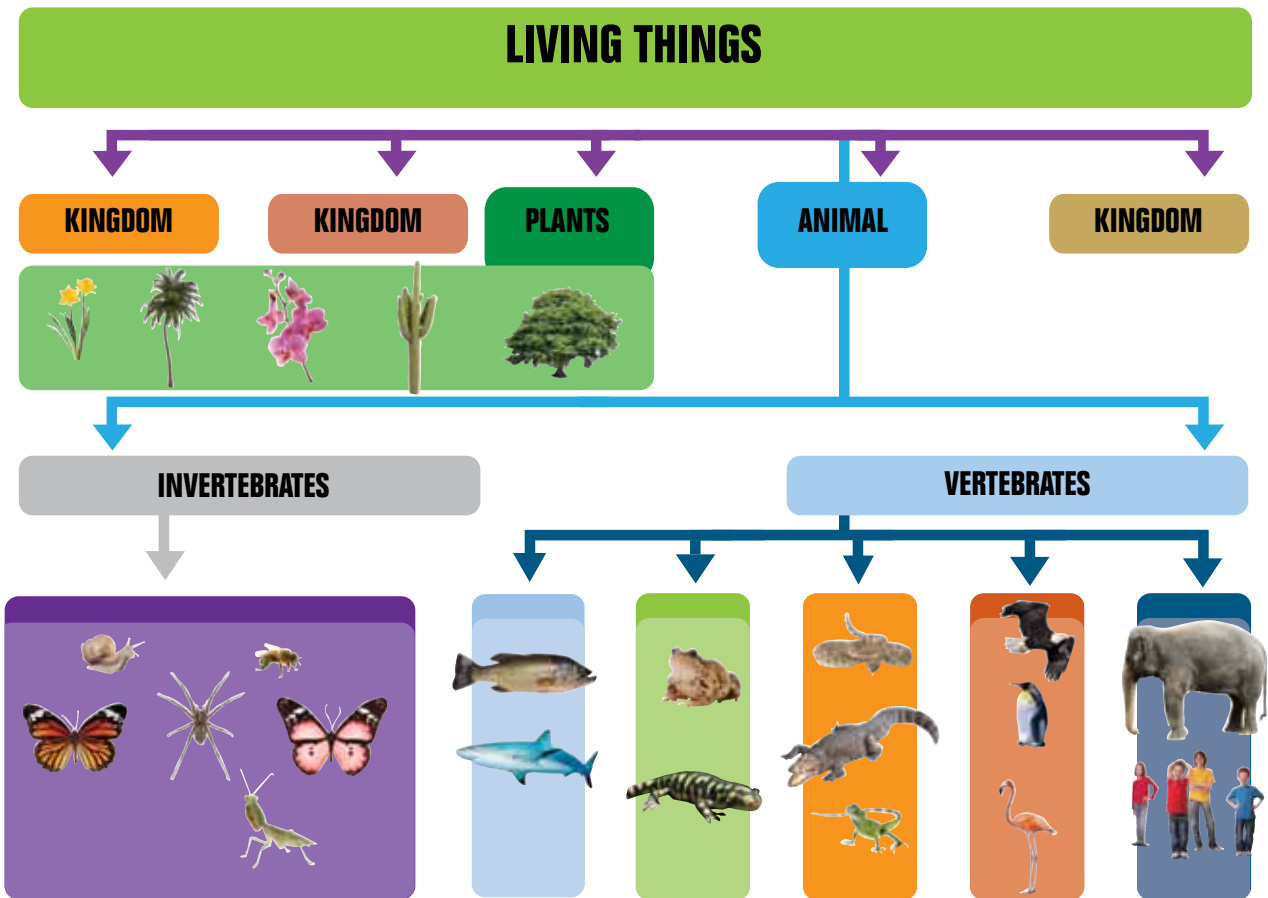


*Animals have the **characteristics** that all living things have.*

Plants and animals are both living things, but plants and animals are different in important ways. For example, animals move from place to place, but plants do not.

**Scientists** study how living things are alike and different and sort, or **classify**, them into large groups called **kingdoms**. There are five **kingdoms** of living things. You have just learned about two—the plant **kingdom** and the animal **kingdom**. (You will learn about the other **kingdoms** in later grades.) The living things in each **kingdom** can then be sorted into more specific groups.

**Scientists** study animals within the animal **kingdom** and **classify** them by the **characteristics** they share with other animals. One way **scientists classify** animals into more specific groups is by checking if an animal has a backbone. Insects do not have backbones, but birds and fish do. So, animals with a backbone are in different, more specific groups within the animal **kingdom**. Insects make up the largest group in the animal **kingdom**. But there are other large groups of animals, such as birds and fish. You will learn more about other major groups in future chapters.



*Scientists classify living things into five **kingdoms**. They classify animals into other groups by their **characteristics**.*

We **classify** the things around us so we can get to know our world better. As we learn about living things, we also learn about ourselves and our place in the world.

So far, **scientists** have **classified** over 1 million different kinds of animals. Most of these are insects! Many **scientists** think there may be close to 10 million other animals that still have not been **classified**!

That's all for now! Rattenborough, over and out! I'll be back in the next chapter to tell you more about how animals are **classified** into different groups.





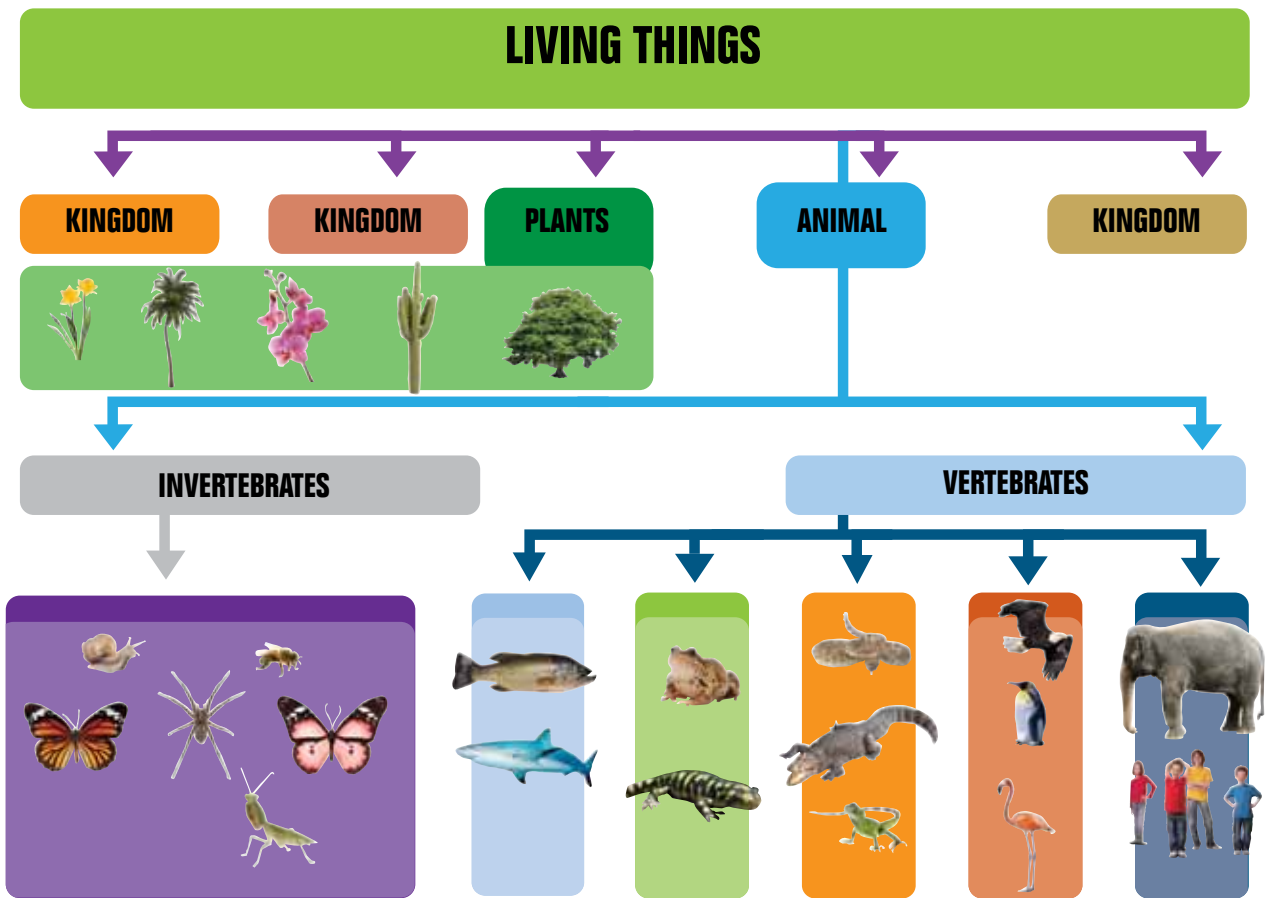
*Insects are the largest group of animals.*

# Chapter 2 Warm-Blooded and Cold-Blooded Animals



Rattenborough, here again! In the last chapter, you learned how scientists classify living things into groups called kingdoms. You learned about the animal and plant kingdoms. You also learned that animals and other living things are classified into more specific groups.

Today, you will learn more about the animal kingdom. You will learn that there are many kinds of animals that have different characteristics. Scientists study these different characteristics to divide the animal kingdom into more specific groups.



*Scientists classify living things by different characteristics.*

Many animals—such as cats, mice, rats, cows, elephants, tigers, and even people—belong to a group called **mammals**. So, you and I are **mammals**! All **mammals** have hair, but some have more hair, or fur, than others. You have to get pretty close to an elephant to see its hair, but it is a **mammal**.

Another characteristic of **mammals** is that they give birth to live babies. **Mammal** babies begin breathing, moving, and looking for food as soon as they are born. **Mammal** mothers make milk to feed their newborns. This is another key characteristic of all **mammals**.



*Mammal* mothers feed their babies milk from their bodies.

Do you think this **crocodile** is a **mammal**?

Answer: No!

Why not?

- **Crocodiles** have **scales**, not hair or fur.
- **Crocodiles** lay eggs and baby **crocodiles** hatch from those eggs.
- A baby **crocodile** does not get milk from its mother. Its first meal might be a bug. Later, he'll eat bigger animals.

**Crocodiles** belong to a different group of animals called **reptiles**, along with snakes, lizards, and turtles.



*Crocodiles, snakes, lizards, and turtles are all **reptiles**.*

Scientists also classify animals as **mammals** or **reptiles** based on how the animals control their body **temperature**. All animals need to keep a **constant temperature** inside their bodies for their bodies to work properly. If an animal gets too hot or too cold, its body will not work the way it should. An animal may become sick or even die.

**Mammals** are **warm-blooded** animals. When **warm-blooded** animals are in a cold place, they use energy from food they eat to help keep their bodies warm. Some **warm-blooded** animals shiver to keep warm. When they shiver, their bodies make heat to keep warm.





*When a person shivers, his/her body is using energy to keep him/her warm.*

When **warm-blooded** animals are somewhere hot, their bodies react in a different way to cool off. Some **warm-blooded** animals, like people, sweat to stay cool. Dogs pant to stay cool. Other **warm-blooded** animals drink lots of water as a way to cool off. Did you know that cows need to drink almost a bathtub full of water a day?

**Warm-blooded** animals act in different ways to maintain a **constant temperature** inside their bodies. **Mammals** can live in habitats with different **temperatures** because their bodies do not rely on the environment. **Warm-blooded** animals, like **mammals**, must eat often to make energy to heat or cool their bodies. Most **warm-blooded** animals need to eat every day. Some need to eat every hour!



*Dogs pant to stay cool.*

**Reptiles** are **cold-blooded** animals. The body temperature of **cold-blooded** animals changes depending on the outside **temperature**. They become hot when it is hot outside and cold when it is cold outside. But **cold-blooded** animals must also keep a **constant temperature** for their bodies to work properly.

