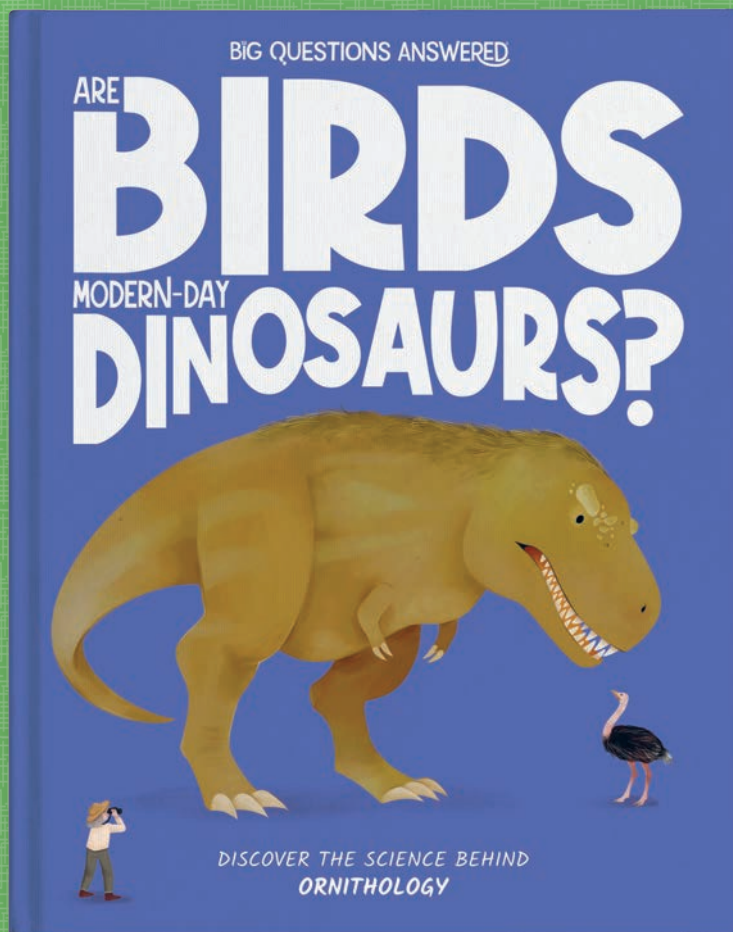


THE BIG QUESTIONS ANSWERED

TEACHERS' & PARENTS' RESOURCES

*Full of thought-provoking
questions and fascinating
extra information to
accompany this book!*



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INTRODUCTION

NOTES FOR TEACHERS, HOME EDUCATORS AND PARENTS

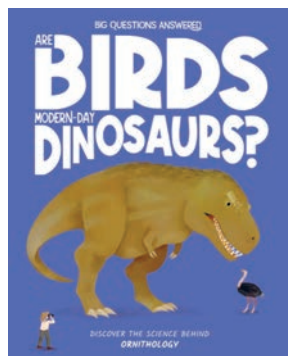
Inspire children's natural curiosity, improve literacy, and have fun learning about different sciences with The Big Questions Answered. Each book in the series is accompanied by a selection of fantastic, **FREE** downloadable resources.

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Are Birds Modern-Day Dinosaurs? book



Young Ornithologists' Activity Pack

KEY CURRICULUM TOPICS

The resources related to *'Are Birds Modern-Day Dinosaurs?'* tie in with key curriculum topics including:

- Animals, including humans
- History
- Living things and their habitats
- Earth and space
- Materials and their properties
- Rocks
- Working scientifically

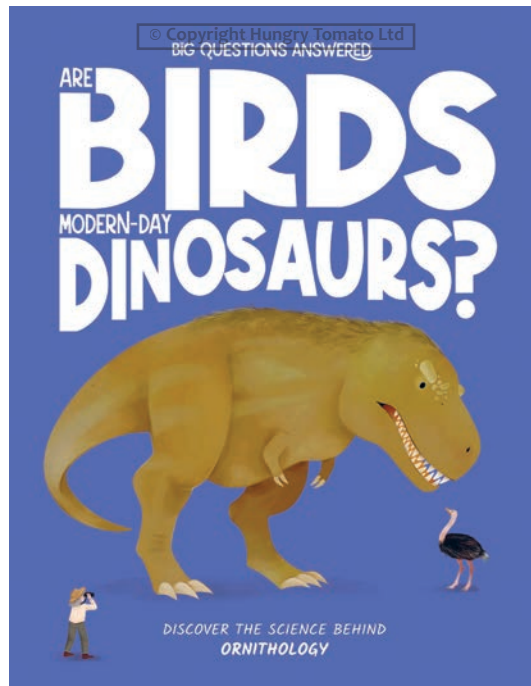
The most relevant topics are indicated throughout this guide.

ARE BIRDS MODERN-DAY DINOSAURS?

This book explores the extraordinary world of ornithology by following the discovery of the part-bird, part-dinosaur, Archaeopteryx, which led scientists to uncover the link between birds and dinosaurs. As well as covering key facts from this specific discovery, the book explores different bird species, their clever adaptations, and the incredible things they do today to help our planet stay happy and healthy.

