# **BIG QUESTIONS ANSWERED**

# FACHERS' BARENIS' BESOURCES

Full of thought-provoking questions and fascinating extra information!



# **CONTENTS:**

Introduction	3
Pre-Reading Questions	4
The Discovery of a Lifetime: Scene 1	5
Fossil Detectives: Scene 2	8
A Herd Of Dinosaurs: Scene 3	11
<b>Dig, Dig, Dig:</b> Scene 4	14
In the Lab: Scene 5	17
Ageing Fossils: Scene 6	20
An Egg-Cellent Discovery: Scene 7	23
Building a Full-Size Skeleton: Scene 8	26
Dinosaur X-Ray: Scene 9	29
Long, Long Necks: Scene 10	32
Fight for Survival: Scene 11	35
The Big Reveal: Scene 12	38
The Biggest of All: Scene 13	41
Post-Reading Questions	44

# INTRODUCTION

#### NOTES FOR TEACHERS, HOME EDUCATORS AND PARENTS

These resources accompany *Is This The Biggest Dinosaur Ever?*, our captivating narrative non-fiction children's book. They have been designed to inspire childrens' curiosity and encourage them to have fun while learning about science and improving their literacy.

These pages are full of fun ideas for getting children involved in discussions about the topics raised in the main book, as well as extra information and hands-on activities that help them explore the science and key topics in an engaging way.

Whilst this resources pack has been designed to be used by teachers, home educators and parents, it works alongside an **activity pack** which can be printed off as a booklet or as individual pages. The activity pack is full of soft-learning, fun activities, all subtly linked to the field of science. **Information as to how these booklets link is indicated on the relevant pages.** 

> Download the activity pack that accompanies the book for free at: www.thebigquestionsanswered.com



#### **KEY CURRICULUM TOPICS**

The resources related to *Is This The Biggest Dinosaur Ever?* tie in with key curriculum topics including:

- Animals
- Creative writing and literacy
- Living things and their habitats
- Materials and their properties
- Rocks
- Working scientifically

The most relevant topics are indicated throughout this guide.

#### IS THIS THE BIGGEST DINOSAUR EVER?

This book explores the extraordinary world of palaeontology by following the discovery of the biggest dinosaur ever, the Patagotitan mayorum. As well as covering key facts from this specific discovery, the book explores the wider prehistoric world by looking at different dinosaur species, clever adaptations, and the fascinating methods scientists use to uncover the secrets of the Age of Dinosaurs.

#### **PRE-READING QUESTIONS**

Engage in discussion about the general topic of palaeontology and dinosaurs with the suggested questions below.



- How many different dinosaurs can you name?
- What's the biggest dinosaur that you can think of?
- Do you know how we know about the dinosaurs?

#### THE DISCOVERY OF A LIFETIME: SCENE 1

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

Jump into the initial find that led to one of the biggest dinosaur discoveries ever! Engage in discussion about dinosaurs, bones and fossils, and the types of locations where they're found.



An A4 copy of the scene is provided on page 7 that you can open full screen on a computer or projector, or print off. Alternatively, find this scene in the physical book.

#### **DISCUSSION PROMPTS**

• What is a bone? Information overleaf

- What do you think the bone will look like when it's revealed? Encourage children to write down their answers. The bone is revealed on the second page of the main book, and they'll then be able to see if they were right!
- What is it like in the desert? Can you name any animals that live in the desert? Information overleaf
- How do you think the shepherd felt when he spotted this bone in the ground? Give examples of emotions such as feeling shocked, scared, excited, and so on.

#### ACTIVITY

Corresponding activity on page 4 of the activity pack: 'Diary Entry' is a creative writing activity which encourages children to imagine they found a fossil, like the shepherd, and describe it in a letter to family or friends.

### THE DISCOVERY OF A LIFETIME: SCENE 1

#### **RELEVANT INFORMATION**

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

#### **BONES AND FOSSILS**

Bones are hard tissues that connect with muscles and joints to hold a body together.

Most animals have their **skeleton** on the inside of their body. This is called an **endoskeleton**. Examples of animals with endoskeletons include humans, fish, cows, orangutans.

Some animals have their skeleton on the outside of their body! This is called an **exoskeleton**. Examples of animals with exoskeletons include crabs, grasshoppers, beetles.

