

Lesson 3 The Mesozoic Era

Scan Lesson 3. Read the lesson titles and bold words. Look at the pictures. Identify three facts that you discovered about the Mesozoic era. Record your facts in your Science Journal.

Main Idea

Geology of the Mesozoic Era

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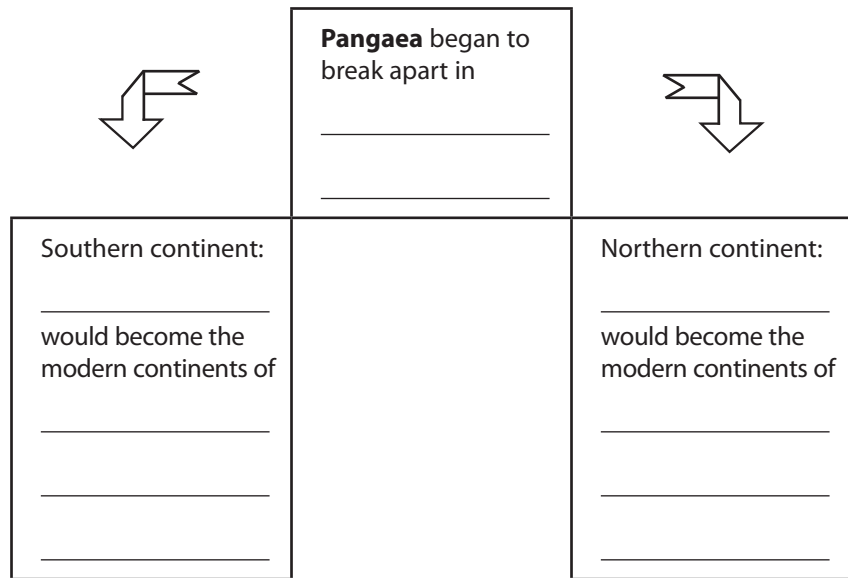
Details

Arrange the periods of the Mesozoic era in the table below.

| Periods of the Mesozoic Era | | |
|-----------------------------|-------|-------|
| _____ | _____ | _____ |

↑ from _____ mya to _____ mya ↑

Organize information about the breakup of Pangaea.



Sequence the events that formed the Atlantic Ocean.

1. The climate was _____ during the Mesozoic.
2. _____ rose.
3. Pangaea began _____.
4. _____ flowed onto _____.
5. _____ formed.
6. As continents _____, the channels became _____.

Geologic Time

The Mesozoic Era

..... Before You Read

What do you think? Read the two statements below and decide whether you agree or disagree with them. Place an A in the Before column if you agree with the statement or a D if you disagree. After you've read this lesson, reread the statements to see if you have changed your mind.

| Before | Statement | After |
|--------|--|-------|
| | 5. All large Mesozoic vertebrates were dinosaurs. | |
| | 6. Dinosaurs disappeared in a large mass extinction event. | |

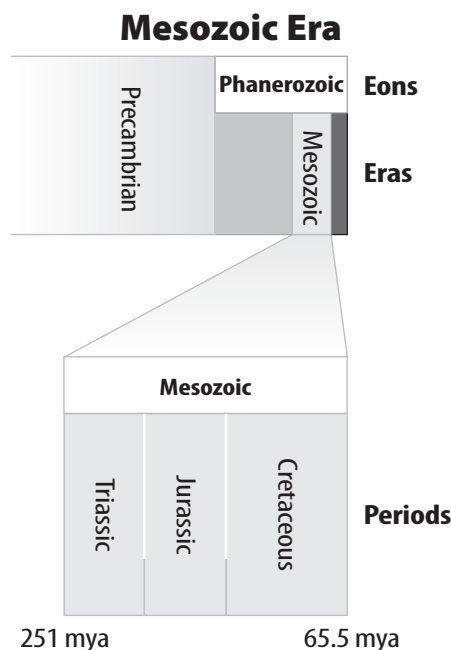
Key Concepts

- What major geologic events occurred during the Mesozoic era?
- What does fossil evidence reveal about the Mesozoic era?

..... Read to Learn

Geology of the Mesozoic Era

When people imagine what Earth looked like millions of years ago, they often picture dinosaurs. Dinosaurs lived during the Mesozoic era. This era of geologic time lasted from 251 mya to 65.5 mya. As shown in the figure below, the Mesozoic era is divided into three periods: the Triassic (tri A sihk), the Jurassic (joo RA sihk), and the Cretaceous (krih TAY shus).