PRE-READING QUESTIONS

Engage in discussion about the general topic of ornithology, birds, and dinosaurs with the suggested questions below.



- Do you think birds and dinosaurs are related?
- How many different types of birds can you think of?
- What do you know about birds already?

AN UNUSUAL DISCOVERY: SCENE 1

The material for this scene can be linked to curriculum topics, including: animals, including humans; everyday materials; living things and their habitats; rocks.

Discover the fossil that led to scientists changing their understanding of where birds came from! Engage in discussion about fossils and what they can teach us about the animals that lived on Earth millions of years ago.



DISCUSSION PROMPTS

- What is a fossil?

Information overleaf

- Do you think the fossil animal looks more like a bird or a dinosaur? Why?

Encourage children to write down their answers. The answer is revealed in the fourth scene of the main book, and they'll then be able to see if they were right!

- What do you know about dinosaurs? How are they different from the animals that live on Earth today?

Information overleaf

ACTIVITY

Corresponding activity on page 3 of the activity pack: 'Fossil Hunt' is a task where children match up the dinosaur with its skeleton! With handy hints, this is a fun activity that reinforces how fossil bones were once inside living dinosaurs.

AN UNUSUAL DISCOVERY: SCENE 1

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

FOSSILS

Fossils are the **remains** or **impressions** of living things that were alive more than 10,000 years ago and have been **preserved** underground. Fossils come from animals, like bones, footprints, or poop, or from plants, like leaves and pollen.

Fossils are very **rare** and are usually buried really deep underground. Because of this, scientists think they will never find all the fossils in the world. Fossils are also very **fragile**, which means they break easily, so scientists must be very careful when digging them up.

Thanks to fossils, we can learn about the plants and animals that lived on Earth millions of years ago! The scientists that study fossils are called **palaeontologists**.

DINOSAURS

Dinosaurs are a group of **reptiles** that ruled the Earth for more than 170 million years. There were many different dinosaur **species** and they all came in different shapes and sizes – from gigantic T.rex and Diplodocus to tiny Microraptor. Most died out 66 million years ago, but (as shown later in the main book) there is now evidence that links birds with dinosaurs.

Dinosaurs stood upright with their legs directly beneath them, unlike reptiles today whose legs stick out to the side.

The word “dinosaur” means “terrible lizard” – the group of animals was named almost 200 years ago based on just a few huge fossil bones.

THE DISCOVERY OF ARCHAEOPTERYX

The fossil in the scene is the Archaeopteryx, which is discussed in detail in the main book.

This specific fossil was not the first Archaeopteryx ever found; however, it was the most complete **skeleton** to date which made it very important.

It was found in **limestone**, a soft type of **rock**, by a farmer called Jakob Niemeyer. Jakob sold it to an innkeeper in exchange for a cow. The fossil was sold several times to different owners before it was studied **scientifically**.

WHEN DINOSAURS RULED THE WORLD: SCENE 2

The material for this scene can be linked to curriculum topics, including: animals, including humans; history; living things and their habitats; working scientifically.

Explore the prehistoric planet with this scene which jumps back in time to when dinosaurs walked the Earth. Discuss the different types of dinosaurs that existed and how they can be grouped based on their features.



DISCUSSION PROMPTS

- Can you name any of the dinosaurs in this scene?
Information overleaf
- What differences can you spot between the different dinosaurs in this scene?
 - Do you know when the dinosaurs walked the Earth?
Information overleaf
 - Do you know what a palaeontologist is and what they do?
Information overleaf

ACTIVITY

Corresponding activity on page 4 of the activity pack: 'Dinosaur Tricksters' is a spot the difference activity where children have to spot 10 differences between 2 versions of the scene.

WHEN DINOSAURS RULED THE WORLD: SCENE 2

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

TYPES OF DINOSAURS

Scientists classify dinosaurs into groups based on their **features**. The main ones are:

- Sauropods – a type of huge dinosaur that had a long neck and tail, trunk-like legs, but a small head. Examples include Alamosaurus (pictured in the scene) and Diplodocus.
- Theropods – a type of meat-eating dinosaur that walked on two legs and had short arms. Examples include T.rex (pictured in the scene) and Velociraptor.
- Cerapods – a type of plant-eating dinosaur that had thick, strong teeth and thick bone at the back of their skull. Examples include Triceratops (pictured in the scene) and Pachycephalosaurus.
- Thyreophora – a type of plant-eating dinosaur that had thick body armour. Examples include Ankylosaurus (pictured in the scene) and Stegosaurus.

Fun fact – Pterodactyls (seen flying in the scene) are often called dinosaurs but they technically aren't because their hip and arm bones are shaped differently!