#### DESERTS

**Deserts** are very dry places that get less than 25 cm (10 inches) of rainfall every year. Deserts can be boiling hot, for example the Sahara desert in Africa, or freezing cold, for example the Antarctic desert in Antarctica.

It is difficult for animals and plants to live in the desert because there is so little water. All plants and animals on Earth need water to **survive**. Those that live in the desert have to **adapt** - change themselves - to survive.

Examples of animals that live in hot deserts include camels, roadrunners, meerkats, tarantulas, ostriches, scorpions, snakes.

Examples of plants in that live in hot deserts include cacti (plural of cactus), tumbleweed, elephant trees.

Deserts are examples of **habitats**. Some examples of other habitats include the rainforest, forest, swamp, Arctic tundra.



#### **FOSSIL DETECTIVES: SCENE 2**

The material for this scene can be linked to curriculum topics, including: animals; everyday materials, rocks.

Discover the gigantic bone in all its record-breaking glory. Engage in discussion about dinosaurs, bones and fossils by examining the revealed bone, and engage curiosity by considering how bones are uncovered.



An A4 copy of the scene is provided on page 10 that you can open full screen on a computer or projector, or print off. Alternatively, find this scene in the physical book.

#### **DISCUSSION PROMPTS**

• What does the bone look like now? What words can you use to describe it? Encourage children to use a range of adjectives to describe the bone, including describing the colour, size, texture and so on.

#### • How close were you to being right?

Encourage children to compare their expectations with the answer.

#### • What tools do you think the scientists used to dig out the bone?

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

#### ACTIVITY

Corresponding activity on page 5 of the activity pack: 'Match the Fossil' is a task where children match up the dinosaur with its skeleton! With handy hints, this is a fun activity that reinforces how fossilised bones were once inside living dinosaurs.

#### FOSSIL DETECTIVES: SCENE 2

#### **RELEVANT INFORMATION**

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

#### **DINOSAUR BONES**

The dinosaurs haven't been around for **millions** of years! They **died out** about 66 million years ago.

The only reason we know about dinosaurs is because palaeontologists have found **fossils** of their **bones**, **footprints**, and even their poop! From these **remains**, the scientists have found clever ways of learning all about the animals that they came from.

Fossils are very **rare** and they are usually **buried** really deep underground! Scientists think they will never find all the fossils hidden across the world.

Fossils are very **fragile** and palaeontologists have to be extremely careful when digging them out of the ground. They don't want to **damage** them!

#### PALAEONTOLOGY

Palaeontology is a **branch of science**. It takes lots of training to become a palaeontologist, and these scientists usually **specialise**. This means they choose what they want to spend most of their time looking at.

Some choose to study **ancient** animals like dinosaurs, some choose to study ancient plants, and some choose to study tiny fossils that are so small they can only be seen with a **microscope**!

Palaeontologists usually spend some time digging up bones, and some time **examining** them in a lab using clever machines and equipment. It's an exciting job that's like being a science detective!





#### A HERD OF DINOSAURS: SCENE 3

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

Uncover the impressive scale of a titanosaur herd! Engage in discussion about these gigantic creatures and how they lived within their prehistoric world.



An A4 copy of the scene is provided on page 13 that you can open full screen on a computer or projector, or print off. Alternatively, find this scene in the physical book.

#### **DISCUSSION PROMPTS**

- Can you spot the different dinosaur hiding on this page of the book?
  - Why do you think this different dinosaur is hiding? Information overleaf
- Do these dinosaurs remind you of any animals that we have on Earth today? Why do they remind you of these animals?

Encourage children to talk about features such as neck shape and length, leg shape, features like horns and claws, and so on.

#### ACTIVITY

Corresponding activity on pages 6-9 of the activity pack: 'Label the Dinosaurs' is an activity where children have to label the dinosaur with the corresponding body part. Multiple dinosaur sheets have been provided.

# A HERD OF DINOSAURS: SCENE 3

#### **RELEVANT INFORMATION**

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

#### DINOSAUR GROUPS

Scientists **divide** dinosaurs up into different groups to show which other dinosaurs they are most like or share **features** with. There are lots of different groups...

Examples of dinosaur groups are: **theropods** (includes Tyrannosaurus rex and Velociraptor); **sauropods** (includes Diplodocus and Brachiosaurus) and **ornithopods** (includes Iguanodon and Hypsilophodon).