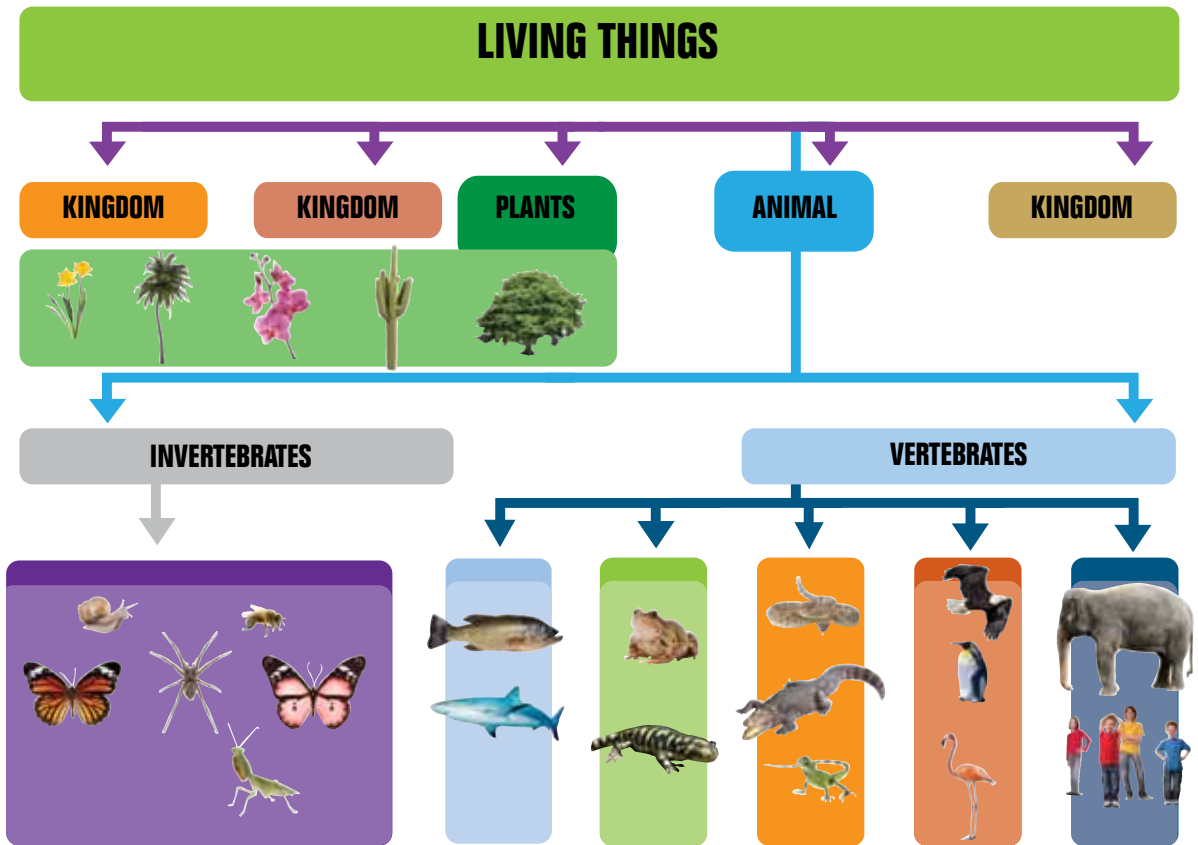
**Cold-blooded** animals do not use energy from their bodies to stay warm or cool. Instead they use what is around them to keep warm or keep cool. **Crocodiles** stay in water or mud in order to stay cool on hot days. If they need to warm up on cooler days, they bask in the sun.



*Cold-blooded* animals like these **crocodiles** cool off by taking a swim when it's too hot. When it's cool outside, they warm up in the sun.

While **warm-blooded** animals can live in just about any habitat, **cold-blooded** animals can only live in certain habitats.

**Cold-blooded** animals do not need to eat as often as **warm-blooded** animals. This is because they do not need lots of food to make energy to warm or cool their bodies. Most **crocodiles** only eat once a week, but they can live for months and sometimes years without eating!



*Reptiles* are one group of **cold-blooded** animals. What other animals are **cold-blooded**?  
*Mammals* are **warm-blooded** animals. What other animals are **warm-blooded**?

Chapter

# 3

## Vertebrate or Invertebrate?

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Rattenborough, here again! You have learned that scientists who study the animal kingdom classify animals into different groups, based on different characteristics. Some characteristics scientists study are:

- what makes up the animal's skin, such as hair or scales
- whether animals give birth to live babies or lay eggs
- whether mothers feed their babies milk from their own bodies
- whether animals are warm-blooded or cold-blooded

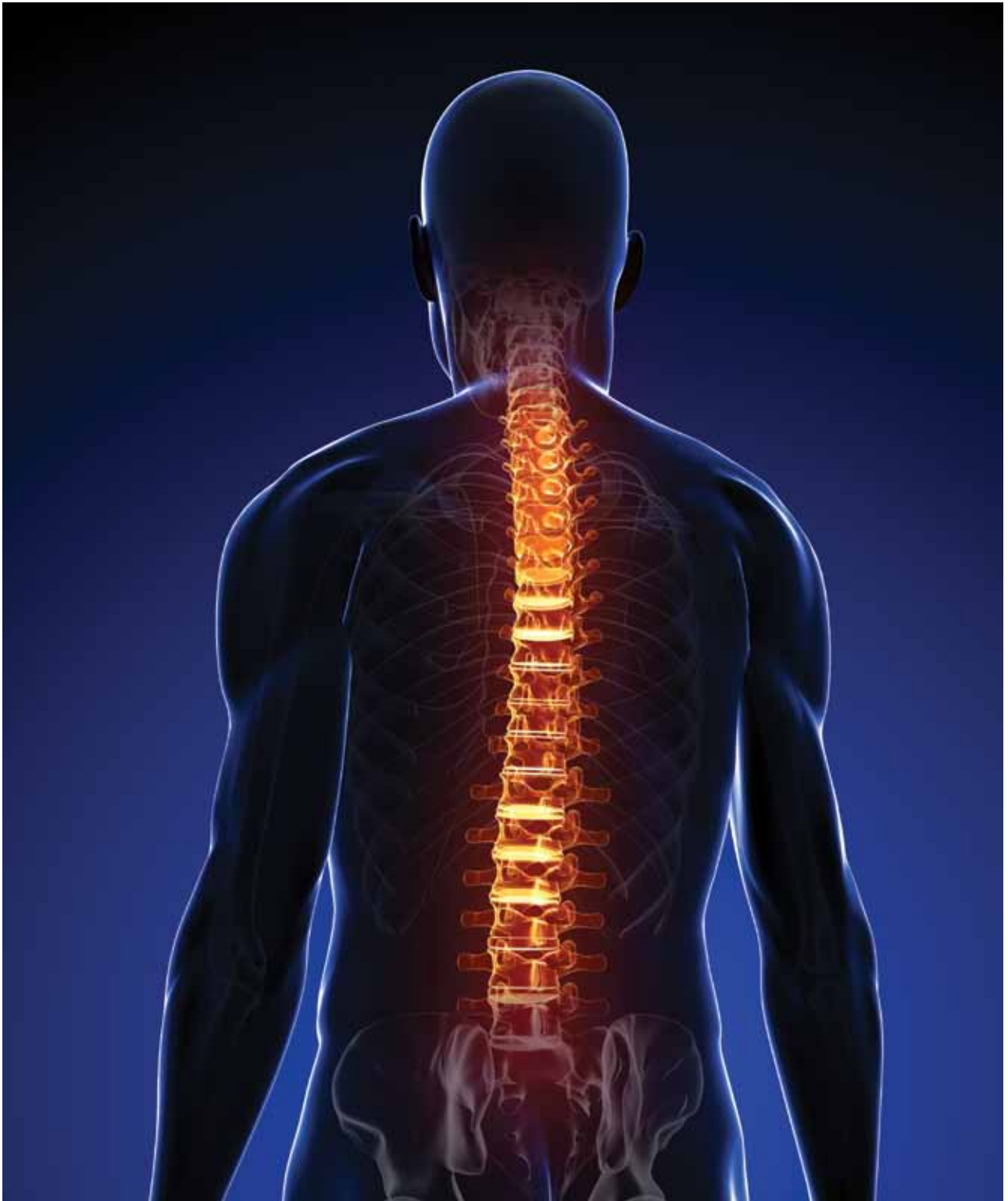




*Scientists classify living things by different characteristics, such as what is on their skin, if they lay eggs or have live babies, how they feed their babies, and whether they are warm-blooded or cold-blooded.*

Another key characteristic that scientists study is whether animals have a backbone. Animals that have a backbone are called **vertebrates**. Humans are **vertebrates**. Place your hand on the back of your neck until you feel a bump. Now, rub your hand up and down the middle of your back. Do you feel bumpy bones that run in a row down your back, from your neck down to your waist? That's your backbone. Another name for a backbone is a **spine**.

The backbone or **spine** wraps around and protects an important part of your body called the **spinal cord**. The **spinal cord** is a bundle of nerves. Messages travel up and down your **spinal cord** from your brain to other parts of your body. This is the way that your brain sends signals telling the other parts of your body what to do.



*Humans have a backbone and are classified as **vertebrates**.*

Many other animals also are **vertebrates**. All mammals, reptiles, fish, and birds have a backbone, so they are all **vertebrates**. They have some type of **spinal cord**, too.

Animals with a backbone come in all different shapes and sizes. Apes, rhinos, horses, rabbits, bats—and yes, rats and humans, too—are all mammals and **vertebrates**. Lizards, turtles, snakes, and crocodiles are reptiles and **vertebrates**. Huge sharks and tiny goldfish are also **vertebrates**. Small hummingbirds and large eagles are **vertebrates**, too.



*These animals are all classified as **vertebrates** because they have a backbone.*

But there are many more animals that do not have a backbone. Animals without a backbone are called **invertebrates**. Insects are the largest group in the animal kingdom. Insects are also the largest group of **invertebrates**. Insects include flies, wasps, beetles, cockroaches, ladybugs, and butterflies. Other kinds of **invertebrates** include earthworms and spiders.



*These animals are **invertebrates** that do not have a backbone.*

Some interesting **invertebrates** live in the sea. Lobsters, shrimp, and crabs do not have a backbone. The giant octopus is an **invertebrate** as well. Have you ever seen a jellyfish or a starfish? They are also **invertebrates**. So, these animals do not have a backbone or **spinal cord**.





*These **invertebrates** live in the saltwater environment of the sea.*

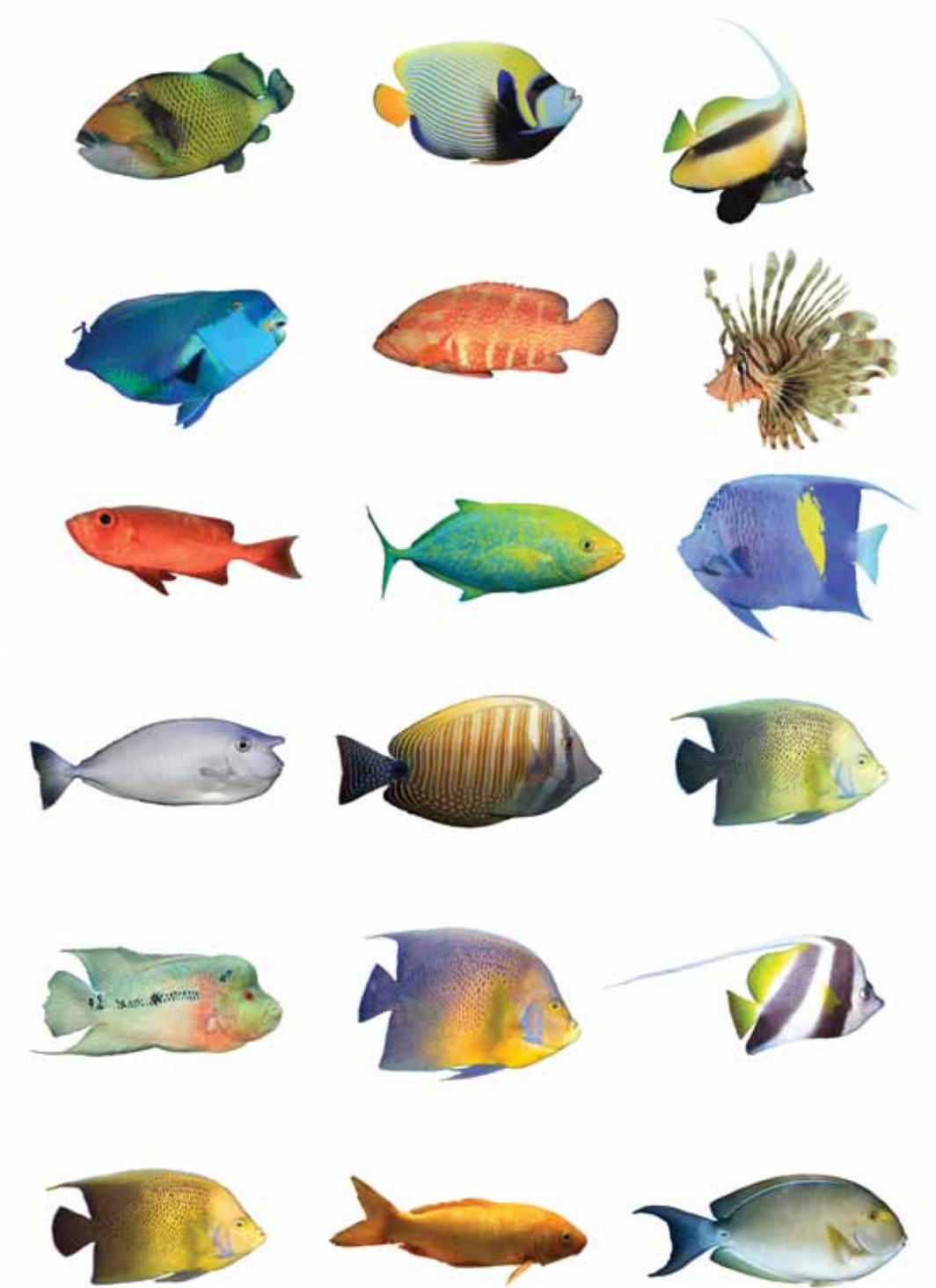
Chapter

# 4 Fish



Rattenborough here again! You have learned that scientists study the characteristics of animals. They do this to divide the animal kingdom into different groups, such as mammals and reptiles. Today you are going to learn about another group of animals within the animal kingdom—fish.