PREHISTORIC TIME PERIODS

Dinosaurs first appeared around 245 million years ago. There were 3 main **time periods**:

- **Triassic** period (252-201 million years ago) – a very dry, hot time when lots of land on Earth was desert! Triassic dinosaurs included Coelophysis and Plateosaurus.
- **Jurassic** period (201-145 million years ago) – a wetter time when forests and lots of new plants grew. Jurassic dinosaurs included Allosaurus and Diplodocus.
- **Cretaceous** period (145-66 million years ago) – some of the most famous dinosaurs lived in this period, including T.rex, Triceratops, and Spinosaurus.

PALAEONTOLOGISTS

These scientists study **fossils**! They spend long periods of time on **dig sites**, carefully digging up fossils from the ground. They also work in the **lab**, studying fossils to work out how old they are, what animal they came from, and lots of other amazing facts.

AMAZING ARCHAEOPTERYX: SCENE 3

The material for this scene can be linked to curriculum topics, including: animals, including humans; living things and their habitats; working scientifically.

Explore what scientists think Archaeopteryx looked like when it was alive with this scene recreating this curious animal. Discuss the similarities and differences between this animal, and birds and dinosaurs.



DISCUSSION PROMPTS

- Which parts of the Archaeopteryx remind you of birds and which parts remind you of dinosaurs?

Encourage children to write down their answers. The similarities between Archaeopteryx and dinosaurs are revealed in the following scene of the main book.

- How is Archaeopteryx different from the dinosaurs in the previous scene?
 - What do you think Archaeopteryx ate?
Information overleaf

ACTIVITY

Corresponding activity on page 5 of the activity pack: 'Words Back in Time' is a word search activity, using lots of great dinosaur words to get children familiar with prehistoric Earth and how we learn about it.

AMAZING ARCHAEOPTERYX: SCENE 3

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

ARCHAEOPTERYX KEY FACTS

- **Name means:** “ancient wing”.
- **When it lived:** Archaeopteryx lived approximately 150 million years ago, in the **Jurassic period**.
- **Size:** Archaeopteryx was thought to be similar in size to a modern-day pigeon. This made it much smaller than many other dinosaurs of the time.
- **Diet: Carnivore.** Archaeopteryx was a meat-eating animal that may have eaten small reptiles, mammals, or insects.
- **Feathers:** Archaeopteryx had feathers all over its body and wings. Scientists have used clever machines to work out that these feathers had probably been black.
- **Where its fossils have been found:** Germany.

BIRD CHARACTERISTICS

There are several features that make modern-day birds different from other animals, but the main one is feathers – no other living type of animal today has feathers.

While different types of birds can look very different from each other, they all share the following features and characteristics:

- They are **warm-blooded** animals that also have a backbone.
- They have a four-chambered heart.
- They have wings.
- They lay a hard-shelled egg.
- Their vision is better than any of their other senses.

Some different types of modern-day animals may also have some of these features, but only birds have them all.

The main similarities between Archaeopteryx and birds are feathers and wings.

DINOSAUR CONNECTIONS: SCENE 4

The material for this scene can be linked to curriculum topics, including: animals, including humans; living things and their habitats; working scientifically.

Uncover how scientists discovered that Archaeopteryx was part-bird and part-dinosaur by looking at the links between Archaeopteryx and Velociraptor, a theropod.



DISCUSSION PROMPTS

- Do you know any other dinosaurs that belonged to the theropod group?
Information overleaf
- Why do you think some animals, including dinosaurs, have feathers?
Information overleaf
- Why do you think birds that live on Earth today look different from the Archaeopteryx?
Information overleaf

ACTIVITY

Corresponding activity on pages 6-9 of the activity pack: 'Animal Detective' is an activity where children have to label the birds and dinosaurs with the corresponding body part. Multiple sheets have been provided.

DINOSAUR CONNECTIONS: SCENE 4

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

THEROPODS

Theropods were one of the main groups of dinosaurs. They walked on two legs, had short arms, and were **carnivores**, which means they ate meat from animals. As well as Velociraptor (shown in scene), examples of theropods include T.rex, Allosaurus, Spinosaurus, and Compsognathus.

FEATHERS

For many years, scientists thought that dinosaurs were all covered in scales like **reptiles** today, but they now know some had feathers! Evidence of feathers has mostly been found on meat-eaters, like theropods, that lived towards the end of the **Age of Dinosaurs**. Scientists think feathers developed over time as they haven't found evidence of feathers on early meat-eating dinosaurs.

Scientists think that dinosaurs developed feathers for the same reasons that birds do today: to help them fly, to keep warm, or to attract a **mate**.

In our modern-day world, birds are the only animals that have feathers. All birds have feathers, even those that can't fly, like ostriches and penguins.

BIRD ADAPTATIONS

Animals that are able to change part of their bodies or their behaviour to better fit their surroundings are more likely to **survive**. Scientists call these changes **adaptations**. Adaptations are part of the reason that there are so many different animal **species** that look and act differently around the world.

Modern-day birds are different from Archaeopteryx in many ways, including:

- They don't have teeth – this makes their bodies lighter, which helps them fly. It also means they can more easily eat insects, nuts, and seeds.
- They have some toes that face backwards – this means they can perch on branches and walk up **vertical** surfaces like tree trunks.
- They don't have claws on their wings – being able to climb up trees with their toes and catch prey with their beaks means wing claws were no longer needed.