#### **DINOSAURS SPECIES**

Big groups of dinosaurs are divided into even smaller groups called **species**. These groups are much more specific.

Examples of dinosaur species include Tyrannosaurus rex, Tyrannotitan and Diplodocus.

It's not just dinosaurs that are divied into species. Examples of other animal species include lion, tiger and leopard.

Dinosaur species are usually named after a **characteristic** body feature, the place they were found, or a person involved in the discovery.

For example, Triceratops was named after its horns. Its name means "three-horned face"!

#### **PREDATORS AND PREY**

In the **animal kingdom**, some animals are **predators** and some are **prey**. This is all to do with what animals eat!

In this scene of the book, did you spot Tyrannotitan, a fierce predator, hiding in the bushes?

Predators hunt, fight and eat other animals. Examples of dinosaur predators included Tyrannotitan, T.rex and Allosaurus. Examples of modern-day predators include tigers, polar bears and sharks.

Prey are the animals that are hunted and eaten by the predators! Examples of dinosaur prey included small lizards, fish and other dinosaurs! Examples of modern-day prey include rabbits, mice and fish.





#### DIG, DIG, DIG: SCENE 4

The material for this scene can be linked to curriculum topics, including: rocks, working scientifically.

Discover the process of fossil excavation, from the tools that palaeontologists use to the impressive scale of a dig. Engage in discussion about uncovering fossils and the detective work that palaeontologists do.



An A4 copy of the scene is provided on page 16 that you can open full screen on a computer or projector, or print off. Alternatively, find this scene in the physical book.

#### **DISCUSSION PROMPTS**

#### • What tools can you see the scientists using?

Encourage children to compare their expectations with the answer.

• Why do you think they use different tools when digging out fossils? Information overleaf

#### • How many fossils do you think the palaeontologists found?

This answer is revealed on the fifth page of the main book, and they'll then be able to see if they were right!

#### ACTIVITY

Corresponding activity on page 10 of the activity pack: 'Fantastic Fossils' is a classic activity where children fill in the blanks in a series of sentences and facts about fossils, dinosaurs and digging palaeontologists!

#### DIG, DIG, DIG: SCENE 4

#### **RELEVANT INFORMATION**

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

#### TOOLS

Palaeontologists use lots of different **tools** to help them uncover **fossils**. Fossils are **fragile**, but they are also usually **buried** under thick layers of rock which makes digging them out really tricky.

Sometimes palaeontologists use big, powerful **machinery** like diggers and jackhammers for breaking through rocks, but they must be very careful as these strong tools can damage fragile fossils!

Most of the time they use small, **handheld tools** like chisels and brushes to carefully uncover fossils. These may be slower, but they are much more gentle and safe to use.

Once the fossils have been revealed, they are carefully **transported** to the palaeontologist's **lab** where they use incredible machines and equipment to learn all about the animals that the fossils came from.

#### THE CHALLENGES OF A DIG

Palaeontologist digs can go on for months and months, and sometimes years! The scientists must be patient and make sure they have found all the fossils in the area.

It can be a **stressful** job for lots of reasons: the fossils can be easily **damaged**; the machinery is **dangerous** to use; being outside, palaeontologists have to work through different weather, including desert heat, freezing cold or wet weather.

Working well as a team is very important for all kinds of scientists, but it's especially important for palaeontologists working out on a dig site.





#### IN THE LAB: SCENE 5

The material for this scene can be linked to curriculum topics, including: animals; rocks, working scientifically.

Uncover the detective work that scientists undergo when examining fossils. Engage in discussion about what can be learnt from fossils and introduce the setting and tools that are needed to uncover fossil secrets.



An A4 copy of the scene is provided on page 19 that you can open full screen on a computer or projector, or print off. Alternatively, find this scene in the physical book.

#### **DISCUSSION PROMPTS**

- Why do you think the scientists took the fossils to the lab rather than stay in the desert?
  - What can you tell about the lab from the picture? What useful things can you spot?

Encourage children to point out tools like the microscope, brushes, notebooks and features like cleanliness, lighting, and so on.

- If you were one of the palaeontologists in this lab, what's the first thing you would want to find out about the dinosaur?
  - Do you think dinosaurs still exist?

Information overleaf

#### ACTIVITY

Corresponding activity on page II of the activity pack: 'When Did Dinosaurs Live?' is a cutting and sticking activity where children match up the dinosaur with the period it lived in. A fun way to show they didn't all live at the same time!

