

Science & Literacy Activity

GRADES K-2

OVERVIEW

This activity, which is aligned to the Common Core State Standards (CCSS) for English Language Arts, introduces students to scientific knowledge and language related to pterosaur body parts. Students will read content-rich texts, visit *Pterosaurs: Flight in the Age of Dinosaurs*, and use what they have learned to complete a CCSS-aligned writing task, creating an illustrated text about pterosaur body parts.

Materials in this packet include:

- Teacher instructions for:
 - Pre-visit student reading
 - Visit to *Pterosaurs* and Student Worksheet
 - Post-visit writing task
- Text for student reading: "Flying Pterosaurs"
- Charting exemplar
- Student Worksheet for the *Pterosaurs* visit
- Student Writing Guidelines
- Teacher rubric for writing assessment

Common Core State Standards:

W.K-2.2, W.K-2.8 RI.K-2.1, RI.K-2.2, RI.K-2.4, RI.K-2.7, RI.K-2.10

New York State Science Core Curriculum:

LE3.1a

Next Generation Science Standards:

PE 1-LS1-1

DCI LS1: All organisms have external parts.

Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air.

SUPPORTS FOR DIVERSE LEARNERS: An Overview

This resource has been designed to engage all learners with the principles of Universal Design for Learning in mind. It presents multiple ways for your students to engage with scientific concepts through reading, observing, discussing, and writing. While certain tasks may challenge individual students, we suggest that all learners participate in each part of the experience. In the paragraphs labeled "Supports for Diverse Learners" that supplement this activity, we have provided suggestions for how to adapt each section for students with different skill-levels. If any students have an Individualized Education Program (IEP), consult it for additional accommodations or modifications.

1. BEFORE YOUR VISIT

This part of the activity engages students in reading and discussing a non-fiction text about pterosaur body parts. The reading and discussion will prepare students for their visit by introducing them to the topic and framing their investigation.

Student Reading

Read "Flying Pterosaurs" aloud to students. Have students in grades K-1 look at the images of pterosaurs as you read the text aloud. Have students in grade 2 follow along as the text is read aloud.

As a class, create a chart (see attached sample) to illustrate different features in order to compare and contrast different pterosaurs. Have students discuss the information in the chart, focusing on comparing the body parts of the different pterosaurs they described.

SUPPORTS FOR DIVERSE LEARNERS: Student Reading

- "Chunking" the reading can help keep them from becoming overwhelmed by the length of the text. Present them with only a few sentences or a single paragraph to read and discuss before moving on to the next "chunk."
- Provide "wait-time" for students after you ask a question. This will allow time for students to search for textual evidence or to more clearly formulate their thinking before they speak.

2. DURING YOUR VISIT

This part of the activity engages students in exploring *Pterosaurs: Flight in the Age of Dinosaurs*.

Museum Visit & Student Worksheet

Explain to students that they will be focusing on specific pterosaurs throughout the exhibition, using worksheets to gather all the necessary information about pterosaurs and their body parts including wings, beaks, teeth, and crests. Tell students that back in the classroom they will refer to these notes when completing the writing assignment.

SUPPORTS FOR DIVERSE LEARNERS: Museum Visit

- Review the Student Worksheet with students, clarifying what information they should collect during the visit.
- Have students explore the exhibition in pairs, with each student completing their own Student Worksheet.
- Encourage student pairs to ask you or their peers for help locating sources of information. Tell students they may not share answers with other pairs, but they may point each other to places in the exhibition where answers may be found.
- For those who may have trouble taking notes in the exhibition, teachers and chaperones may use the included worksheets to transcribe students' observations. Teachers and chaperones may also take photos for students to refer to back in the classroom.

3. BACK IN THE CLASSROOM

This part of the activity engages students in an informational writing task that draws on the pre-visit reading and on observations made at the Museum.

Writing Task

Distribute the Student Writing Guidelines handout, which includes the following prompt for the writing task:

Based on your reading, your visit to *Pterosaurs: Flight in the Age of Dinosaurs*, and your discussions, write an essay in which you describe the body of one kind of pterosaur.

Be sure to include:

- the scientific name of your pterosaur
- a drawing of your pterosaur with three or more body parts labeled
- a description of your pterosaur including size and shape of the body, and anything else that you have learned about this kind of pterosaur

Support your discussion with evidence from the reading and your visit to the *Pterosaurs* exhibition.

Go over the handout with students. Tell them that they will use it while writing, and afterwards, to evaluate and revise their essays.

Students can work in pairs, small groups, or as a class. First have them use the prompt and guidelines to discuss the information that they gathered in the *Pterosaurs* exhibition, and to compare and exchange their findings.

Referring to the writing prompt, have students underline or highlight all relevant passages and information from the reading and their notes from the exhibition. Drawing on both these sources and the chart that the class created, students should write individual essays.

SUPPORTS FOR DIVERSE LEARNERS: Writing Task

- Re-read the "Before Your Visit" assignment with students. Ask what they saw in the exhibition that helps them understand pterosaurs.
- Allow time for students to read their essay drafts to a peer and receive feedback based on the Student Writing Guidelines.