THE END OF THE DINOSAURS?: SCENE 5

The material for this scene can be linked to curriculum topics, including: animals, including humans; Earth and space; living things and their habitats; working scientifically.

Explore what happened when the giant asteroid hit Earth millions of years ago, causing almost all the animals that existed to be wiped out! Discuss what asteroids are, why this one was so catastrophic, and how scientists found out about it.



DISCUSSION PROMPTS

- What is an asteroid?
Information overleaf

- How do you think the asteroid wiped out nearly all the animals that existed?
Information overleaf

- How do scientists know this happened?
Information overleaf

- How do you think some animals survived this event?

Encourage children to write down their answers. The answer is revealed in the following scene of the main book.

ACTIVITY

Corresponding activity on page 10 of the activity pack: 'Word Smash' is an activity where children have to unscramble the letters to spell out dinosaur-themed words. In a linked activity, they have to see how many words they can create out of set letters.

THE END OF THE DINOSAURS?: SCENE 5

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

ASTEROIDS

Asteroids are space rocks left over from the early formation of our **solar system**.

Most asteroids today float between Saturn and Jupiter; however, occasionally asteroids are pulled by **gravity** in different directions, causing them to stray from their normal flight path and crash into a **planet**.

ASTEROIDS & DINOSAURS

Scientists have **debated** the reason the dinosaurs, as we know them, became **extinct**, but most now believe that a gigantic asteroid crashed into Earth about 66 million years ago. They think the asteroid was between 6 and 9 miles wide (10-15 km) but because it was moving so fast, it made an even BIGGER **crater** when it hit Earth.

How did it cause **mass extinction**? The **impact** of the asteroid hitting the ground would have thrown up lots of **debris** and caused **tidal waves**, hurting animals nearby. Scientists also think the impact caused lots of **volcanic eruptions** and **wildfires** which, as well as hurting animals nearby, caused lots of **dust** to spread around the world and blocked out the Sun for up to 15 years!

This had a knock-on effect on the **food chain**: fewer plants could grow so plant-eaters had little to eat and started to die off, leaving meat-eaters with nothing to eat either.

HOW DO WE KNOW THIS HAPPENED?

The event of the asteroid hitting the Earth and causing a mass extinction at the end of the **Age of Dinosaurs** is called the “**K-T extinction event**”.

Two scientists came up with this **theory** after finding an ancient layer of **rock** which was rich in specific **minerals** that suggested it had been caused by an asteroid hitting Earth. This layer of rock dates to the time when we know dinosaurs died out – dinosaur fossils are only found in rock that is older. Many huge craters have been found dating back to this same period of time too, the main one being off the coast of modern-day Mexico.

This is the most supported theory for why the dinosaurs, as we know them, died out.

PREHISTORIC SURVIVORS: SCENE 6

The material for this scene can be linked to curriculum topics, including: animals, including humans; living things and their habitats; plants.

Discover the animals that survived the extinction event, including a tiny dinosaur relative, and why scientists think they survived. Consider the importance of adaptation in the animal kingdom, as well as the food chain.



DISCUSSION PROMPTS

- Why do you think these birds didn't have teeth?
Information overleaf
- Can you think of any other animals that have special features, or act in a certain way, to help themselves survive?
Information overleaf
- Can you name any examples of mammals, fish, and reptiles? What makes these types of animals different from each other?
Information overleaf

ACTIVITY

Corresponding activity on page 11 of the activity pack: 'Incredible Birds' is a mixture of research and creativity. Children choose a bird, research it, fill in the fact file, and draw it. This activity can be printed multiple times to generate a fact booklet!

PREHISTORIC SURVIVORS: SCENE 6

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

TSIDIYAZHI ABINI

The first **fossils** of this bird were found in New Mexico, USA, by two 11-year-olds on a fossil hunt! Their father, a scientist, collected and studied the fossils with his team. They worked out the age of the fossils, what the bird looked like, and the family trees of 10 similar birds that appeared soon after the **mass extinction**.

Tsidiyazhi abini is similar to the modern-day mousebird. It could also turn one toe backwards, allowing it to grip onto branches and twist its body 180°, something owls do today but most **prehistoric** birds couldn't. Scientists think birds stopped growing teeth to make their bodies lighter and help them fly, and to more easily eat insects, nuts, and seeds.

DIFFERENT TYPES OF ANIMALS

Mammals, fish, and reptiles thrived after the mass extinction, but what are these animals?

- **Mammals:** **warm-blooded** animals that produce milk to feed their young.
- **Fish:** animals that live in water and have fins instead of arms or legs to help them swim.
- **Reptiles:** **cold-blooded** animals that have scales and lay eggs instead of giving birth to live young.

PREHISTORIC SURVIVORS

Scientists aren't sure why only some animals survived, but they have ideas. For example, they think crocodiles survived because they could alter their diet to fit what was around, meaning they weren't relying on one food source. The ability to **adapt** seems important.