Study Coach

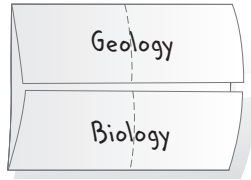
Make Flash Cards Change each main head into a question. Write each question on one side of a small index card. Write the answer on the other side of the card. Quiz yourself until you know all of the answers.

Visual Check

1. Name List the periods of the Mesozoic era from oldest to youngest.

FOLDABLES®

Make a shutter-fold book to record information about changes during the Mesozoic era.



Key Concept Check

2. Explain When did the Atlantic Ocean begin to form?

Interpret a Graph

3. Identify In which period was sea level at its highest?

Breakup of Pangaea

Recall that Pangaea was a supercontinent that formed at the end of the Paleozoic era. Pangaea began to break apart in the Late Triassic period. Eventually, Pangaea split into two landmasses—Gondwanaland (gahn DWAH nuh land) and Laurasia (la RAY shzah).

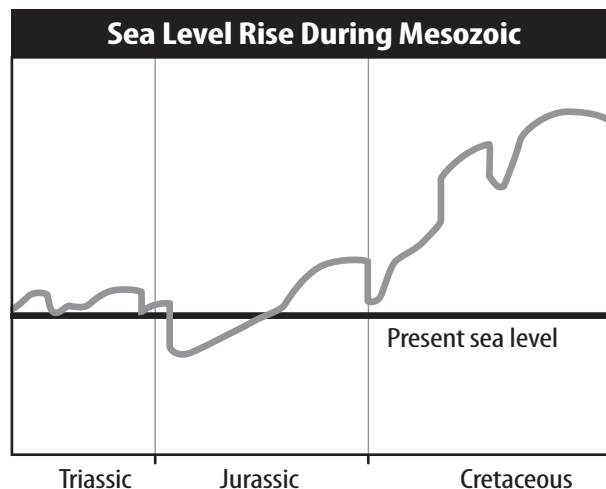
Gondwanaland was the southern continent. It included the future continents of Africa, Antarctica, Australia, and South America. Laurasia was the northern continent. It included the future continents of North America, Europe, and Asia.

Return of Shallow Seas

Much of Earth during the Mesozoic era was covered by lush, tropical forests and warm ocean waters. This is because the climate of the Mesozoic era was much warmer than the climate of the Paleozoic era. Many species were adapted to this type of environment. It was so warm that, for most of the Mesozoic era, there were no ice caps, even at the poles. With no glaciers, more water filled the oceans.


Some of this water flowed onto the continents as Pangaea began to split apart. This created narrow channels that grew larger as the continents moved apart. Eventually, the channels became oceans. The Atlantic Ocean began to form at this time.

The graph below shows the rise in sea level during the Mesozoic era. Toward the end of the era, sea level was so high that inland seas covered much of Earth's continents. These warm, shallow waters provided environments in which new organisms evolved.



Mesozoic North America

Along North America's eastern coast and the Gulf of Mexico, sea level rose and fell over millions of years. As this happened, much seawater evaporated, leaving large salt deposits behind. Some of these salt deposits are sources of salt today. Other salt deposits later became traps for oil. Today, salt traps in the Gulf of Mexico are an important source of oil.

Throughout the Mesozoic era, the North American continent moved slowly and steadily westward. Its western edge collided with several small landmasses carried on an ancient oceanic plate. As this plate subducted beneath the North American continent, the crust buckled inland, slowly pushing up the Rocky Mountains. In the dry Southwest, windblown sand formed huge dunes. In the middle of the continent, a warm inland sea formed. 

Mesozoic Life

The species that survived the Permian mass extinction event lived in a world with few species. Vast amounts of space were open for animals and plants to inhabit. New types of cone-bearing trees, such as pines and cycads, began to appear. Toward the end of the Mesozoic era, the first flowering plants evolved. The dinosaurs were the dominant vertebrates living on land. Hundreds of species existed.

Dinosaurs

Scientists today disagree about classifying dinosaurs as reptiles. Dinosaurs share a common ancestor with present-day reptiles, such as crocodiles. However, dinosaurs differ from present-day reptiles in their hip structure. **Dinosaurs** *were dominant Mesozoic land vertebrates that walked with legs positioned directly below their hips.* This means that dinosaurs walked upright. In contrast, the legs of a crocodile stick out sideways from its body. As a result, a crocodile appears to drag itself along the ground.