# IN THE LAB: SCENE 5

#### **RELEVANT INFORMATION**

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

#### WHEN DID DINOSAURS LIVE?

Dinosaurs lived **millions** of years ago, but they didn't all live at the same time...

#### TRIASSIC PERIOD - 252-201 MILLION YEARS AGO

Dinosaurs appeared about 245 million years ago when the world was very hot and dry, and lots of land was **desert**. The first dinosaurs were much smaller than ones that came later. The first dinos included Euraptor, Coelophysis and Plateosaurus.

#### JURASSIC PERIOD - 201-145 MILLION YEARS AGO

During this period, the weather became wetter, allowing **forests** and new **plants** to grow. Plant-eating dinosaurs grew bigger, and so did hungry meat-eaters! Dinosaurs in the Jurassic period included Allosaurus, Diplodocus and Stegosaurus.

# **CRETACEOUS PERIOD - 201-145 MILLION YEARS AGO**

Some of the most famous dinosaurs lived in the Cretaceous period, including T.rex, Triceratops and Spinosaurus. Lots of other creatures were also around, like the now-**extinct reptile** Mosasaurus. This was the last dinosaur period and it ended very dramatically indeed...

#### WHERE ARE THEY NOW?

Scientists think that dinosaurs died out about 66 million years ago. There have been **debates** about the reason, but most scientists believe that a gigantic **asteroid** crashed into Earth which caused most of the animals on Earth at the time – including dinosaurs – to become extinct.





#### **AGEING FOSSILS: SCENE 6**

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

Explore how a single fossil can tell us how many millions of years ago the dinosaur lived! Engage in discussion about the dinosaurs that were around at the same time as the titanosaur, Patagotitan mayorum, and the different diets that dinosaurs had.



An A4 copy of the scene is provided on page 22 that you can open full screen on a computer or projector, or print off. Alternatively, find this scene in the physical book.

#### **DISCUSSION PROMPTS**

- Can you name any of the dinosaurs in this scene?
- What do you think each dinosaur would eat for dinner? Information overleaf
- What dinosaur do you think is the scariest? Why do you think this dinosaur is the scariest?

Encourage children to talk about features such as teeth, horns, spikes, and so on.

#### ACTIVITY

Corresponding activity on page 12 of the activity pack: 'Dino Dinners' is a fill in the blanks activity where children are given a series of sentences about dinosaurs, what they ate and how we know about it, and they have to select the correct missing word!

# AGEING FOSSILS: SCENE 6

#### **RELEVANT INFORMATION**

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

#### WHAT DID DINOSAURS EAT FOR DINNER?

Just like us, dinosaurs didn't all eat the same things, they all had different **diets**.

**Fossils** give palaeontologists lots of information about what dinosaurs ate. They look at the shape of the teeth and the markings on them, as well as fossilised **remains** from inside the dinosaurs' bellies. Sometimes they even find bite marks in bones. They can match up the marks with specific teeth to see who was trying to eat who!

#### CARNIVORES

Some of the most famous dinosaurs, like T.rex and Velociraptor, were **carnivores** – they **hunted** and ate other animals! They had sharp **teeth**, **jaws** and **claws** for catching and eating **prey**. Some other examples include Allosaurus and Giganotosaurus.

#### HERBIVORES

Palaeontologists think most dinosaurs were **herbivores** – they only ate plants. Many, like **sauropods**, grew very long necks to help them eat from the tops of trees. Some other examples include Triceratops and Stegosaurus.

# OMNIVORES

Some dinosaurs ate meat AND plants! These animals are called **omnivores**. Dinosaurs that could eat both types of food could **survive** in lots of different places as they could always find something to eat. Some examples include Oviraptor and Troodon.

# PISCIVORES

Animals that mostly eat fish (but also meat) are called **piscivores**. Scientists only know of a few piscivore dinosaurs, including Spinosaurus and Baryonyx. They had long, **narrow snouts** and curved claws to help them catch fish.

# THE FOOD CHAIN

Scientists draw food chains to show what animals eat. For example, plants were eaten by Triceratops which was eaten by T.rex! This shows scientists how things in nature **interact**. They don't just do this for dinosaurs, but modern-day plants and animals, too!