MODERN-DAY SURVIVORS

Modern-day adaptations that help animals survive include:

- **Camouflaging** skin or fur to blend in with surroundings, for example chameleons.
- Creating **venom** to harm **predators**, for example some snakes and scorpions.
- Becoming **nocturnal** to regulate temperature in hot climates, for example bats.
- **Moving around in herds** to stay safer from predators, for example wildebeest.
- **Hunting in packs** to make hunting more successful, for example hyenas.
- **Growing long necks** to help reach food, for example giraffes.
- **Bright skin** to scare predators away, for example some frogs.

TERRIFYING TERROR BIRDS: SCENE 7

The material for this scene can be linked to curriculum topics, including: animals, including humans; living things and their habitats; plants.

Take a look back in time to some of the most ferocious prehistoric birds that ever lived. Discuss the reasons that can cause animals and plants to become extinct, and the impact this has on the wider natural world.



DISCUSSION PROMPTS

- Can you name the animal that the birds are attacking?
Information overleaf
- Who do you think would win this fight? Why?
- Neither of these animals are around anymore. What do you think causes animals (and plants) to become extinct?
Information overleaf

ACTIVITY

Corresponding activity on page 12 of the activity pack: 'Fierce Animals' is a crossword activity where children use clues to name the different body parts animals use to fight for survival! They can then fill in the crossword with the answers.

TERRIFYING TERROR BIRDS: SCENE 7

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

TERROR BIRDS

Terror birds lived from about 62 million years ago to 2.5 million years ago! These meat-eaters were huge and scientists think they could run pretty quickly, making their name appropriate. They are thought to have been at the top of the **food chain** for a long time.

From **fossils**, scientists have worked out that terror birds had very good hearing, strong hooked beaks, and that the largest of them stood at about 3 metres (10 ft) tall. That's almost the same height as a basketball hoop!

SABRE-TOOTHED CATS

The other animal pictured in the scene is a saber-toothed cat.

These animals outlived the terror birds, only becoming **extinct** about 12,000 years ago. It's thought these two animals lived in separate places for millions of years, until the current **continents** of North and South America joined up and travel between the two pieces of land was possible.

Scientists think that the sabre-toothed cats and terror birds **competed** for the same food, leading the birds to eventually become **extinct** due to lack of food.

EXTINCTION

What does it mean to become extinct? When a **species** dies out and no more of those things exist, we say that the species has become extinct. It's not just animals that become extinct; plants can too.

By looking at fossils, scientists have discovered lots of species that lived in the past but are now extinct. However, it's not just a problem of the past. Millions of plants and animals that live on Earth today are in danger of becoming extinct.

Scientists and **wildlife conservation** companies monitor animal **populations** around the world, ranking them on how close they are to extinction and working to save them.

Extinction can happen for many reasons, but some of the most common reasons include **habitat** loss, loss of **food sources**, **hunting** (by humans), **disease**, and **climate change**.

BEAUTIFUL BIRDS OF TODAY: SCENE 8

The material for this scene can be linked to curriculum topics, including: animals, including humans; living things and their habitats; working scientifically.

Dive into the world of modern-day birds with this bright flamingo scene. Discuss the different habitats where bird species live on Earth today, as well as the different ways that ornithologists study them.



DISCUSSION PROMPTS

- How do you think ornithologists study birds that are alive today?
Information overleaf
- Where do birds live in the world? What sort of environments do you think they like?
Information overleaf
- What do you think the ornithologist in the scene would be feeling?
Give examples of emotions such as feeling excited, scared, curious, and so on.
- Do you know why flamingos stand on one leg?
Information overleaf

ACTIVITY

Corresponding activity on page 13 of the activity pack: 'Diary Entry' is a creative writing activity which encourages children to imagine they are on a birdwatching expedition when they discover a new type of bird, and describe it in a diary entry.

BEAUTIFUL BIRDS OF TODAY: SCENE 8

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

ORNITHOLOGISTS

These scientists study everything to do with birds, from **classifying** new **species** to studying their **behavior**, and working out how to **protect them**. It is a very varied job.

Ornithologists often go on **field trips** to study birds in their natural **habitats**. **Fieldwork** can involve watching bird behavior, counting the number of birds in a specific place, and monitoring nests. The scientists take photos, write down their **observations**, and sometimes attach small bands to a bird's leg to identify individual birds they want to study.

Some ornithologists work in the lab instead. **Lab work** can include studying feathers or bones that have been collected during fieldwork or tracking data that has been collected to learn about changes to bird behavior or their **population** numbers.

BIRD HABITATS

Birds live on every **continent** in the world, and in all sorts of **environments**. Our planet is made up of different **habitats** – places with specific features such as weather patterns. Over time, plants and animals **adapt** to the conditions of their habitat. For example:

- Penguins have adapted to the frozen lands of Antarctica by growing multiple layers of overlapping feathers which are waterproof to keep them dry and warm.
- Black-throated sparrows have adapted to the hot, dry deserts of America by hiding in the shade during the day and getting all the water they need from the food they eat.