Fish are **aquatic** animals, meaning that they spend their lives underwater. Most fish are cold-blooded. Their body temperature changes with the temperature of the water. Fish are also vertebrates. In fact, they are the largest group of animals on Earth that are vertebrates. Earth is covered mostly by water, so it makes sense that fish are the most common vertebrates. There are many different types and sizes of fish.

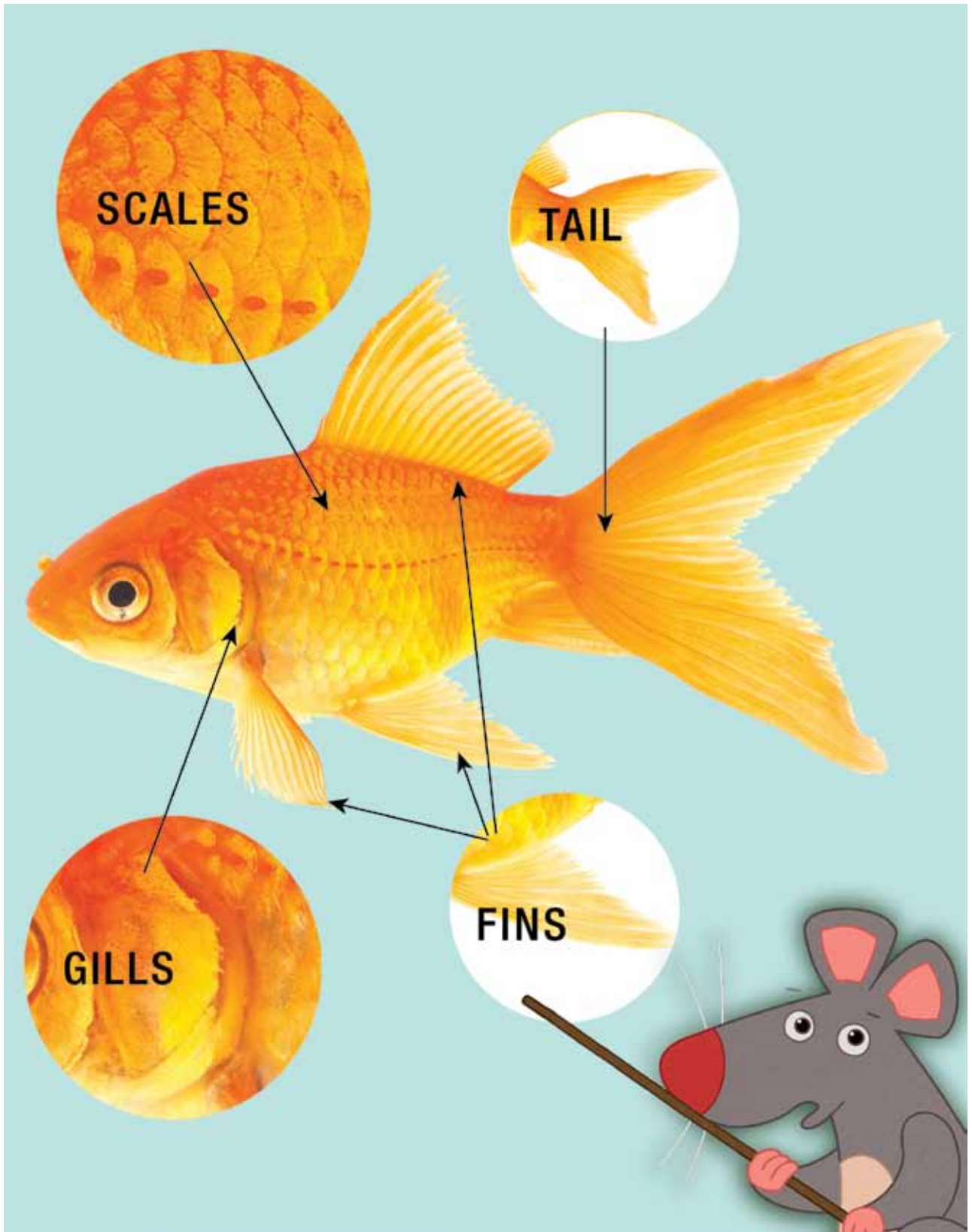


*Fish come in many sizes and colors.*

Fish lay eggs underwater. They also eat and sleep under water. Fish do not sleep in the same way mammals sleep. Fish can't close their eyes because they don't have eyelids. When they sleep, they float around or find a place to hide while they rest.

Like other animals, fish need to breathe **oxygen**. But fish do not have lungs like people and they do not breathe **oxygen** from the air. Instead, they have **gills** just behind their heads. Fish **gills** take **oxygen** out of the water, so that fish can breathe. But **gills** do not work well outside water. They cannot take **oxygen** out of the air. A fish will die quickly—within several minutes—if it is removed from water.

Fish have scales that cover their skin. Scales are rounded and smooth, and there is usually an inner and outer layer. The scales protect the skin and help fish move easily through the water. Fish also use the different **fins** on their body and their tails to swim. They are able to glide through the water, rapidly changing direction by using their **fins** and tail.



Most fish live in saltwater, because most water on Earth is salty. Tropical fish that live in the warm **ocean** are very colorful. They look as if an artist painted interesting patterns on their bodies. Many fish also live in freshwater, including streams, rivers, lakes, and ponds.



*These tropical fish live in a saltwater habitat.*

Some fish travel in groups called **schools**. One type of fish that travels in **schools** is salmon. Salmon live in both saltwater and freshwater. Some types of salmon are born in freshwater streams and rivers. After about a year, they make their way to the **ocean** where they live for one to five years. Then, they **migrate** back to the exact same stream where they were born. They lay eggs and the life cycle begins again.

Salmon don't use a map to help them find their way back home. Most scientists think they use their strong sense of smell to find their way. They swim upstream, against the river's current, sometimes swimming hundreds of miles. They leap over waterfalls and rocks to get to the same stream where they were born. They go through all this hard work to reach their home to lay their eggs.

Hopefully, along the way, a grizzly bear or fisherman won't catch them first. It just so happens that salmon are among the tastiest of all fish!





*A salmon leaping over a waterfall to get upstream to lay its eggs must watch out for enemies.*

Chapter

# 5

## Amphibians

---



Greetings once again from your pal and animal expert, Rattenborough! Are you ready to learn about another group of animals within the animal kingdom? The group we are going to talk about today is really interesting. They live both in water and on land. This group of animals is called **amphibians**. The word **amphibian** comes from Latin meaning “both sides of life.”

**Amphibians** are classified into three more specific groups. Frogs and toads are the largest group. Salamanders and newts make up another. Animals in the third group do not have legs, so they look more like large snakes. We don’t know as much about this group of **amphibians** because they live mostly underground.



*Amphibians can live both in water and on land.*

To understand the life cycle of an **amphibian**, let's take a closer look at an American toad.

Like all **amphibians**, toads are cold-blooded. An **amphibian's** body temperature changes as the outdoor temperature changes. Some **amphibians hibernate** during the winter. Some toads dig deep underground. Other **amphibians** like frogs bury themselves in mud at the bottom of a pond. **Hibernating amphibians** can survive for months. They do not eat or move, using only the fat stored in their body to stay alive. Frogs and toads—and all **amphibians**—are also vertebrates.

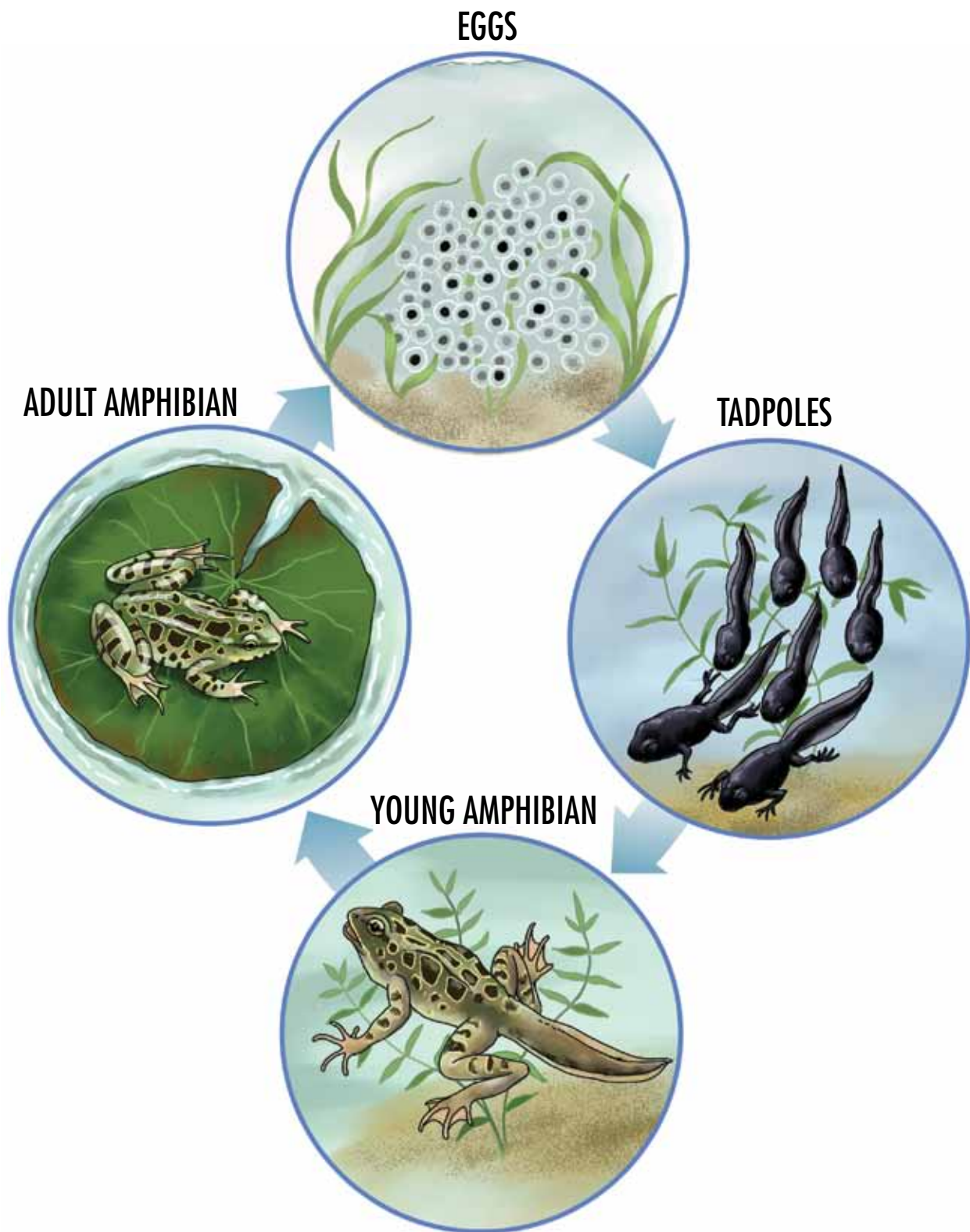


*This toad may be preparing to **hibernate** for the winter.*

A toad's life cycle begins as one of thousands of soft, slimy eggs. The mother lays her eggs close to shore in a pond, lake, or calm spot in a river or stream.

But most of these eggs will never hatch. Instead, they will be eaten by fish or other animals. If the water moves the eggs away from the shore and into direct sunlight, the eggs will dry out and die.

Out of the thousands of eggs laid, a few hundred toad eggs manage to hatch into **tadpoles**. A **tadpole** is very **fragile**. Its young body is made up mainly of a mouth, a tail, and gills. At this stage, **tadpoles** are aquatic. Like fish, they use gills to breathe underwater.