Scientists hypothesize that some dinosaurs are more closely related to present-day birds than they are to present-day reptiles. Some dinosaur fossils show evidence of a feathery covering. *Archaeopteryx* (ar kee AHP tuh rihks), for example, was a small bird the size of a pigeon. It had wings and feathers. It also had claws and teeth. Many scientists suggest that it was an ancestor to birds. Future discoveries might help answer the question about why some dinosaurs are more closely related to present-day birds than they are to present-day reptiles.

REVIEW VOCABULARY

evaporated

changed from liquid to gas

Key Concept Check

4. Explain How did the Rocky Mountains form?

Think it Over

5. Make Connections

Which animals on Earth today are most closely related to dinosaurs of the Mesozoic era? (Circle the correct answer.)

- a. birds
- b. mammals
- c. reptiles

Other Mesozoic Vertebrates

Dinosaurs dominated the land during the Mesozoic era. But fossils show that other large vertebrates swam in the seas and flew in the air. **Plesiosaurs** (PLY zee oh sorz) were *Mesozoic marine reptiles with small heads, long necks, and flippers*. Through much of the Mesozoic, these reptiles dominated the oceans. Some were as long as 14 m.

Other Mesozoic reptiles could fly. **Pterosaurs** (TER oh sorz) were *Mesozoic flying reptiles with large, batlike wings*. The *Quetzalcoatlus* (kwetz oh koh AHT lus) was one of the largest pterosaurs. It had a wingspread of nearly 12 m. Though pterosaurs could fly, they were not birds. Recall that birds are more closely related to dinosaurs.

Appearance of Mammals

Dinosaurs and reptiles dominated the Mesozoic era, but another type of vertebrate also lived during this time—mammals. Mammals evolved early in the Mesozoic era. They were small in size. Few were larger than present-day cats.

Cretaceous Extinction Event

The Mesozoic era ended 65.5 mya with a mass extinction called the Cretaceous extinction event. Scientists propose that a large meteorite impact was the main cause of this extinction. This crash would have produced enough dust to block sunlight for a long time. There is evidence that volcanoes also erupted at the same time. These eruptions would have added more dust to the atmosphere. Without light, plants died. Without plants, animals died. Dinosaur species and other large Mesozoic vertebrate species could not survive in the changed environment. They became extinct.

Key Concept Check

6. Contrast How could you distinguish fossils of plesiosaurs and pterosaurs from fossils of dinosaurs?

Think it Over

7. Generalize How could the impact of a meteorite help cause a mass extinction event?

..... **After You Read**

Mini Glossary

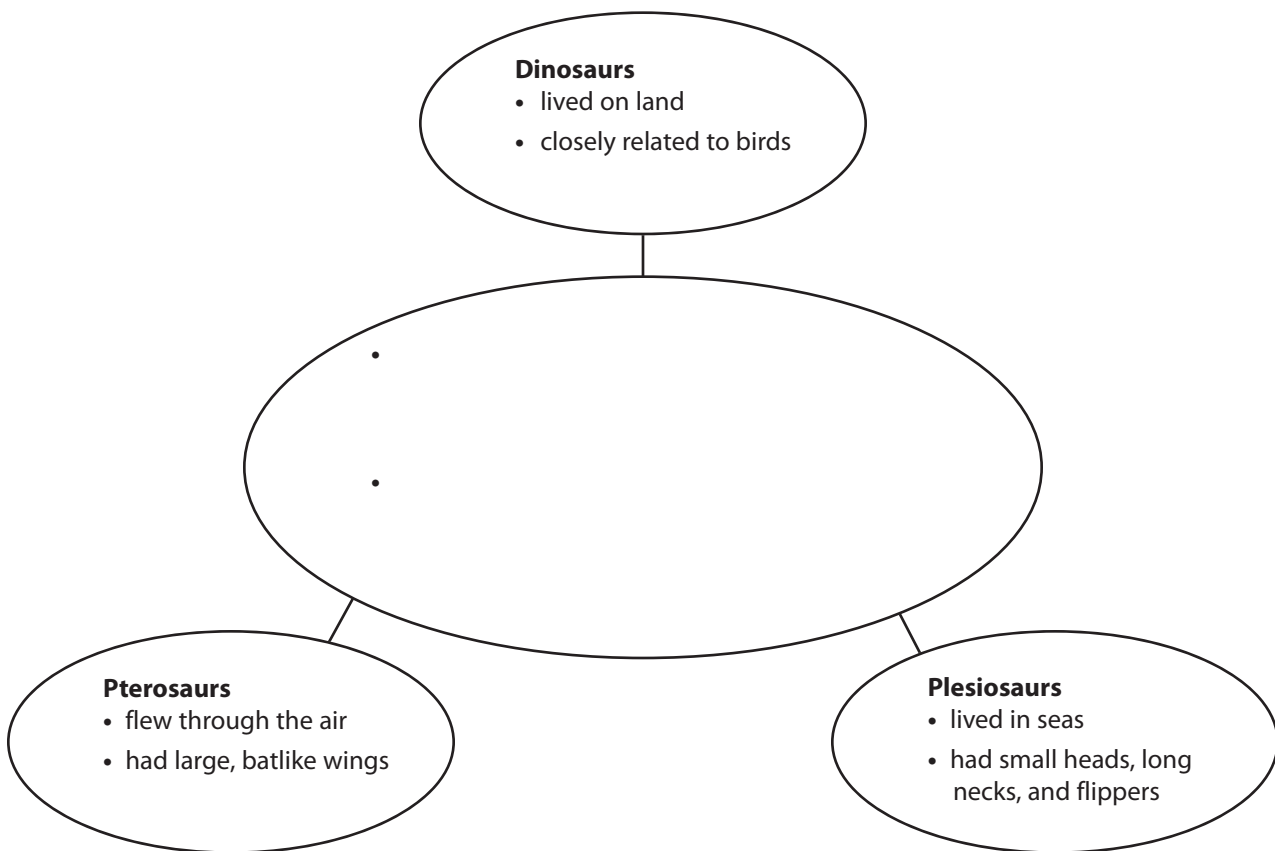
dinosaur: a dominant Mesozoic land vertebrate that walked with legs positioned directly below its hips