Some other examples of habitats include rainforests, swamps, grasslands, and mountains.

FLAMINGOS

The **wetlands** where flamingos live are another example of a habitat. They have adapted to this habitat by growing very long legs so they can walk into deeper water and catch more food to eat, while keeping their feathers dry. They also have scales on their legs to protect them from water that is hot or contains lots of **chemicals**.

These birds are known for standing on one leg. But why do they do it? Scientists think this unusual position helps flamingos in several ways, including **regulating** their body **temperature** and stopping their leg **muscles** from getting too tired.

SPREADING SEEDS: SCENE 9

The material for this scene can be linked to curriculum topics, including: animals, including humans; living things and their habitats; plants.

Dive in and discover some of the incredible things birds do that help our natural world. This scene covers how birds spread seeds which are then able to grow into new plants.



DISCUSSION PROMPTS

- Why do plants need to spread their seeds?
Information overleaf
- Can you think of any other ways that plants' seeds are spread?
Information overleaf
- Do you know any other ways that plants and animals help each other out?
Information overleaf
- Can you think of any other ways that birds help nature?

Encourage children to write down their answers. There are some examples in the twelfth scene of the main book.

ACTIVITY

Corresponding activity on page 14 of the activity pack: 'Bird Spotting Journal' is an activity where children go walking with an adult in search of different birds. There is space to draw and write facts about each bird so that they can build a whole booklet.

SPREADING SEEDS: SCENE 9

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

PLANTS AND SEEDS

Every plant, from tiny flowers to gigantic trees, starts its life as a **seed**. If it's in the right conditions, the seed will grow **roots**, a **shoot**, and eventually turn into a full-size plant with **leaves** and **flowers** or **fruit**. Fully-grown plants produce lots of seeds which need to spread so that many more plants can grow and keep the cycle going.

As plants can't move around, they need clever ways of spreading seeds to make sure that plants keep on growing in the world. Some of the ways seeds are spread are explained in this scene, with the birds knocking fruit off branches, and pooping out seeds.

SPREADING SEEDS

There are many other ways that seeds can be spread. For example:

- Some plants grow exploding **seedpods** which shoot lots of seeds really far away.
- Some plants rely on the wind to pick up their seeds and blow them away. These seeds are shaped to fly or spin through the air.
- Plants that grow over rivers or streams have their seeds spread by the **current** as fruit containing seeds falls into the water below.

HELPING EACH OTHER OUT

Lots of plants and animals help each other stay healthy and alive. For example:

- **Pollinators**, like bees, travel from flower to flower, eating **nectar** and moving **pollen** around at the same time, which allows plants to make new seeds.
- Tube-like pitcher plants make the perfect **nesting** place for small animals like bats. In exchange for shelter, the bats poop inside the plants. This may sound gross, but the plants use the **nutrients** from the poop to keep themselves healthy!
- In the desert at nighttime, the senita moth travels from flower to flower, pollinating the plants so they can make new seeds. As it does so, it lays an egg on each flower. The flowers close up in the day, protecting the egg while it hatches.

HELPFUL HONEYGUIDES: SCENE 10

The material for this scene can be linked to curriculum topics, including: animals, including humans; living things and their habitats; plants.

Uncover the surprising way that birds help humans by looking at the greater honeyguide bird. Discuss why this is unusual, contrasting with the reasons that birds are normally afraid of humans.



DISCUSSION PROMPTS

- How do you think these birds and humans communicate with each other?
Information overleaf
- Can you think of any other ways that animals communicate and the reasons they do?
Information overleaf
- Do you think it's good that humans and animals work together like we see in this scene? Why?

ACTIVITY

Corresponding activity on page 15 of the activity pack: 'Honey Hunt' is a fun maze activity for children to help the honey hunter follow the honeyguide bird through the maze to reach a beehive full of honey.

HELPFUL HONEYGUIDES: SCENE 10

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

HONEYGUIDE BIRDS

These **unique** birds have a special relationship with humans. It's thought that they have been directing us towards honey for around 500 years! Most animals are scared of humans, but the greater honeyguide bird doesn't seem to be.

Some communities in Africa, where this honeybird lives, have reported seeing the birds working with honey badgers (pictured in the scene) to find and reach honey, although it's thought they don't communicate in the same way with badgers as they do with humans.

HONEYGUIDE COMMUNICATION

Both the humans and birds **communicate** with each other during the honey-hunting process. The humans use a special call to draw the birds to them. The call changes depending on the area – honeyguide birds in different places respond to different sounds.

The bird then flies away in the direction of the honey, making its own calling sounds for the human to follow. Once the bird has reached the tree with the honey inside, it sits near the beehive silently. That's when the person knows they're in the right place.

Once the beehive has been opened, the humans take the honey and leave behind the empty hive and some of the beeswax, which the birds love to eat.