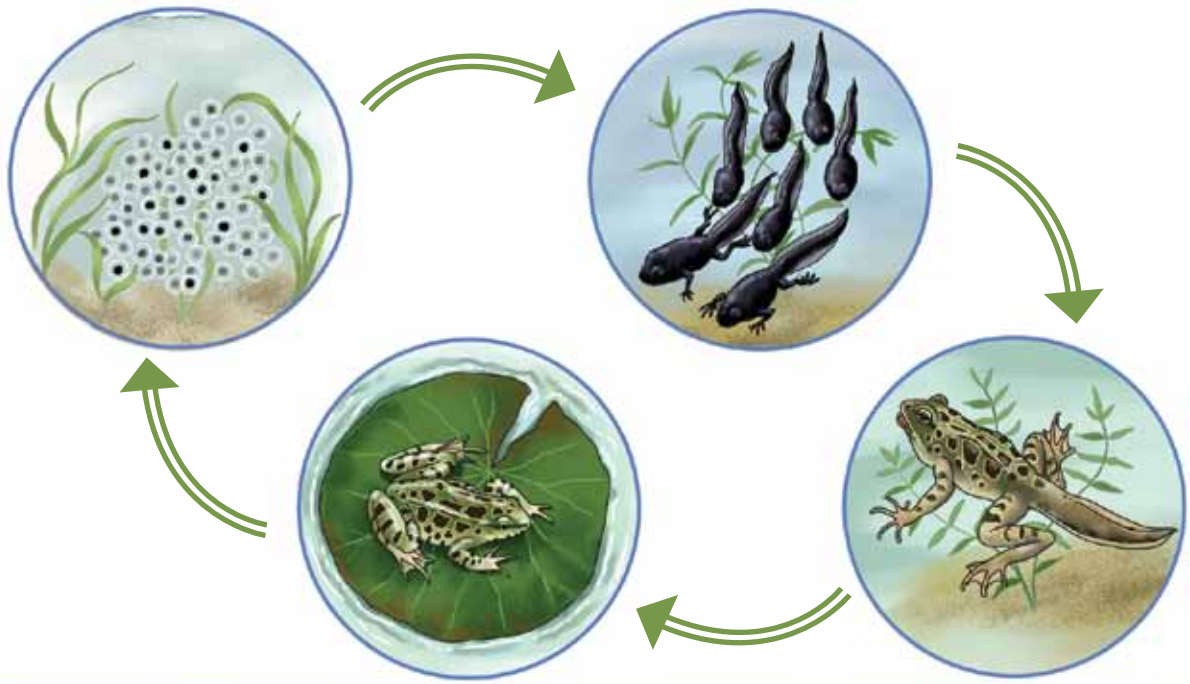
*The life cycle of a frog or toad*

After a while, **tadpoles** begin swimming around and eating tiny aquatic plants. **Tadpoles** tend to stay together in schools, like fish. However, this makes it more likely that other animals will be able to catch and eat them. Most **tadpoles** end up as fish snacks.

If a **tadpole** survives for a month, skin will begin to grow over its gills. After about six to nine weeks, the **tadpole** also starts to grow little legs. As its body changes, the young frog or toad starts to look less like an aquatic animal and more like a land animal.

After a few months, a toad will make its way out of the water to land. At this stage, it may still have a tail, but that won't last long. By this time, its gills have become lungs. That means the toad now breathes oxygen from the air instead of oxygen from the water, like fish. Soon, it will be a full-grown adult toad living and hopping around on land. Adult **amphibians** are carnivores, eating insects, small reptiles, and even mice.





*Bottom: A young amphibian leaving the pond for land.  
Top: The life cycle of a frog or toad*

Adult toads are very good swimmers and can even swim underwater. But they cannot use their lungs to breathe underwater. Instead, their thin, moist skin **absorbs** oxygen from the water.

**Amphibians** are a very interesting animal group. **Amphibians** are the only type of animal that have both gills and lungs. As adults, they live on land but lay eggs in the water. The Latin meaning of the word **amphibian** makes perfect sense!



*This frog has laid her eggs in the water.*

Chapter

# 6

## Reptiles

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Hi again, it's Rattenborough! You have already learned a little about today's group of animals, which are reptiles. You already know that reptiles are cold-blooded animals and vertebrates. But did you know that reptiles live both on land and in water like amphibians? Reptiles have lungs from the time they are born, not gills, like amphibians.

You may also already know that reptiles lay eggs. Some reptile eggs have soft shells and some have hard shells. They lay their eggs on land. A few snakes hold the eggs inside their bodies until they hatch. Very few rare reptiles do give birth to live young, never making real eggs.

Many different groups of animals are classified as reptiles. These include animals such as crocodiles, alligators, turtles, tortoises, snakes, and lizards.



*Crocodiles, turtles, snakes, and lizards are all reptiles.*

Some people may think reptiles, mainly snakes, are scary. Most reptiles will not harm people. But there are some reptiles that you should try to avoid. The black mamba is the best example. This is the longest and most **poisonous** snake in Africa. It is also the **deadliest** snake in the world. A mamba **injects venom** whenever it bites something. A mamba bite can kill any animal—even a human—in less than 20 minutes!



*A **poisonous** black mamba snake*

Rattlesnakes, copperheads, and **water moccasins** are types of **poisonous** snakes found in the United States. Rattlesnakes, or rattlers, are easy to spot because they have “rattles” that shake on their tails. You know when there is one nearby because you can hear the rattles shaking.

Copperheads have a triangle-shaped head and dark stripes. They are normally less than three feet long. They prefer to live in rocky, wooded areas. They only bite humans if they are attacked or **startled**.

**Water moccasins** live in the water so they are hard to spot. They have a dangerous bite, but rarely attack humans. If you live in a southern state like Florida, Alabama, Mississippi, or Louisiana, you are more likely to see one. They live in swamps or shallow lakes. You might want to avoid swimming in shallow waters if you live in those states.





*Rattlesnake*



*Copperhead*



*Water Moccasin*

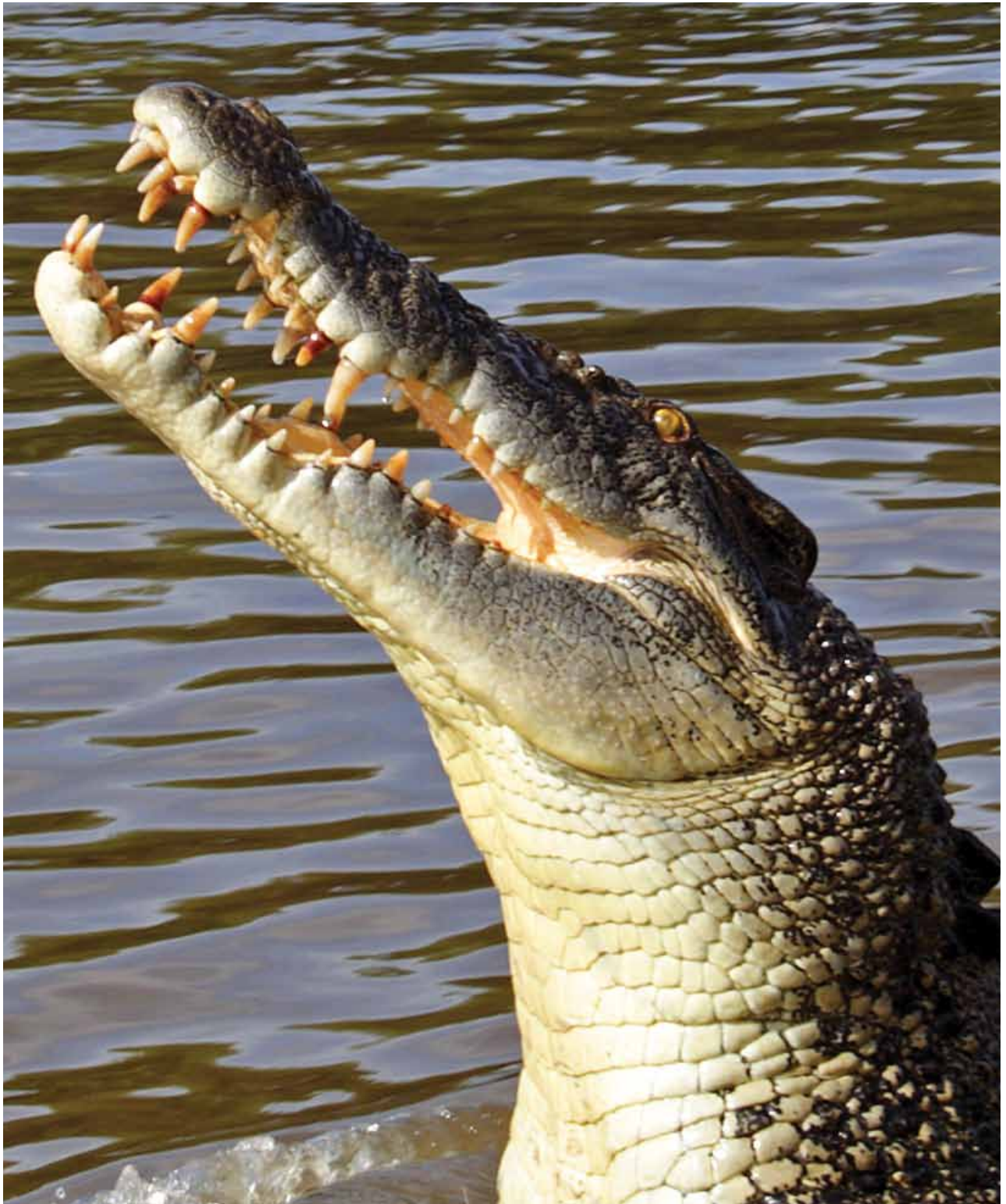
Some people think snakes are slimy because their skin looks shiny, but most reptiles have thick, dry, scaly skin. Reptiles are known for **molting**, or shedding their skin. Reptiles shed their skin several times during their lives. Snakes, for example, shed their skin in one big piece. They do this when they grow too big for their current skin.



*This snakeskin has been left behind by a large snake after it **molted**.*

The biggest reptile is the saltwater crocodile, which lives mainly in Australia and a few parts of India and Asia. Male saltwater crocodiles can grow to be 20 feet long or more! Attacks on humans are rare. If they do attack a human, it's usually not a happy ending.

Crocodiles have the most powerful bite in the entire animal kingdom. Their bites are ten times stronger than that of a great white shark. Despite their power when they bite and snap their jaws shut, it is fairly easy to hold a crocodile's mouth closed. They open their mouths using a weak set of muscles. In fact, a third grader may be able to hold a crocodile's jaw shut . . . would you like to try?



*Crocodiles have powerful jaws and a mean bite.*

Chapter

7

# Birds

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Yoo hoo—over here! It’s Rattenborough! So far, you have learned about the following groups of animals within the animal kingdom: mammals, reptiles, fish, and amphibians. Do you remember all of their different characteristics? Do you remember that we said that fish were the largest group of vertebrates in the animal kingdom? Well, today we are going to talk about the second largest group of vertebrates—birds.

Birds belong to a group all their own. Birds, like all living things, are highly **adaptive**, meaning they can survive in many different habitats. You can find them in deserts and in the coldest places on Earth. Many love forests. There are only a few birds found way out to sea, many miles from land. But if you are out in a boat only a few miles from land, you may see many sea birds, such as seagulls.



*Different kinds of birds live in many different habitats.*

Like mammals, birds are warm-blooded. Many birds migrate when the seasons change. In late fall, they fly in groups called **flocks** from colder places to warmer places. Then, in the spring after winter is over, they migrate back to the place where they were in the fall. Birds are the only animal besides some insects and bats that are able to fly like an airplane.





*A flock of migrating birds*

All birds have wings, but not all birds are able to fly. **Penguins** are probably the best known birds that do not fly. **Penguins** make up for not flying by being great swimmers. Ostriches, the largest of all birds, can't fly either, but they sure can run very fast! They also lay the world's largest eggs.

Besides wings, all birds have two legs and a mouth without teeth, called a beak. A key characteristic of birds is that they all have **feathers**. **Feathers** help these warm-blooded animals fly and help them maintain a constant body temperature. Bird **feathers** come in all kinds of colors and sizes. A bird's **feathers** are also called **plumage**. Peacocks have the fanciest **plumage** of all. They like to show off by fanning their long, colorful **feathers**.



*All birds have wings and **feathers**, but not all birds can fly.*

Most birds are nesting animals. Many birds make their own nest, often high up in the trees or in thick bushes. They use bits and pieces of **nature**, such as twigs and parts of plants, to create their nest. Other birds build their nests in tree holes. Some bird nests are made of mud.

Most birds lay eggs in their nests. Some lay a bunch of eggs and some lay only one or two. The nest needs to be in a safe place to protect the little eggs from the **weather** and other animals that might eat the eggs. Birds sit on their eggs to keep them warm and safe until the eggs hatch. Once they hatch, the baby birds need to eat. Mother and father birds fly out from the nest and find food for their babies. They fly back to the nest and place the food in each baby's beak.



*Baby birds are being fed by their parents.*

Many birds are omnivores. Some birds eat seeds and berries. Some eat insects. Some, like the great blue heron, eat fish. Hawks eat little mammals. Other birds, like tiny hummingbirds, eat **nectar** from flowers. All birds drink water.

Birds are also known for their songs. Their songs are used to **attract** mates and to claim a place as their own. Sometimes it seems as if they sing because they want to. Maybe they sing just to remind us how beautiful and interesting the animal kingdom is!



*Different kinds of birds eat different types of food.*

## Chapter

# 8

# Mammals

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Aha! Now we get to an animal group that I really know a lot about! I, Rattenborough, am part of this group of animals myself! I'm talking about mammals. Do you remember the characteristics that scientists use to identify mammals? Hair is one major characteristic. Live birth and giving milk to their young are others. They breathe oxygen from the air using their lungs. Mammals are also warm-blooded, and they are vertebrates.