#### AN EGG-CELLENT DISCOVERY: SCENE 7

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

Explore how even tiny fossil finds can have a huge impact on our understanding of dinosaurs. Engage in discussion about how special and rare fossils are and how we're constantly learning more from them.



An A4 copy of the scene is provided on page 25 that you can open full screen on a computer or projector, or print off. Alternatively, find this scene in the physical book.

#### **DISCUSSION PROMPTS**

• What do you think dinosaur skin would feel like? Can you compare it with another animal that we have on Earth today?

Encourage children to use adjectives to refer to texture like 'smooth/rough', 'scaly/spiky', and so on.

- What do you think palaeontologists can learn about by looking at dinosaur eggs? Information overleaf
- Can you think of any other animals that we have on Earth today that lay eggs? Information overleaf

#### ACTIVITY

Corresponding activity on page 13 of the activity pack: 'Dinosaur Family Maze' is a task where children match up the description of the stage of the dinosaur lifecycle with the image, and then put them in order of when they happen.

### AN EGG-CELLENT DISCOVERY: SCENE 7

#### **RELEVANT INFORMATION**

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

#### **ANIMAL LIFECYCLES**

All animals go through a **lifecycle**: they are **born**, they grow, they have babies and they die. Lifecycles of some animals are much longer than others, and can look very different from each other.

One big difference in animal lifecycles is the way that animals give birth to their babies: some lay **eggs** and some give birth to **live young**.

#### LAYING EGGS

Animals that lay eggs have to **protect** the egg until it has **hatched**. This is because the baby animal inside the egg is very tiny and not ready to live outside the egg yet. It grows inside the egg until it's big enough and ready to live outside the egg, then it hatches!

Examples of animals that lay eggs include insects, birds, fish, **amphibians** (like frogs) and **reptiles** (like snakes and lizards).

Dinosaurs are another example of reptiles. Scientists have found many **fossils** of dinosaur eggs which showed how these animals lived and had babies! They have also found huge areas covered with egg fossils which suggest that some dinosaur **herds** laid their eggs close together, protecting them in big groups and finding safety in numbers.

#### LIVE YOUNG

Animals that give birth to live babies are called **mammals**. This huge group of animals grow their babies inside their tummies. Once the baby is big enough and ready to live outside the tummy, it gets born! The amount of time this takes is very different depending on the animal - some take less than a month, and some take almost 2 years!

Examples of mammals include humans, dogs, horses, and elephants.



#### **BUILDING A FULL-SIZE SKELETON: SCENE 8**

The material for this scene can be linked to curriculum topics, including: animals; working scientifically.

Explore how scientists create a full-size replica of the dinosaur's skeleton from its fossilised bones. Engage in discussion about the clever methods that are used and the reasons for doing so.



An A4 copy of the scene is provided on page 28 that you can open full screen on a computer or projector, or print off. Alternatively, find this scene in the physical book.

#### **DISCUSSION PROMPTS**

- Why do you think the palaeontologists are building a full-size replica of the dinosaur? What do you think they will do with it?
  - Which part of this process do you think will be the hardest? Why?

#### ACTIVITY

Corresponding activity on pages 14-15 of the activity pack: 'Create Your Own' is a series of creative drawing activities where children create their own dinosaur skeleton! After, they can draw what their dinosaur would have looked like alive, with skin and muscles!

#### **BUILDING A FULL-SIZE SKELETON: SCENE 8**

#### **RELEVANT INFORMATION**

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

#### TYPES OF SKELETONS

Skeletons are the framework of bones that hold an animal's body together.

Most animals have their **skeleton** on the inside of their body. This is called an **endoskeleton**. Examples of animals with endoskeletons include humans, fish, cows, orangutans.

Some animals have their skeleton on the outside of their body! This is called an **exoskeleton**. Examples of animals with exoskeletons include crabs, lobsters, grasshoppers, beetles.

The skeleton that the scientists are building in the book is an endoskeleton.

#### TEAMWORK IN SCIENCE

Working well as a team is very important for all kinds of scientists, but it's especially important for palaeontologists who work on projects, like the one in this book, that can take months or years to finish!

It's not just getting on with other palaeontologists either, they have to work with lots of different scientists! Different **branches** of science crossover all the time, for example palaeontology and geology (the study of the Earth and all it's made of).

When creating huge **replica** skeletons, like the one in the book, palaeontologists may need help from other specialists like **engineers**. Projects like this couldn't happen without lots of different people coming together to put in hard work.