pterosaur (TER oh sor): a Mesozoic flying reptile with large, batlike wings

plesiosaur (PLY zee oh sor): a Mesozoic marine reptile with a small head, long neck, and flippers

1. Review the terms and their definitions in the Mini Glossary. Write a sentence describing one group of Mesozoic animals.

2. In the center oval, list the similarities among the three groups shown.



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What do you think NOW?

Reread the statements at the beginning of the lesson. Fill in the After column with an A if you agree with the statement or a D if you disagree. Did you change your mind?



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END OF LESSON

Lesson 3 | The Mesozoic Era (continued)

Main Idea

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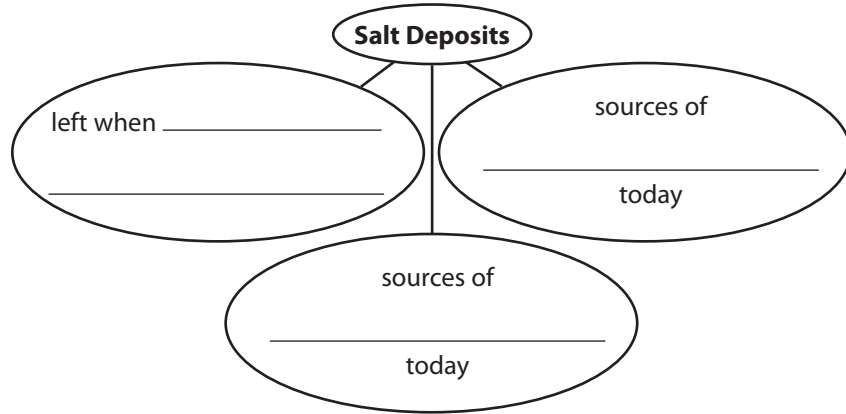
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Mesozoic Life