Most scientists agree that mammals are the smartest **creatures** in the animal kingdom. All animals **communicate** in some way. Dogs **communicate** by barking and wagging their tails. Cows moo. Some cats meow, others roar. But mammals seem to use the most complex forms of **communication**. Humans use **language** to talk. They also **communicate** with their faces and hands. Some apes and chimpanzees have even been taught to use **sign language** to **communicate**.





*Mammals **communicate** in different ways.*

There are two other mammals that also seem to use an advanced form of **communication**. In fact, you may not even realize that these animals are mammals because they live in the ocean. Dolphins and whales are classified as aquatic mammals. Dolphins and whales, like other mammals, do not have gills like fish, so they cannot breathe underwater. Instead, they use blowholes at the top of their heads to blow out water and suck in air. Dolphins and whales rise to the surface of the water and poke their heads into the air to breathe.

Whales and dolphins **communicate** by sending out sound waves through the water. These waves, called **sonar**, help them find their way through the ocean. The sound waves bounce off objects and **echo** back to the whale or dolphin. The whale or dolphin can tell the size, shape, and speed of objects, and the distance away from them based on the time it takes the **echo** sound to travel back to them. They also use their sounds to “talk” to each other!



*You might think dolphins would be classified as fish, but they are classified as mammals.*

Dolphins and whales also give birth to live young. No eggs needed! They even feed milk to their young. If you study them closely, you will learn that dolphins and whales have hair, not scales. They also have very thick skin. Their skin protects them from the cold and animals that are their **predators**.

You might also be surprised to learn that bats are also mammals. Bats fly like birds, but they do not have the other characteristics that birds have. Bats have fur, not feathers. Their arms have wing-like flaps of skin, but they are not like bird wings. Bats also give birth to live young and they produce milk. So, scientists classify bats as mammals.



*Bats are also mammals.*

Here's an interesting fact: not all mammals give birth to live young. The **duck-billed platypus** and spiny anteater both lay eggs like birds and some reptiles, but have all the other characteristics of mammals. Good luck finding one. They are very rare!

Mammals have their fair share of odd members, like the **duck-billed platypus**. But the basic characteristics—hair, backbone, milk, warm-blooded—are always present in mammals no matter what.



*A duck-billed platypus*

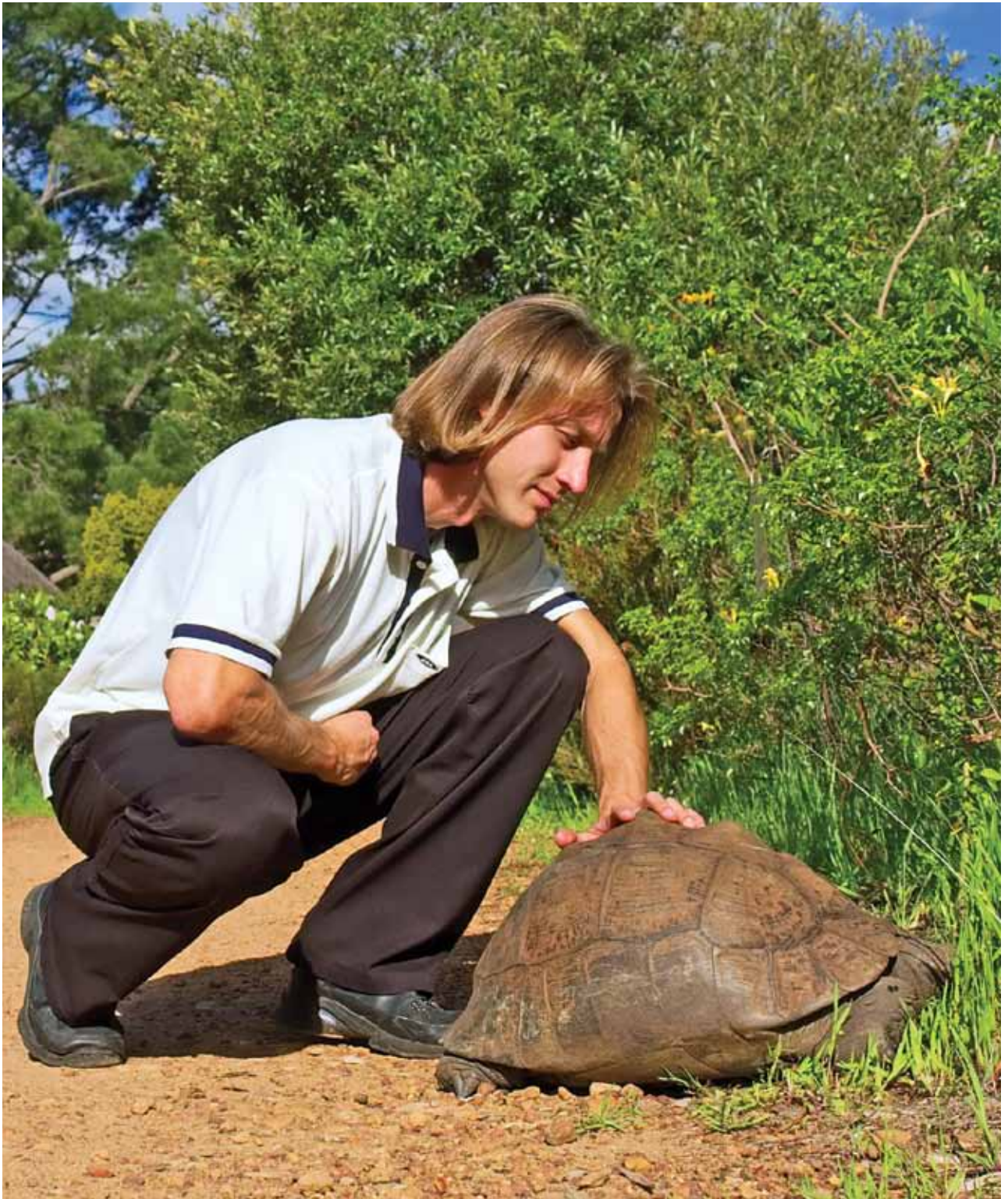
# Chapter 9 Scientists Who Classify Animals



Rattenborough, here once again! You have been learning about how scientists study the characteristics of living things. They classify all living things into one of five large groups called kingdoms. You have been learning a lot about how animals are sorted into more specific groups within the animal kingdom.

The scientists who study animals and their characteristics are called **zoologists**. **Zoologists observe** animals to see the ways they are the same and the ways they are different. For example, **zoologists** discovered that some animals are warm-blooded and some are cold-blooded.





*This **zoologist** is studying a turtle.*

**Zoologists** also classify animals by whether or not they have a backbone. Animals with a backbone and a spinal cord are called vertebrates. Animals that do not have a backbone are called invertebrates. We learned that there are five groups of vertebrates—fish, birds, amphibians, reptiles, and mammals. The largest group of vertebrates is fish.

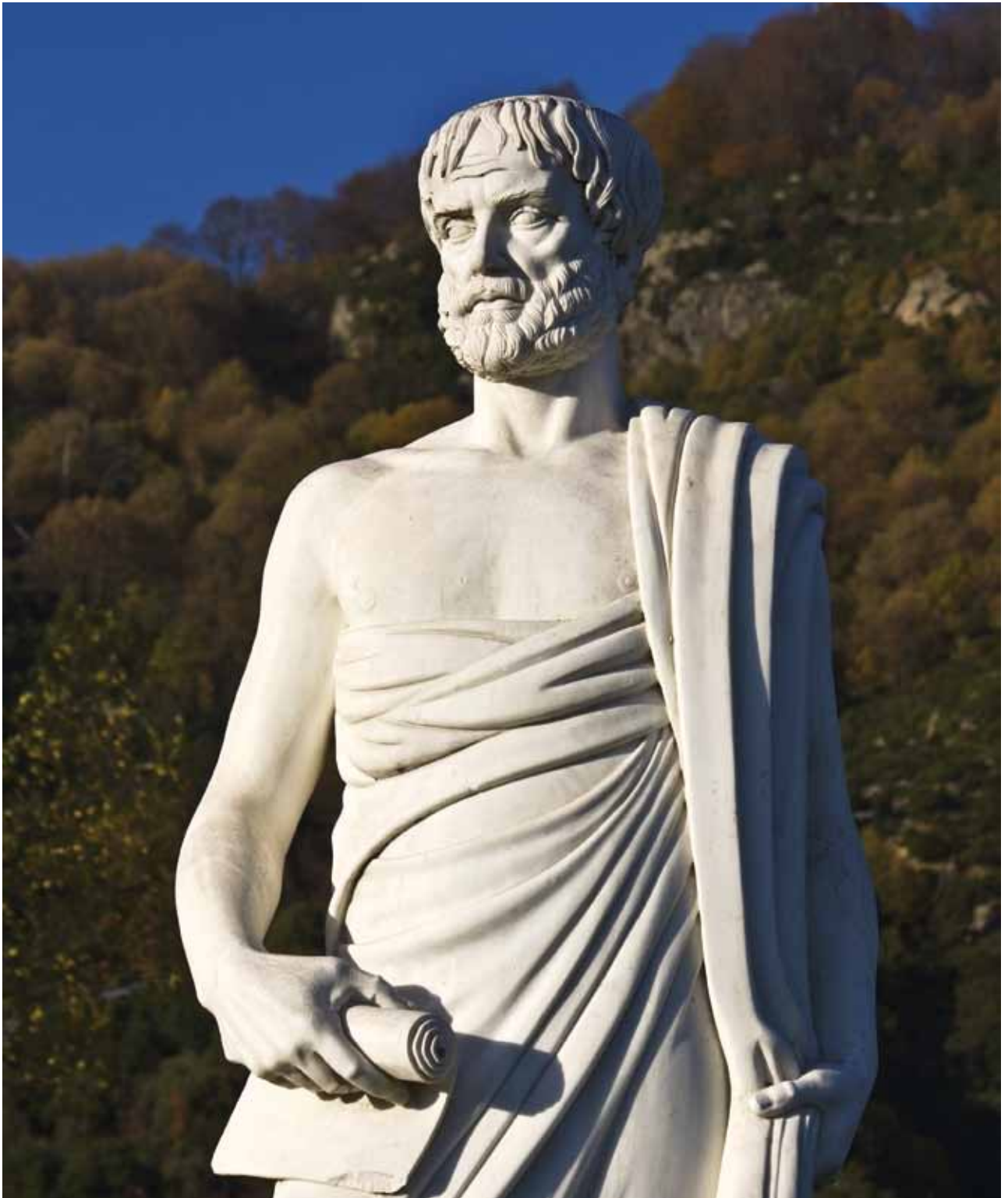
**Zoologists** also study other characteristics of animals. They study animal body parts and how they are alike or different. All animals need to breathe oxygen. But they may have different **organs** that help them breathe. Fish and young amphibians have gills that help them get oxygen out of the water. Mammals, reptiles, and adult amphibians get oxygen from the air using lungs.

**Zoologists** also study how different animal babies are born and cared for. Do you remember which group of animal mothers feed their babies milk from their own bodies?



*Do you remember which group of animals feed their babies milk from their own bodies?*

Everything we have learned about animals was discovered by scientists. There have been many scientists who have been interested in animals since long, long ago. A Greek man named **Aristotle** first classified animals over 2,000 years ago. He wrote a book called *A History of Animals*. As scientists have discovered and learned more about animals, the classification system has changed. There is still much to learn about animals. After all, there are thousands of new animals yet to be discovered and classified!



*A statue of Aristotle*

Every single day, scientists learn new facts about animals. Scientists even find new animals they didn't know existed. There is no end to new **knowledge** if you study living things!

Today, there are about one million scientists around the world who are studying and classifying animals, even as you read this. Every one of them spends the day **observing**, experimenting, and finding new information. This adds to our **knowledge** about the world we live in.

If you want to be a **zoologist** when you grow up, there is plenty to study. You never know when someone is going to learn something that changes the way we think about the world. Who knows? Maybe you will be the first to find a feathered fish or a flying snail. It may sound silly now, but a hundred years ago, nobody knew that whales communicated with each other. What will you discover?



*What kind of animals would you like to **observe** if you were a **zoologist**?*

Chapter

# 10 Jane Goodall

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Jane Goodall is a very famous **primatologist**. She is a scientist who studies a group of mammals called **primates**. **Primates** are a group of mammals that includes humans, monkeys, gorillas, and chimpanzees. Jane Goodall has spent her whole life studying chimpanzees. She has focused on studying animal **behavior** in chimpanzees. Her discoveries have made her one of the best known scientists in the world.

Goodall was born in 1934 in London, England. When she was a little girl, her father gave her a toy chimpanzee. It looked so real that people who visited her house were afraid of it, but she loved it!

When Goodall was 23, she went to Africa. She began studying chimpanzees with a well-known scientist named Louis Leakey. After a year of working in Africa, Goodall went back to England and studied at the University of Cambridge. Can you guess what her favorite subject was? Chimpanzees!