#### **DINOSAUR X-RAY: SCENE 9**

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

Discover the ginormous size of the titanosaur's body and its impressive features that kept it alive. Engage in discussion about the features that all animals have different features that keep them alive.



An A4 copy of the scene is provided on page 31 that you can open full screen on a computer or projector, or print off. Alternatively, find this scene in the physical book.

#### **DISCUSSION PROMPTS**

- From the picture, can you point out which part is the dinosaur's heart?
- We know that this dinosaur's body had special features that kept it alive. Can you think of any animals alive today that have special features of their own? Encourage children to talk about features like teeth, claws and camouflage fur/ skin and abilities like good eyesight, and so on.
  - Can you think of any other animals that are nearly as big as this dinosaur?

#### ACTIVITY

Corresponding activity on page 16 of the activity pack: 'Dinosaur Wordsearch' is a classic wordsearch activity, using lots of great dinosaur words to get children familiar with the language of palaeontology.

#### DINOSAUR X-RAY: SCENE 9

#### **RELEVANT INFORMATION**

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

#### **BODY PARTS**

All animals are **unique**, but many have similar parts that make up their bodies. For example, head, mouth, eyes, legs, and so on.

Some body parts can be seen from looking at the animal and some are hidden under the **skin**. For example, you can see an animal's head which is on top of its body, but you usually can't see its ribs because they're under the skin.

To see what's under an animal's skin, scientists use special machines called **x-rays**. These machines **scan** the body and show the scientists what's inside, including the **bones**, **tissues** and **organs** that make up the body!

#### **DINOSAUR BODY PARTS**

Looking at dinosaurs is a bit different from animals that are alive today! Usually only bones become **fossils**, so scientists have to use what they know about animals that are alive today to work out how big the dinosaur's **muscles** and organs were, and how they fitted together.

Creating **computer models** and **3D models** with this information can help get an idea of how the dinosaur's body worked.

# MODERN EQUIPMENT

Modern day palaeontologists use lots of computers and different **technology** to help them do their jobs.

- Super strong **microscopes** allow them to study the tiniest fossils.
- X-ray machines and **CT scanners** allow them to see inside fossils.
- Computer programmes help **reconstruct** skeletons and visualise dinosaurs' bodies and their movements.
- Clever tools allow them to look at **DNA** and learn more about the dinosaurs.



#### LONG, LONG NECKS: SCENE 10

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

Compare prehistoric times with modern day with this side-by-side scene in the book. Engage in discussion about the similarities and differences between the time periods, from animals and plants to landscapes.



An A4 copy of the scene is provided on page 34 that you can open full screen on a computer or projector, or print off. Alternatively, find this scene in the physical book.

#### **DISCUSSION PROMPTS**

• What similarities and differences can you notice between the titanosaur and the giraffe?

Encourage children to point out similarities such as long necks, eat plants, head shape, and differences such as leg size and shape, skin patterns, and so on.

• Titanosaurs had very long necks. Can you think of any other dinosaurs with special features?

Information overleaf

• What's different about the landscape in each scene?

Encourage children to notice features such as different types of trees, grass, weather, and so on.

#### ACTIVITY

Corresponding activity on pages 17-19 of the activity pack: 'Cool Dinosaur Features' is a fun challenge for children to work out which key dinosaur feature is missing and draw it onto the image of the dinosaur provided.

# LONG, LONG NECKS: SCENE 10

#### **RELEVANT INFORMATION**

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

#### **COOL DINOSAUR FEATURES**

The Patagotitan mayorum was able to **survive** thanks to its very long neck. It wasn't the only dinosaur that had special features. Here's some other great and unusual examples:

# **BONY PLATES AND SPIKES**

Some dinosaurs' bodies were covered with thick, bony **plates** and **spikes**. An example of this is Ankylosaurus. This smart dinosaur also had a solid chunk of bone at the end of its tail. These things probably helped the dinosaur **protect** itself from any animals that tried to attack it.

#### HORNS

Triceratops had three huge **horns** on its head! These would have made great **weapons** for fighting off attacking **predators**. Fossils show that Triceratops' horns could **heal** themselves if bitten off, which would have been very useful!

# HEAD CREST

This unusual feature would make any dinosaur stand out from the crowd. Parasaurolophus had a big head **crest** that connected to its nose! Palaeontologists think that it could blow air through the crest to make a loud sound, maybe to **warn** others about nearby **danger**!