ANIMAL COMMUNICATION

The greater honeyguide is the only wild animal known to communicate back and forth with humans, but there are lots of ways animals communicate with each other, such as:

- **Sound** – Monkeys cry out to warn others that a **predator** is near. Some monkeys even have different calls to indicate different predators.
- **Sound** – Bullfrogs croak to attract **mates**.
- **Scent** – Dogs mark their **territory** by peeing. This spreads their scent around and warns other animals to stay away from that area.
- **Visual** – The height of a male deer's antlers shows how powerful it is; the bigger the antlers, the more powerful it is.
- **Visual** – The bright colours on a Gila monster tell predators that it is **poisonous**, and that they should stay away.
- **Touch** – Sea otters rub their faces and noses together to show **affection**.

FEATHERY CLEANUP CREW: SCENE 11

The material for this scene can be linked to curriculum topics, including: animals, including humans; living things and their habitats; working scientifically.

Explore how birds keep our natural world clean and free from disease and illness by jumping into this scene which shows how vultures clean up animal carcasses.



DISCUSSION PROMPTS

- What is a scavenger?
Information overleaf
- Can you think of any other animals that are scavengers?
Information overleaf
- How do scientists know what different dinosaurs ate?
Information overleaf

ACTIVITY

Corresponding activity on page 16 of the activity pack: 'Dinnertime!' is a classic line maze activity where children have to complete the maze to help the lonely vulture get back to its flock for dinner.

FEATHERY CLEANUP CREW: SCENE 11

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

VULTURES

Vultures live on most **continents** in the world, except for Australia and Antarctica.

They are **scavengers**, which means they don't hunt live animals for **prey** but eat from the **carcasses** of animals that are already dead. Vultures have such strong **acid** in their **stomachs** that they can break down and **digest** bones! One type of vulture, the bearded vulture, eats more bones than actual meat.

SCAVENGERS

Vultures aren't the only animal scavengers. Some more examples include:

- Blowflies feed on the dead **flesh** around the **wounds** of livestock, like sheep and cattle, as well as **rotting** plant matter.
- Cockroaches feed on dead animals, as well as plants, paper, and other material.
- Lone hyenas mostly feed on dead animals, but they will take down live prey when working in a **pack**.
- Great white sharks feed on dead whales, fish, and other sea creatures if they come across them, as well as hunting for live prey.

Most animals will scavenge if they get the chance, even if dead meat is not their favourite.

WHAT DID DINOSAURS EAT?

We know what dinosaurs ate thanks to **fossils**. Palaeontologists look at the shape and size of the teeth, markings on teeth and bones, fossil **remains** inside dinosaurs' bellies, and even fossilised poop to work out what dinosaurs ate!

Just like animals today, dinosaurs all ate different things. Some, like T.rex and Allosaurus, were **carnivores** and only ate meat, while others, like Diplodocus and Stegosaurus, were **herbivores** and only ate plants. Less fussy dinosaurs, like Troodon and Oviraptor, were **omnivores** which means they ate meat AND plants. Very few dinosaurs were **piscivores** and ate just fish, but this group included Spinosaurus and Baryonyx.

LOOKING AFTER NATURE: SCENE 12

The material for this scene can be linked to curriculum topics, including: animals, including humans; living things and their habitats; plants.

Discover more amazing things that birds do to help keep our natural world happy, healthy, and balanced. From eating parasites to having nutrient-filled poop, these varied animals are full of surprises!



DISCUSSION PROMPTS

- What dangers or threats are birds facing?
Information overleaf
- Can you think of any ways we can help protect birds so that they can keep helping the planet out?
Information overleaf
- Do any other animals help our planet like birds do?

ACTIVITY

Corresponding activity on page 17 of the activity pack: 'Nature's Friends' is a classic activity where children fill in the blanks in a series of sentences and facts about birds and what they do for our natural world.

LOOKING AFTER NATURE: SCENE 12

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

EXAMPLES IN THE SCENE

- 1) This scene shows oxpecker birds on a rhino. These animals have a **symbiotic relationship**.
- 2) This scene shows chickadee birds eating caterpillars off **crops**.
- 3) This scene shows red-footed booby birds in the Chagos Archipelago, located in the Indian Ocean.

THREATS TO BIRDS

Unfortunately, birds around the world are facing lots of dangers. Some examples include:

- **Habitat loss:** human activity such as cutting down trees, and building houses and skyscrapers, are just a few examples of why there are fewer places for birds to live.
- **Illness:** the use of **chemicals**, like pesticides and fertilisers, which are used on farmland and crops can make their way into birds' diets, causing illness and even poisoning them.
- **Climate change:** changes to temperatures and weather patterns, and an increase in **natural disasters** affect birds directly, as well as their **habitats**, food sources, and **migration patterns**.
- **Plastic pollution:** seabirds often think small pieces of plastic are food, leading to injury, poisoning, or **starvation**. They can also get tangled up and trapped inside plastic waste.