*Jane Goodall*

After finishing school, Goodall returned to Africa and spent the next 45 years studying chimpanzees in the wild. Her discoveries during those years completely changed the way people think about **primates**.

Before Goodall's work, people thought chimpanzees were herbivores. She discovered that they eat meat, too. More importantly, Goodall discovered that chimps were quite **intelligent**. She observed them making and using tools! Before that, people thought humans were the only animals that made and used tools.

When you hear the word *tool*, you may think of a hammer, saw, or shovel. Chimps don't use those kinds of tools. A tool is something used to help make a job easier. Tools can be very simple. A rock becomes a tool if you pick it up and use it to crack open a walnut.



*Goodall studies chimpanzees, a type of mammal belonging to the **primate** group.*

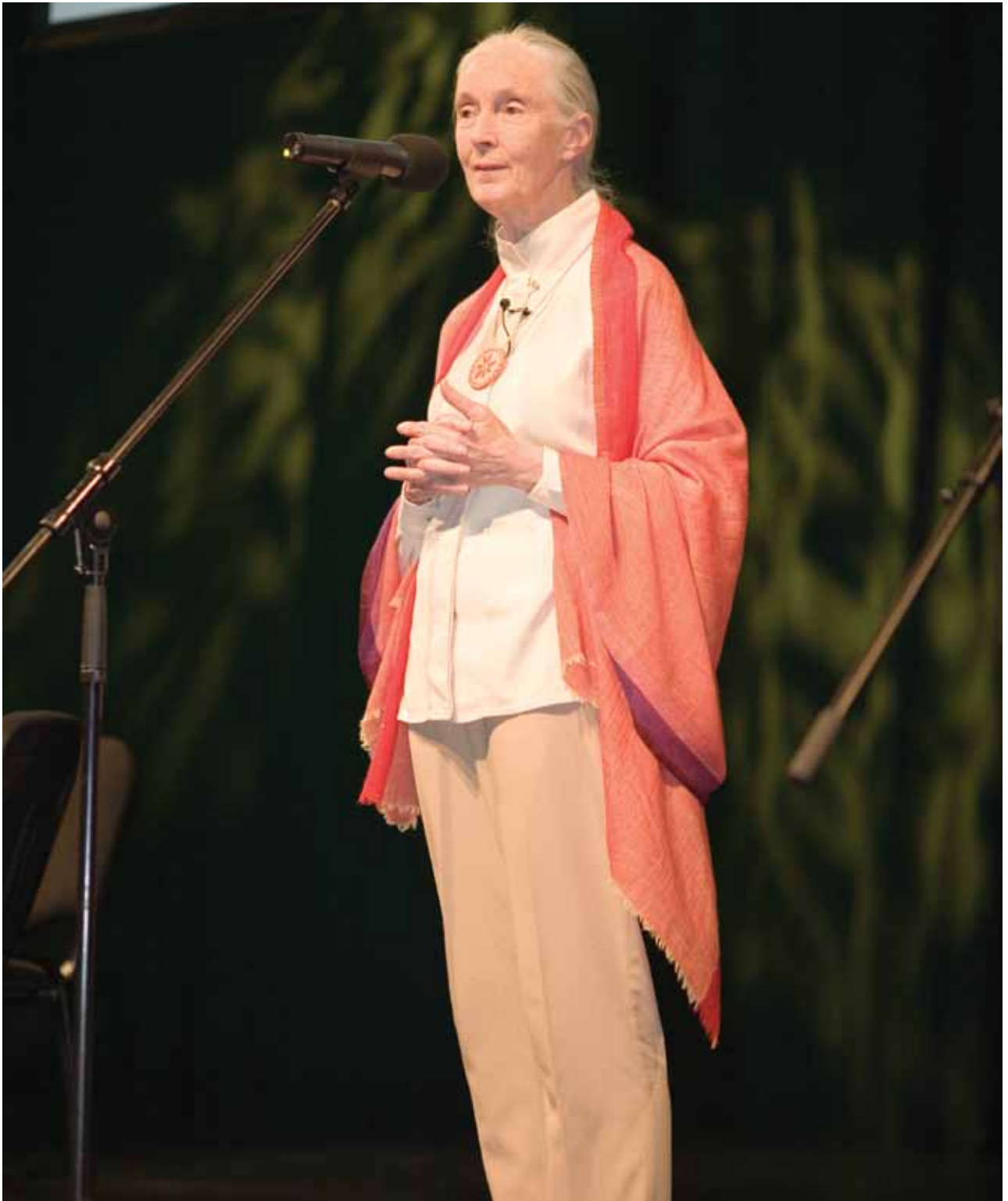
Goodall observed chimps using blades of grass and sticks as tools. Chimps like to eat termites, a type of insect that is like an ant. Termites live in holes underground. To catch these tasty insects, Goodall observed a chimp sticking a blade of grass into a termite hole. The termites crawled onto the grass. Then, the chimp took the grass out of the hole and ate all the termites. Before Goodall wrote about this **behavior**, people did not realize how clever chimps and other **primates** are.

Goodall gave names to all the chimps in the group she was studying. She got to know them pretty well. Over time, she learned that chimps were smart animals. She learned that chimps express many of the same feelings as people. They can feel happy, sad, and mad. Chimps can also be mean. Goodall saw them attack and eat small monkeys, not out of hunger, but because they didn't want them around.



*A chimpanzee uses a plant stem as a tool.*

Goodall is more than a scientist. She is also an **activist**. An **activist** is someone who works hard to solve a problem and change something in the world. Goodall works as an animal rights **activist** to protect chimpanzees and their habitats. She tells others about human **damage** to habitats, such as hunting and **pollution**, and works to stop these problems. She loves working with young people and teaching them how to protect animals. She has written many books and has been the subject of books and movies. She has won many awards for her work in protecting chimpanzees. As of 2013, she was 79 years old and still working to spread the message that animals need to be protected!



*Jane Goodall continues to work as an animal rights **activist**.*

Chapter

# 11 Deep-Sea Fish

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Oceans are very, very deep bodies of water. However, people cannot go very deep into the ocean. Even with all the right **scuba gear**, including a tank of oxygen, there is a limit to how deep you can go underwater. The deeper you go, the higher the **water pressure** gets because of the **weight** of all the water around you.

You can notice **water pressure** if you swim to the bottom of a pool. If you rest on the floor of the pool for a few seconds, you will start to feel the pressure in your eardrums.

The deeper you go in the ocean, the higher the **water pressure** gets. If you dive a few hundred feet down, you will start to feel like someone is squeezing your head and chest. At 1,000 feet, you might pass out. Go deeper than that and you might be crushed by all the **water pressure!**



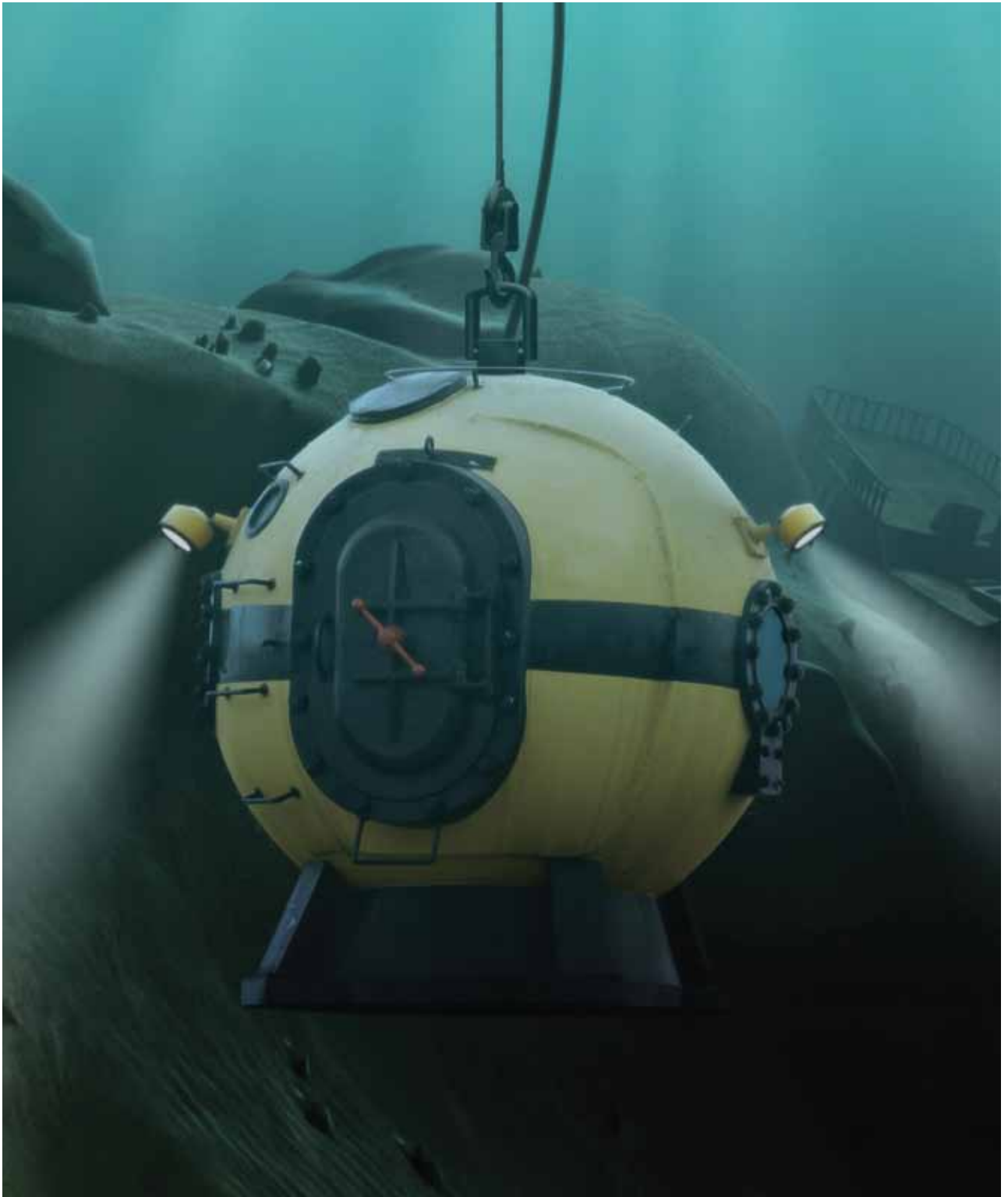


*Scuba divers feel more **water pressure** the deeper they dive in the ocean.*

How deep are oceans? That depends on where you are in the world. Some parts are a few yards deep, while others are around 10,000 feet. The deepest part of the ocean is more than six miles deep! Down there, the **water pressure** is very strong. It is so strong, it would feel as if someone dropped 3,300 elephants on you at the same time. In other words, you would be crushed to the size of an ant, maybe smaller.

No creature that lives on land can survive the **water pressure** of the deep ocean. Most fish can't either. However, there is life down there—lots of it! How do we know? Scientists have created special **submarines** called **submersibles** that can go deep in the ocean.

Some **submersibles** can carry a person or two. Others are controlled remotely from the surface. With a light and a camera, a **submersible** can be used to explore the deepest parts of an ocean. Scientists developed the first **submersible** about 50 years ago and have been discovering some pretty crazy-looking fish ever since!



*A **submersible** exploring deep underwater*

Fish that live deep down in the ocean are unlike any other living things. They have incredibly thick bodies because they need to withstand all that **water pressure**.

No sunlight reaches the bottom of the ocean, so it's completely dark down there. Many deep-sea fish glow! Lantern fish are the most common deep-sea fish. In fact, they are among the most common of all vertebrates. There are billions of them down there!



*Lantern fish*

The anglerfish is easily one of the strangest creatures on Earth. Have you ever seen anything so ugly? Anglerfish are known for their huge mouths and scary teeth. What is more amazing is that they have a built-in flashlight on their head used to communicate with other fish.

Humans have only managed to explore a tiny part of the deep seas. If you are interested in discovering new creatures, then you might want to think about becoming a deep-sea **marine biologist**, which is a scientist who explores ocean life.



*An anglerfish*

Chapter

# 12 Tree Frogs

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As you have learned, amphibians are vertebrates that spend part of their lives in water and part of their lives on land. They start out like fish because they are born with gills and can breathe underwater. They later develop lungs, so they can breathe air and live on land. Tree frogs are one type of amphibian. They are different from most amphibians because they spend most of their lives in trees.

The American green tree frog can be found in most parts of the southeastern United States. A typical American tree frog is only about two inches long, so they are pretty small. But they can be loud if there are a few hundred of them gathered together.





*An American green tree frog*

If you live in the southern United States, near water and lots of trees, your summer nights may be filled with the gentle chirps of tree frogs.

American tree frogs range in color from lime green to yellow. A tree frog's most distinct characteristic is its long toes with **suction cups**. The **suction cups** allow a tree frog to cling to and climb anything. A tree frog can even stick to a window.

Tree frogs like to stay in the trees, so you are more likely to hear them instead of see them. They will leave the trees to lay eggs. They are most likely to come down to the ground after a heavy rain, when everything is nice and wet.