#### FEATHERS

Palaeontologists used to think that all dinosaurs were **scaly**, but they now know some had **feathers**! For example, tiny Microraptor had long feathers on all four of its arms and legs. Palaeontologists think it may have been able to **glide** from tree to tree, but they argue about whether the dinosaur would have been able to fly in the way that birds do today.

#### TEETH

Most dinosaurs relied on their teeth for eating, but they could also come in handy when fighting other animals. The biggest tooth ever found belonged to a T.rex. It was an impressive 30 centimetres (12 inches) from root to tip!





#### FIGHT FOR SURVIVAL: SCENE 11

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

Explore how fossils teach us about much more than just what dinosaurs looked like, from what they ate to whether they were predator or prey! Engage in discussion about how dinosaurs lived and interacted.



An A4 copy of the scene is provided on page 37 that you can open full screen on a computer or projector, or print off. Alternatively, find this scene in the physical book.

#### **DISCUSSION PROMPTS**

• Why do you think these dinosaurs are fighting? Information overleaf

- Who do you think would win the fight between these two dinosaurs? Why? Encourage children to talk about physical features such as teeth, claws, jaws, and so on.
- Which of these two dinosaurs do you think would be the fastest runner? Why? Do you think this helped them stay alive?
- Can you think of any animals we have on Earth today that have teeth like the Tyrannotitan (pictured left in the scene)?

#### ACTIVITY

Corresponding activity on page 20 of the activity pack: 'Fighting Dinosaurs' is a crossword activity where children use clues to name the different body parts dinosaurs used to fight for survival! They can then fill in the crossword with the answers.

#### FIGHT FOR SURVIVAL: SCENE 11

#### **RELEVANT INFORMATION**

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

#### THE FOOD CHAIN

Scientists draw food chains to show what animals eat. For example, plants were eaten by Triceratops which was eaten by T.rex! This shows scientists how things in nature **interact**. They don't just do this for dinosaurs, but modern-day plants and animals, too!

**Fossils** give palaeontologists lots of information about what dinosaurs ate. They look at the shape of the teeth and the markings on them, as well as **fossilised remains** from inside the dinosaurs' bellies. Sometimes they even find bite marks in bones. They can match up the marks with specific teeth to see who was trying to eat who!

#### SURVIVAL TECHNIQUES

In the **animal kingdom**, only the fittest, strongest or cleverest **survive**! Both in our modern-day world and back in the **prehistoric** times of the dinosaurs, animals must find clever ways to survive. When an animal changes its behaviour or part of its body, scientists call that change an **adaptation**.

Some survival techniques include:

- Herds animals can stay safer from predators when sticking together in a group.
- **Camouflage** animals that can change the colour of their skin to fit in with their surroundings find it easier to hide from predators, or to sneak up on their **prey**!
- Growing big **teeth** or **claws** animals with big and strong body parts are more likely to win when fighting other animals.
- Venom animals that can create venom that harms others are more likely to survive.
- **Nocturnal** animals that sleep in the day and wake up at night find it easier to hide from predators, or to sneak up on their prey! This also helps them control their temperature if they live somewhere that's extremely hot during the day.





#### **THE BIG REVEAL: SCENE 12**

**The material for this scene can be linked to curriculum topics, including:** animals; working scientifically, history.

Observe the full-size replica of the titanosaur, Patagotitan mayorum, on its museum podium. Engage in discussion about dinosaur skeletons and the importance of being able to view them in museums.



An A4 copy of the scene is provided on page 40 that you can open full screen on a computer or projector, or print off. Alternatively, find this scene in the physical book.

#### **DISCUSSION PROMPTS**

- Have you ever seen a giant dinosaur skeleton at the museum? If so, what was it like?
- What do you think these people viewing the skeleton are thinking and feeling? Give the children examples of emotions such as feeling shocked, scared, excited, and so on.
  - Do you think museums are important? Why or why not?

#### ACTIVITY

Corresponding activity on page 21 of the activity pack: 'Dinosaur Fact File' is a mixture of research and creativity. Children choose a dinosaur, research it, fill in the fact file and then draw it. Activity can be printed multiple times to generate a fact booklet!