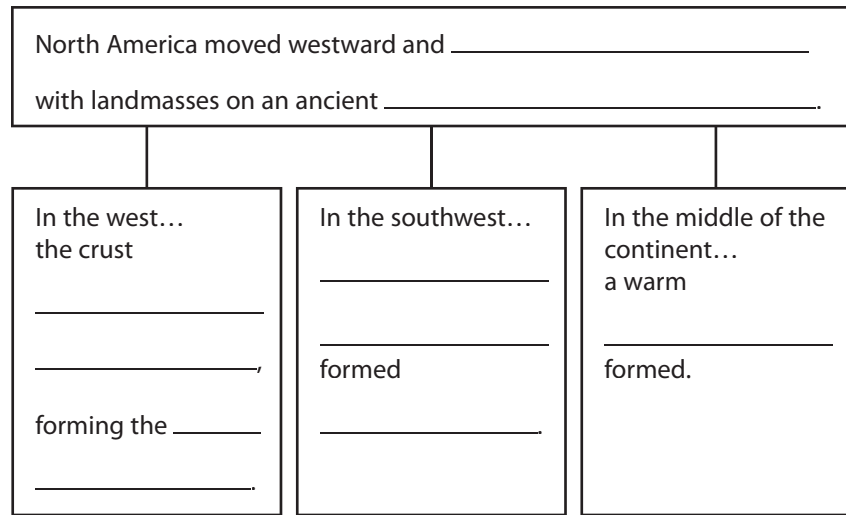
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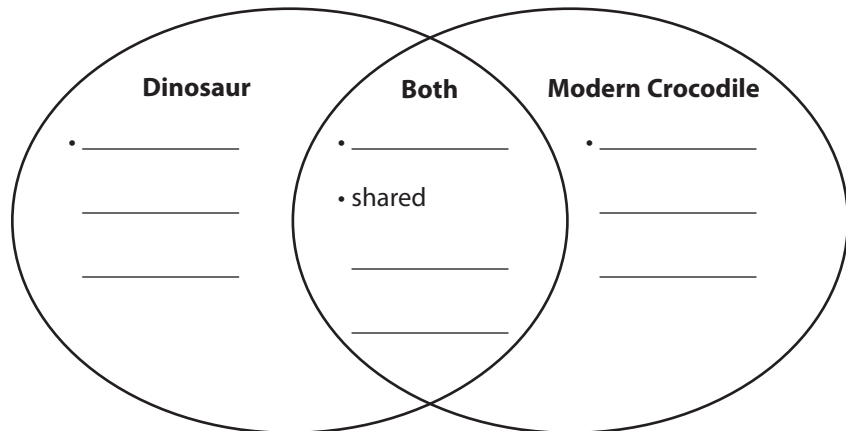
Categorize salt deposits in North America.



Explain the geologic changes in North America during the Mesozoic.



Compare and contrast dinosaurs with modern crocodiles.



Lesson 3 | The Mesozoic Era (continued)

Main Idea


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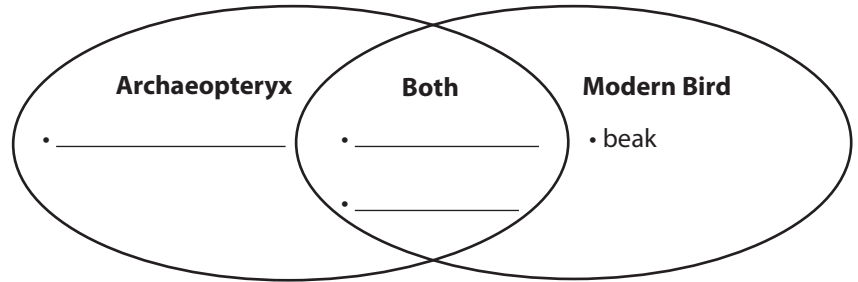
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Details

 **Compare and contrast** the archaeopteryx with present-day birds.

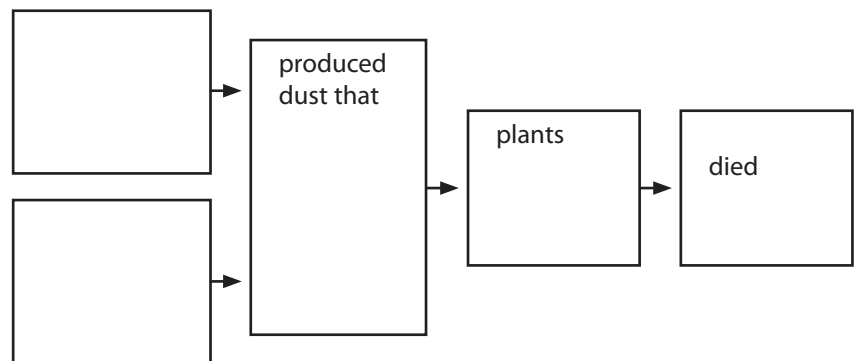


Identify 3 types of Mesozoic reptiles.

| Land | Sea | Air |
|------|-----|-----|
| | | |

 **Describe** the size of Mesozoic mammals.

 **Sequence** the likely events of the Cretaceous extinction event.



 **Summarize It** Summarize the overall evolution of life during the Mesozoic era.