*This tree frog's long toes with **suction cups** help it climb this branch.*

If you do see one, don't worry! They are pretty friendly. They are easy to catch, too. If you catch one, it might sit on your hand or crawl around on your back.

You will probably only find them at night because they are **nocturnal**. This means they sleep during the day and are active at night. They eat small insects, such as crickets, moths, and other **nocturnal** insects.

Like other amphibians, American green tree frogs lay their eggs in or near the water. Most of them like to lay their eggs very close to water, but not quite in it. Their favorite place is on a tree limb or leafy branch that has fallen into a pond.



*The American green tree frog is **nocturnal**.*

Different kinds of tree frogs have been around since long before the dinosaurs roamed the earth. You can find many different types of tree frogs in parts of North and South America, Europe, and Southeast Asia. This is a red-eyed tree frog, which you can find in Mexico and much of Central America.

Most tree frogs prefer a fairly warm, wet **climate**. If you live in a place with tree frogs, consider yourself lucky. In the summer, you can fall asleep each night listening to the steady song of a tree frog **orchestra**.



*This type of tree frog lives in Mexico and Central America.*

## Chapter 13 The Komodo Dragon

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You have probably heard or read at least one fairy tale with a dragon as a character. In these stories, dragons fly around breathing fire and frightening innocent people, until a brave knight comes along and kills the dragon. Well, you won't find fire-breathing dragons in a book about animal classification. There is no proof that these fairy tale dragons ever **existed**.

There is, however, one real dragon that does **exist**: the **Komodo dragon**. No, it does not breathe fire and it does not fly. It's just a big reptile. They can be pretty mean. It's rare, but they have attacked and even killed humans. So, be careful if you are ever traveling through Indonesia.





*Fire-breathing dragons are found only in fairy tales and movies. The **Komodo dragon** is a large reptile found in Indonesia.*

These dragons are named after the **island** of Komodo, which is part of Indonesia. They can be found on four or five other Indonesian **islands**, as well, but overall they are pretty rare.

They prefer hot, dry places. They dig **burrows** two to three feet deep in the ground. Like most reptiles, they spend most of their time sleeping or simply relaxing.

A **Komodo dragon** can be as big, or bigger, than a crocodile. They weigh up to 150 pounds and can be over ten feet long from tail to head. The largest one on record weighed 370 pounds, or as much as about six third graders.



*A **Komodo dragon** can be as large, or larger, than a crocodile.*

Like many reptiles, they can't hear or see very well. Instead, they have a strong sense of smell. They do not use their **nostrils** to smell—they use their **tongue!** They can smell food several miles away if the wind is blowing in the right direction!

Speaking of food, Komodo dragons are carnivores, so they eat mainly meat. For the most part, they eat dead animals. But if there are no dead animals around, they hunt for food.

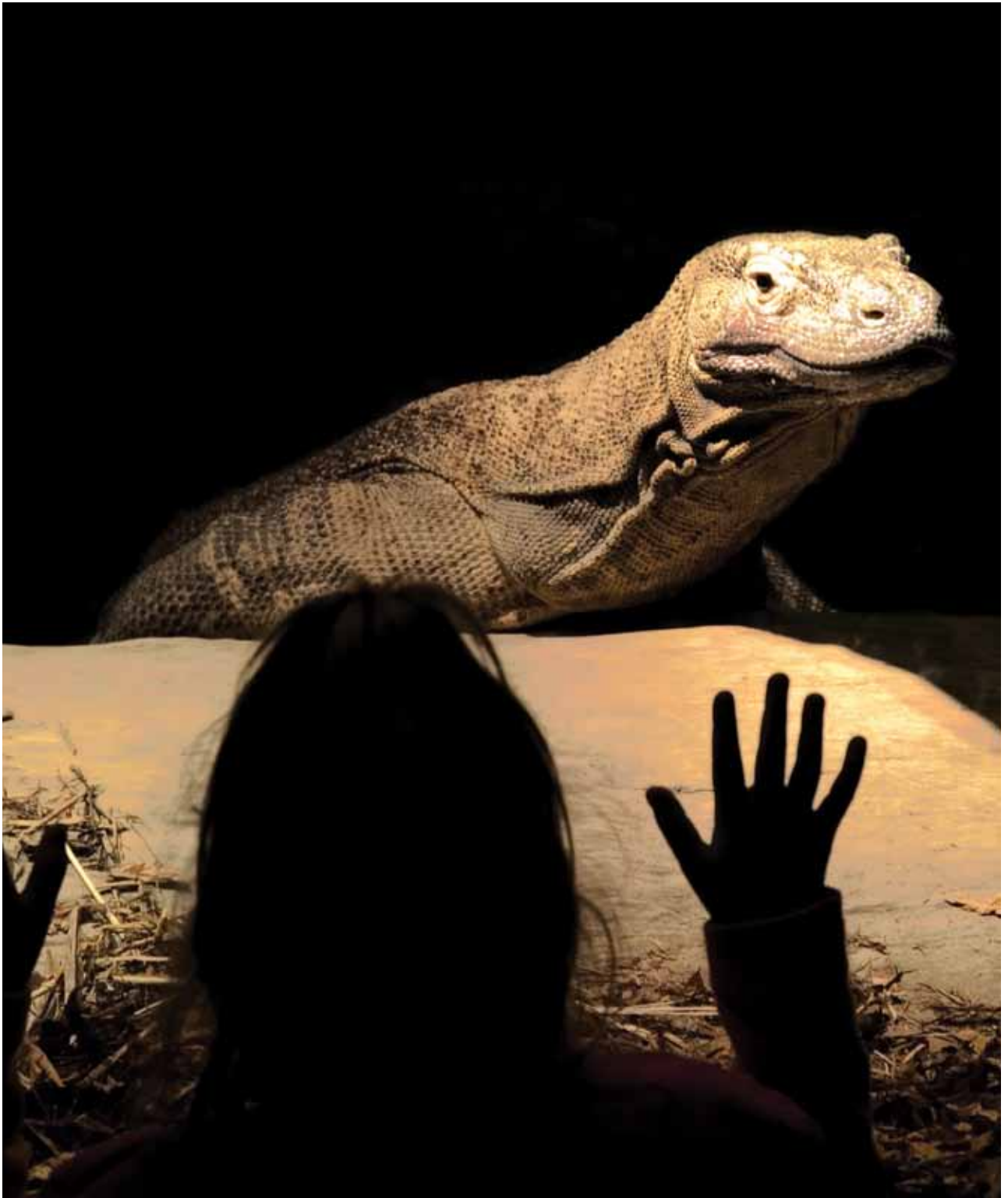


*Komodo dragons use their tongues to smell!*

They have sharp claws and teeth and, when needed, can move pretty fast. They are the only lizards known to attack, kill, and eat animals that are bigger than they are. They might hunt a goat, deer, and even water buffalo!

Young **Komodo dragons** eat insects, smaller mammals, and birds. How? They climb trees and catch them. They will eat anything they can get their claws on, as long as it's meaty.

You definitely don't want a **Komodo dragon** to bite you or even lick you! Its **saliva** is loaded with dangerous germs that can make people very sick. The best way to observe a **Komodo dragon** is at a zoo, unless you are very brave or very foolish!



*The safest way to observe a **Komodo dragon** is at a zoo.*

## Chapter 14 Beavers

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Beavers are mammals that have an important role in nature. Beavers have two key characteristics: long, sharp teeth and a flat, wide tail. They use their teeth to **gnaw** down trees of all sizes for food and for building things. They use their tails to swim, but that's not all! If a beaver smells or sees danger nearby, it will warn the other beavers. It slaps its tail on the water surface as a loud warning.

Beavers live in ponds and lakes in some parts of North America and in some parts of Europe and Asia. They are pretty hard to find today because they were nearly hunted to **extinction**. Beavers were prized for their **pelts**, which people used to make fur coats and hats.





*Beavers have long, sharp teeth and a flat, wide tail.*

They are still hunted today, not only for their **pelts** but also because many people think they are pests. As you will learn, beavers can play a very important role in nature by creating a special habitat called a **wetland**. But sometimes they are pests because they disturb places where people live.

Beavers are the second largest **rodent** in the world. They do look a bit like their fellow **rodents**, such as mice, rats, and hamsters.



*Beavers are mammals that belong to a smaller group of animals called **rodents**.*

Have you ever heard the expression “busy as a beaver?” It comes from the fact that, in the wild, beavers never seem to stop working.

They spend much of their time in water. They are best known for building dams in rivers and streams. They build dams in order to create deeper bodies of water. They move slowly on land, but they are great swimmers. Deep water protects them from bears and other predators. When they sense danger, they dive underwater. They can hold their breath underwater for up to 15 minutes!

Beavers also build places to live called lodges. Lodges are big piles of sticks and mud that they build after they have built a nice dam.

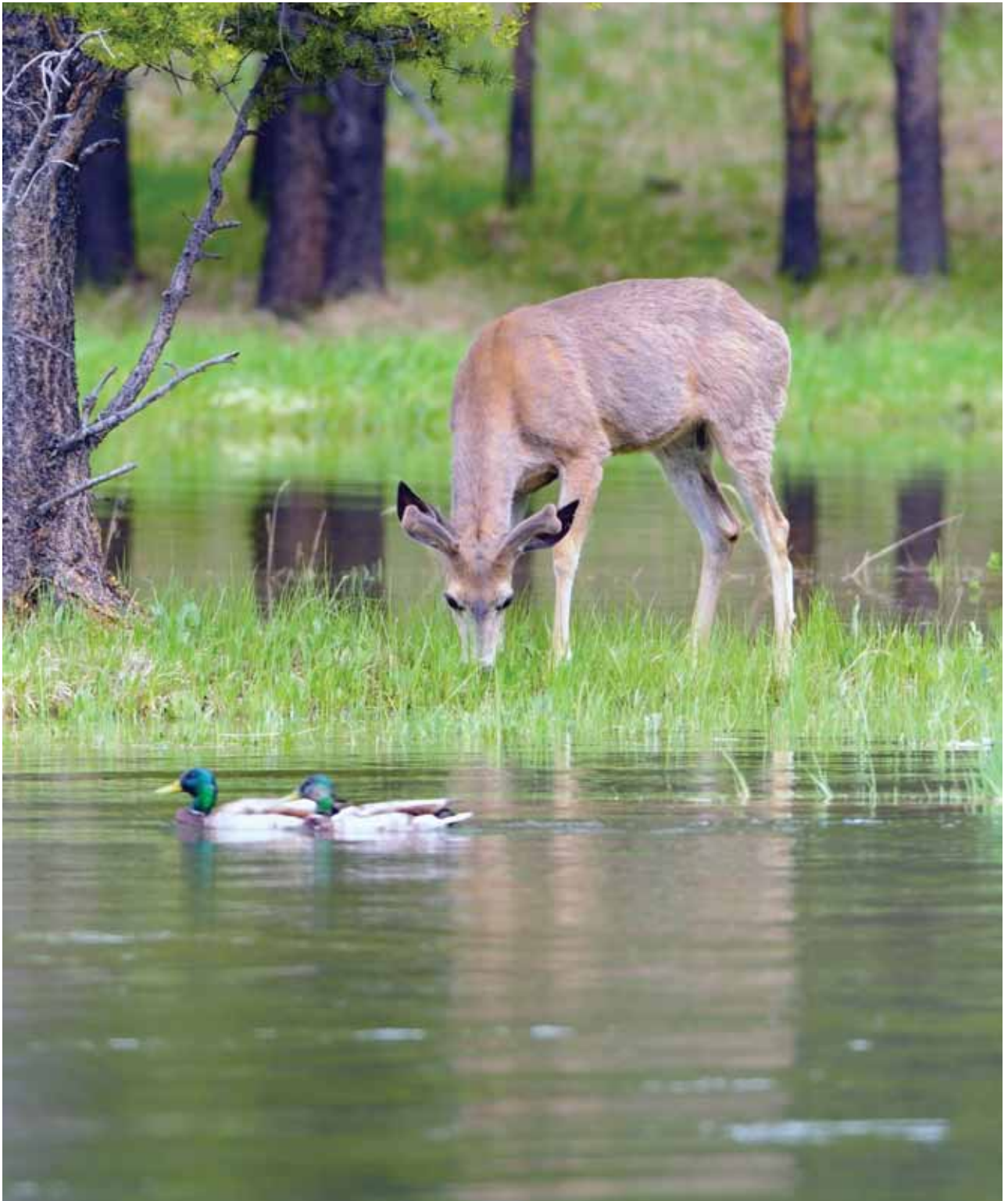
Beavers use their strong teeth to **gnaw** down trees of all sizes. Then they strip off and eat the bark of the tree. They use what’s left over to build their lodges and dams.



*A beaver swimming from its lodge towards a dam*

A single beaver family can really change its surroundings. Beavers' dams can cause the water in the stream or river to rise up, flooding the nearby land. This creates a swamp, or **wetland**. **Wetlands** are important habitats for many types of birds, mammals, fish, and insects. But if there are people living nearby, they may not welcome the flooding!