PROTECTING BIRDS

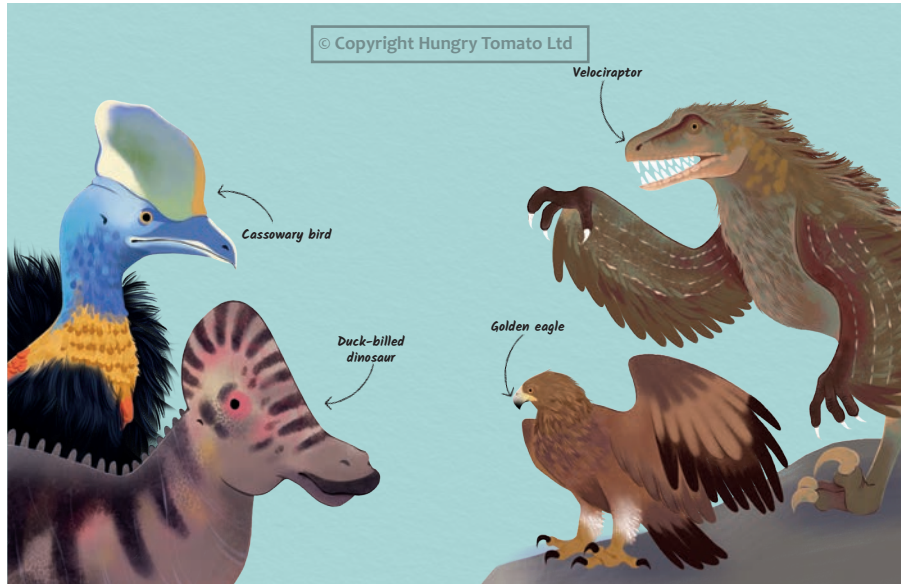
Thankfully, there are things we can do to help birds out. Some examples include:

- **Plant native plants and trees:** with more plants around, birds have access to more food, shelter, and places to live and make nests.
- **Avoid using pesticides:** this means birds are less likely to come into contact with harmful chemicals.
- **Avoid buying plastic:** using items made from recycled, natural materials is much more friendly for the natural world as it reduces harmful waste.

FUNNY FAMILY MEMBERS: SCENE 13

The material for this scene can be linked to curriculum topics, including: animals, including humans; living things and their habitats; working scientifically.

Compare some modern-day birds with their dinosaur ancestors to see the physical similarities they share and reflect on the purpose of these features. Discuss how different scientists often have to work together to make discoveries as big as this.



DISCUSSION PROMPTS

- How many similarities can you spot between the pairs of animals on each side of the scene?
- What do you think the animals on the left use their unusual-shaped heads for?
Information overleaf
- Can you think of any other animals and dinosaurs that share features like this?
Information overleaf
- Do you think the ornithologists could have made this discovery without the help of the palaeontologists?
Information overleaf

ACTIVITY

Corresponding activity on page 18 of the activity pack: 'Spectacular Connections' is a true or false quiz. Children use what they have learnt from reading the main book, as well as their intuition, to fill in the answers.

FUNNY FAMILY MEMBERS: SCENE 13

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

HEAD CRESTS

Scientists don't know exactly what duck-billed dinosaurs used their **head crests** for. They could have helped them spot other duck-billed dinosaurs, control their **body temperature**, or **communicate** with others – they may have blown air through it to make loud sounds!

The cassowary bird's head crest is equally mysterious. Scientists wonder whether it was developed to protect the bird's head from falling fruit or help it **navigate** through **foliage**. But scientists think it's most likely used to help the bird control its body temperature and make louder noises to communicate with other birds that are further away.

SHARED FEATURES

There are lots of shared features between birds and dinosaurs, including:

- **Beaks:** many dinosaurs, like duck-billed dinosaurs and oviraptors, had beak-like mouths, similar in shape to birds today. The main difference is that dinosaurs all had teeth, whereas most modern birds don't.
- **Sharp claws:** many birds and dinosaurs share sharp claws on their feet which help with gripping things, and hunting **prey**. It is very rare for birds today to have claws on the end of their wings like dinosaurs had, but the hoatzin bird from South America does!
- **Feet shape:** chickens have hand-like feet that are similar in shape to T.rex's feet. They are also covered in scales, just like their **reptile ancestors**.
- **Nesting habits:** ostriches come together in big groups to make nests and lay eggs, making it easier to protect their **young**. It's thought that many dinosaurs did the same.

TEAMWORK IN SCIENCE

Although **ornithologists** have discovered lots about modern-day birds, it's clear to see how helpful **palaeontologists** were in helping them understand where birds came from. There's no doubt that the discovery of the link between birds and dinosaurs helped palaeontologists better understand their own field of science too.

As lots of fields of science overlap, different scientists often have to work together to make discoveries, so being able to work as part of a team is incredibly important.

POST-READING QUESTIONS

Engage in discussion about the journey taken throughout the book and the facts that were uncovered, with the suggested questions below.

- Were you surprised to learn that birds are modern-day dinosaurs?
 - Did anything else in the book surprise you?
 - What's the coolest thing you've learnt from this book?
 - Do you have a favourite bird?
-

ACTIVITY

Corresponding activity on page 19 of the activity pack: 'Write Your Own Ornithology Story' is a creative writing activity which encourages children to write a story about ornithology, using three key prompt words.

THE BIG QUESTIONS ANSWERED

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