# THE BIG REVEAL: SCENE 12

#### **RELEVANT INFORMATION**

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

#### **BIGGEST DINOSAURS EVER**

Patagotitan mayorum is the biggest, most **complete** dinosaur found to date, but there are some other **contenders** that almost got the top spot!

#### **ARGENTINOSAURUS**

Argentinosaurus is one of the largest land animals that ever lived! Its **fossils** are huge, but because scientists have only found a few it's very difficult to work out the dino's exact size. They think that Argentinosaurus was shorter than Patagotitan, but heavier.

# **PUERTASAURUS**

Only four Puertasaurus bones have ever been discovered, all of which are gigantic **vertebrae**: it had a very wide rib cage. Until more fossils are found, there's no way of telling just how big this dinosaur really was.

#### SAUROPOSEIDON

When the first Sauroposeidon fossils were found, palaeontologists thought they were tree trunks! This dinosaur had one of the longest necks of all **prehistoric** creatures.

# WHO WINS?

Some scientists have argued about the size of the Patagotitan mayorum since it was announced as the biggest ever. However, since they have more fossils to work off, they're more confident in these numbers compared with other huge dinosaurs.

#### **MEASURING SIZE**

Working out the size of dinosaurs is tricky - palaeontologists don't always have a full **skeleton** to look at! They have some clever ways of working out size, including comparing single bone measurements with complete skeletons of other dinosaurs or animals that still **exist** today.



#### THE BIGGEST OF ALL: SCENE 13

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

Compare the size of the titanosaur, Patagotitan mayorum, against other impressive animals from the prehistoric and modern-day worlds. Engage in discussion about different types of animals and their unique features.



An A4 copy of the scene is provided on page 43 that you can open full screen on a computer or projector, or print off. Alternatively, find this scene in the physical book.

#### **DISCUSSION PROMPTS**

- Why do you think animals are different shapes and sizes?
- What makes dinosaurs different from animals that we have on Earth today?
  - What's the tallest animal you can think of that still lives today? Information overleaf
  - Which of these animals would you most like to meet if you could? Which would you least like to meet? Why did you pick those animals?

#### ACTIVITY

Corresponding activity on page 22 of the activity pack: 'The Discovery' is a true or false quiz based on fun facts from the main book. Children use what they have learnt whilst reading to fill in the answers.

# THE BIGGEST OF ALL: SCENE 13

#### **RELEVANT INFORMATION**

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

#### **BIGGEST IN THE WORLD**

The Patagotitan mayorum may be the overall biggest dinosaur ever found, but there's lots of other impressive animals in the world that have broken different records!

Examples include:

- The biggest animal today is the blue whale.
- The biggest land animal today (by weight) is the African elephant.
- The tallest land animal today is the giraffe.

These records would probably be very different if dinosaurs were still alive today!

#### WHERE DO ANIMAL SPECIES GO?

Scientists know that not all the dinosaurs lived at once. Some lived and died out long before others **existed**, but why does this happen?

When a **species** dies out and no more of those animals exist, we say that the species has become **extinct**.

There are lots of reasons why a species might become extinct. For example, illness and **disease**, **pollution**, loss of **habitat**, and loss of **food sources**.

It's not just animals that go extinct - plants can too!

#### **PROTECTING SPECIES**

There are millions of different plant and animal species on Earth today, but lots are facing extinction.

We can all help protect species through the things that we do.

For example, you can help by looking after natural areas and putting litter in the correct bins, learning about the **endangered** species in your area, not harming plants or animals, **recycling**, turn the tap off when brushing your teeth to cut down how much water you use, and much more!





#### **POST-READING QUESTIONS**

Engage in discussion about the journey taken throughout the book and the facts that were uncovered.

- Were you surprised to learn that the Patagotitan mayorum is the biggest dinosaur ever?
  - Did anything else in the book surprise you?
  - What's the coolest thing you've learnt from this book?
    - Do you have a favourite dinosaur?

#### ACTIVITY

Corresponding activity on page 23 of the activity pack: 'Palaeontology Creative Writing' is a creative writing activity which encourages children to write a story about palaeontology, using three key prompt words.

#### THE BIG QUESTIONS ANSWERED

Explore the many diverse fields of science, discovering captivating stories and incredible discoveries with The Big Questions Answered, an exciting new science series for inquisitive kids.

Find more information about The Big Questions Answered and other books in the series at: www.thebigquestionsanswered.com www.thebigquestionsanswered.co.uk