Beavers don't stay in one place for very long. Once the good bark from all the trees is eaten in one place, they tend to move downstream and start all over again. But the **wetland** they made often remains long after they leave.



*Wetlands are important habitats for many kinds of animals.*

Beavers are very **territorial**. This means they don't like other beavers to move into the same area where they build their lodge. They want to keep all the tasty tree bark for themselves! They often attack other beavers that try to move into a space that they have claimed.

All in all, beavers are interesting mammals to watch and study.





*Beavers are **territorial**.*

Chapter

# 15

## Hummingbirds

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Birds can be found nearly everywhere on Earth and they come in many different sizes and colors. They also live in many different types of habitats. This affects how they eat, nest, and sing songs. Hummingbirds are among the smallest birds. The bee hummingbird is the smallest bird on Earth, just two inches long. It weighs less than a penny!

A hummingbird is an amazing little animal. It can flap its wings up to 90 times in one second! That's so fast it looks like its wings are a blur. It's hard to see its wings because they are constantly flapping.



*A hummingbird compared to the size of a penny*

Hummingbirds dart around from flower to flower, like bees. They use their long, pointy beaks to drink sweet nectar from flowers. Since they are so busy flapping their wings, they need to eat a lot to replace all of their energy. A typical hummingbird will visit hundreds of flowers every day, drinking more than its own weight in nectar. Nectar has sugar, which gives hummingbirds plenty of energy. As they find insects on flowers, hummingbirds eat them up.

Hummingbirds are attracted to red flowers. They are also drawn to red feeders, which people hang on porches and trees. The feeders are filled with sugary water, which is then dyed red to attract the birds. People hang feeders for them because these birds are a lot of fun to watch!

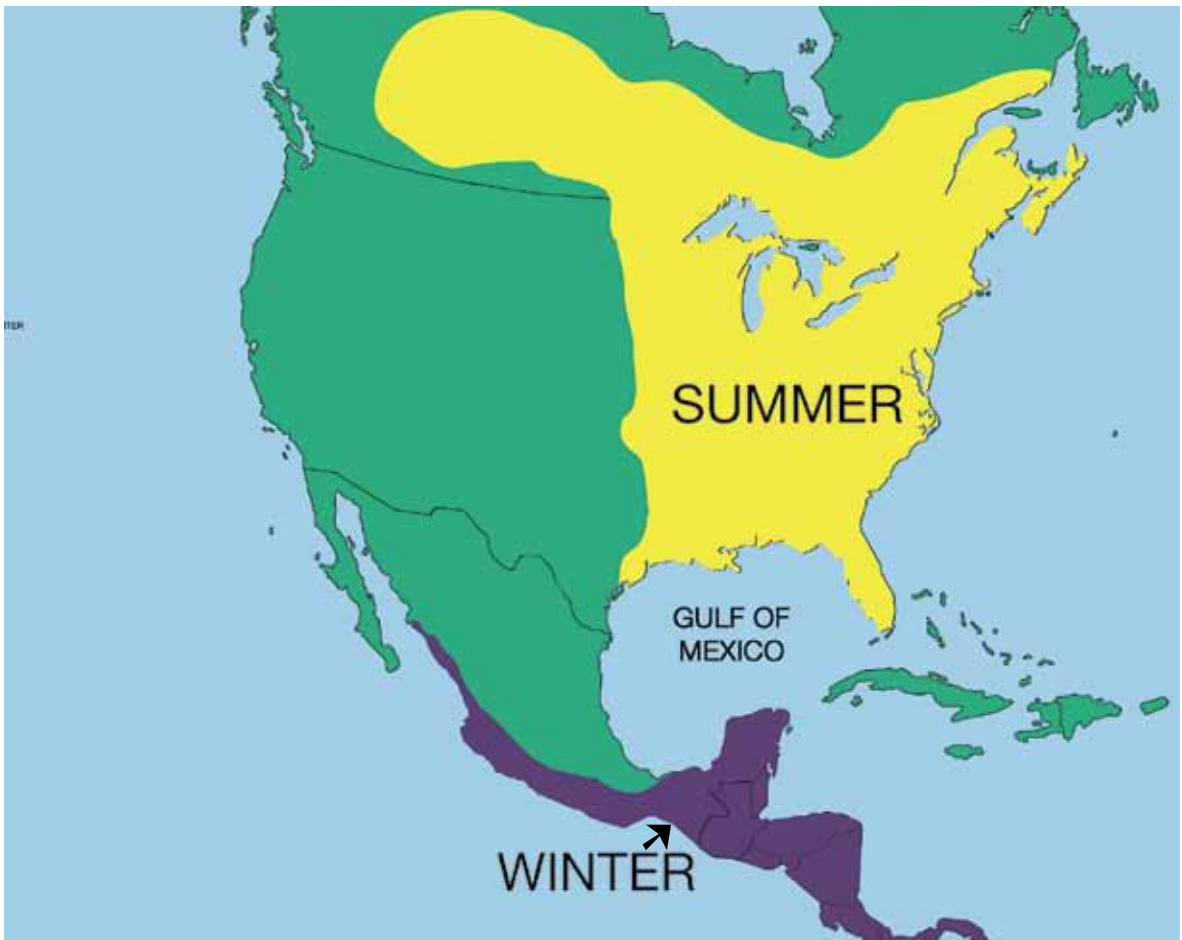


*A hummingbird approaches a flower for nectar.*

Like many birds, the ruby-throated hummingbird migrates. This means it spends part of the year in one place and part of the year in another place. It can be found in parts of the eastern United States during the late spring and early summer. When autumn rolls around, it heads south for warmer weather.

Here is an amazing fact: this tiny bird, which is shorter than your finger, doesn't migrate just a few miles. It migrates all the way across the Gulf of Mexico—500 miles—without stopping! From there, it may continue south through Mexico to Costa Rica and beyond.

Here is another interesting fact: they are the only birds that can fly backwards! They can also **hover** and fly upside-down.



*The locations where the ruby-throated hummingbird lives in summer and winter*

Their nests are very small, about half as big as a walnut shell. They make their nests using little bits of **moss** and leaves. They use spider webs to hold these little bits of nature together. They sometimes eat the spider before using its web as glue.

The spider's web is nice and sticky. It is also **flexible**. A hummingbird will lay two tiny eggs. When its tiny eggs hatch and the babies begin to grow, the spider web will allow the nest to expand. This helps the babies stay warm and safe. In the image, a hummingbird is feeding its babies. Maybe it is giving them a nice, juicy bug to eat. Maybe it is sharing a taste of sweet flower nectar with the babies.

See if you can find a more interesting little bird than that!





*A ruby-throated hummingbird feeds its babies.*



# Glossary for *Rattenborough's Guide to Animals*

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## A

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**absorb**—to take in or soak up (**absorbs**)

**activist**—a person who strongly believes in changing something and works hard to try to make change happen

**adapt**—to change

**adaptive**—easily changes to live in different environments

**adult**—grown-up

**amphibian**—an animal that can live on land and in water (**amphibians**)

**animal**—a living thing that is not a plant (**animals**)

**aquatic**—living, growing, or found in water

**Aristotle**—a Greek man who lived long ago and was one of the first people to write about classifying animals

**attract**—to draw or pull toward a person, place, or thing

## B

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**behavior**—how a person or animal acts

**burrow**—a hole in the ground dug by an animal for safety or for living (**burrows**)

## C

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**carnivore**—an animal that mainly eats meat (**carnivores**)

**characteristic**—something that makes a person, thing, or group different (**characteristics**)

**classify**—to put things into groups based on similarities or type (**classifying, classified**)

**climate**—the usual weather patterns in a particular area

**cold-blooded**—only able to control body temperature by using surroundings; Reptiles are cold-blooded.

**communicate**—to share information with others through language, writing, or gestures (**communication**)

**constant**—unchanging

**creature**—an animal (**creatures**)

**crocodile**—a large reptile that lives near water and has thick, scaly skin and very strong jaws (**crocodiles**)

## D

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**damage**—harm

**deadliest**—most likely to cause death

**duck-billed platypus**—a mammal that has a bill like a duck and lays eggs

## E

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**echo**—a sound that is repeated when sound waves bounce off the surface of an object

**exist**—to be alive (**existed**)

**extinction**—the state of no longer existing, usually referring to plants or animals that have died out completely

## F

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**feather**—one of many light, soft parts that covers a bird's skin (**feathers**)

**fin**—a bony spine covered with skin that sticks out from a fish's body and helps it swim (**fins**)

**flexible**—bendable

**flock**—a group of birds (**flocks**)

**fragile**—easily harmed

## G

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**gill**—one of a pair of organs fish use to breathe underwater (**gills**)

**gnaw**—to bite or chew something over and over

## H

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**habitat**—a place where plants and/or animals live and grow (**habitats**)

**herbivore**—an animal that only eats plants (**herbivores**)

**hibernate**—to spend a season resting or sleeping (**hibernating**)

**hover**—to float in the air close to something

## I

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**inject**—to force in fluid, like poison, usually by piercing the skin (**injects**)

**intelligent**—smart

**invertebrate**—an animal without a backbone (**invertebrates**)

**island**—an area of land completely surrounded by water (**islands**)

## K

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**kingdom**—a major group into which all living things are classified (**kingdoms**)

**knowledge**—information

**Komodo dragon**—the largest, living lizard (**Komodo dragons**)

## L

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**language**—words used to communicate

**life cycle**—the stages through which a living thing goes from birth until death

## M

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**mammal**—an animal that gives birth, has hair, feeds milk from its own body to its young, and is warm-blooded (**mammals**)

**marine biologist**—a scientist who studies underwater sea life

**migrate**—to travel back and forth from one place to another

**molt**—to shed skin (**molting, molted**)

**moss**—a very small green or yellow plant that grows on moist rocks, tree bark, or wet ground

## N

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**nature**—everything in the outside world that is not made by people

**nectar**—sweet liquid that comes from flowers

**nocturnal**—active during the night

**nostril**—one of the openings of the nose (**nostrils**)

## O

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**observe**—to watch closely and carefully (**observing**)

**ocean**—an enormous body of saltwater

**omnivore**—an animal that eats both plants and meat (**omnivores**)

**orchestra**—a group of musicians who play instruments together

**organ**—an important body part that performs a specific function (**organs**)

**oxygen**—a colorless gas that animals must breathe to stay alive



## P

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**pelt**—the skin of a dead animal with hair or fur on it (**pelts**)

**penguin**—a bird that cannot fly, has black and white feathers, and uses its wings for swimming (**penguins**)

**plumage**—birds' feathers

**poisonous**—full of poison or venom

**pollution**—making land, water, or air dirty, thus causing damage

**predator**—an animal that hunts other animals for food (**predators**)

**primate**—a mammal such as a monkey, ape, or human (**primates**)

**primatologist**—a scientist who studies primates

## R

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**reptile**—a cold-blooded animal with tough, scaly skin that uses its surroundings to control its body temperature (**reptiles**)

**rodent**—a small mammal with large, sharp front teeth, such as a squirrel, rat, or mouse (**rodents**)

# S

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**saliva**—spit

**savanna**—a large flat area of land with a lot of grass and few trees commonly found in Africa and South America

**scale**—a thin, small disc on the outside of the bodies of some animals, such as fish and reptiles (**scales**)

**school**—a large group of fish or other aquatic animals that swim together (**schools**)

**scientist**—an expert in science who has knowledge of the natural world based on facts learned through observation and experiments (**scientists**)

**scuba gear**—clothes and equipment used for diving and breathing underwater

**sign language**—a way to communicate using hands to make signs that stand for letters and words

**sonar**—a way to find things underwater using sound waves

**spinal cord**—a large group of nerves that connects to the brain and sends messages to other nerves in the body

**spine**—backbone

**startle**—to surprise (**startled**)

**submarine**—a type of ship that carries people deep underwater for a long time (**submarines**)

**submersible**—a type of ship used to travel deep underwater for research that usually operates without people inside of it (**submersibles**)

**suction cup**—a round, shallow cup that can stick to a surface (**suction cups**)

**survive**—to continue to live (**survives**)

## T

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**tadpole**—the early form of frogs and toads that has gills and a tail, but no legs (**tadpoles**)

**temperature**—the measurement of how hot or cold something is (**temperatures**)

**territorial**—keeping animals or people from coming into an area already claimed

**tongue**—the part of the mouth used for tasting, licking, and swallowing

## V

**venom**—poison produced by an animal used to harm or kill another animal

**vertebrate**—an animal with a backbone (**vertebrates**)

## W

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**warm-blooded**—having a constant body temperature; Mammals are warm-blooded.

**water moccasin**—a type of poisonous snake found in the southern United States (**water moccasins**)

**water pressure**—the weight or force of water as it presses against something or someone

**weather**—what it is like outside

**weight**—how heavy something is

**wetland**—an area of land covered with shallow water, such as a swamp (**wetlands**)

## Z

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**zoologist**—a scientist who studies animals and their characteristics (**zoologists**)

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