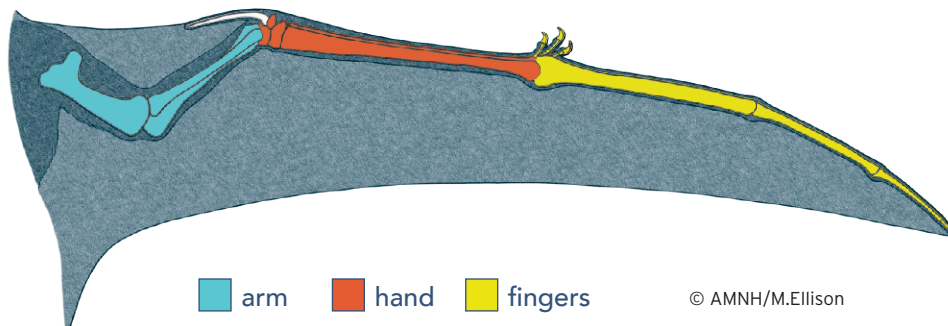
Student Reading

Flying Pterosaurs

Millions of years ago the skies were ruled by flying reptiles. They were not birds. They were not even dinosaurs! These flying reptiles were called pterosaurs.



Pterosaurs had wings. These body parts helped them fly. A single finger supported each pterosaur wing. That fourth finger was longer than the rest of their arm! Their wings bones were hollow. That made pterosaurs lighter.



Scientists who study ancient plants and animals are called paleontologists. They explore rock layers around the planet to find fossils. These fossils give information about plants and animals that are extinct. By studying fossils, paleontologists learned that there were at least 150 different kinds of pterosaurs!

Pterosaurs came in all shapes and sizes. Some were as large as a fighter jet. Others were as small as a paper airplane. Pterosaurs' body parts helped them survive. Some had sharp teeth. Others had no teeth. Some pterosaurs had long tails. Some had no tails. Many pterosaurs had large crests on their heads. They may have used those crests to attract mates. Or they may have used the crests to find others of their kind.

Pterosaurs lived in different environments. Some lived by the sea. Others lived in forests. They also ate different things. Some ate fish. Some ate insects. Others ate fruit.

Meet three different types of pterosaurs. Find out how their body parts help them survive in their environments.

Pterodaustro quinazui

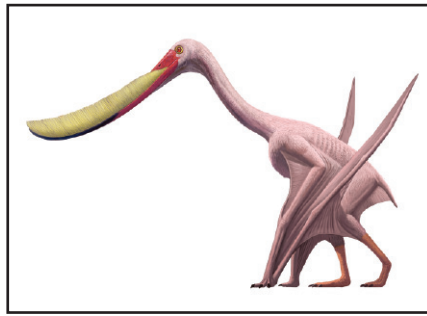
(pronunciation: tair-o-DOW-stro gee-NA-zoo-eye)

Pterodaustro had about 1,000 teeth in its beak. But the teeth were not for biting. Scientists think this pterosaur used its thin teeth to filter small animals out of the water. First it would dip its beak in the water. Next it shook its head back and forth. Then it probably used its tongue to push the water out of its mouth. Tiny creatures like brine shrimp got trapped inside. The result? A tasty meal!



© AMNH/C.Chesek

This fossil is around 100 million years old. It belonged to a pterosaur named *Pterodaustro*. It lived along the shores of lakes in what is now Argentina.



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Pterodaustro had a wingspan of 8 feet (2.5 meters). It ate small arthropods, crustaceans, mollusks, and other tiny animals that lived in lakes.

Dimorphodon macronyx

(pronunciation: dye-MORF-o-don ma-KRON-ix)

Dimorphodon had a large head for its size. It also had a very long tail. It had long, curved teeth at the front of its jaws. But its back teeth were short and pointed. These two types of teeth helped this pterosaur catch and eat more than one kind of prey.

Like all pterosaurs, *Dimorphodon* folded its wing like an umbrella when it walked. This way the wings would not get damaged. And the wings would not trip up the pterosaur.



© AMNH/C.Chesek

This fossil is around 200 million years old. It belonged to a pterosaur named *Dimorphodon*. It lived on a coast in what is now southern England.



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Dimorphodon had a wingspan of up to 4 feet 7 inches (1.4 m). It ate insects, fish, and other small vertebrates (animals with backbones).

Pteranodon longiceps

(pronunciation: ter-AN-o-don LON-ji-seps)

Pteranodon flew over open water looking for food. When it saw a fish it dived into the water, just like a pelican does today. It would swallow the fish and then return to the surface. This pterosaur was huge. It had a 20-foot (6-meter) wingspan. For many years *Pteranodon* was the largest known pterosaur.



© AMNH/D. Finin

This fossil is around 85 million years old. It belonged to a pterosaur named *Pteranodon*. It lived in North America.



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Pteranodon had a wingspan of up to 20 feet (6 m). It ate fish.

Sample Chart

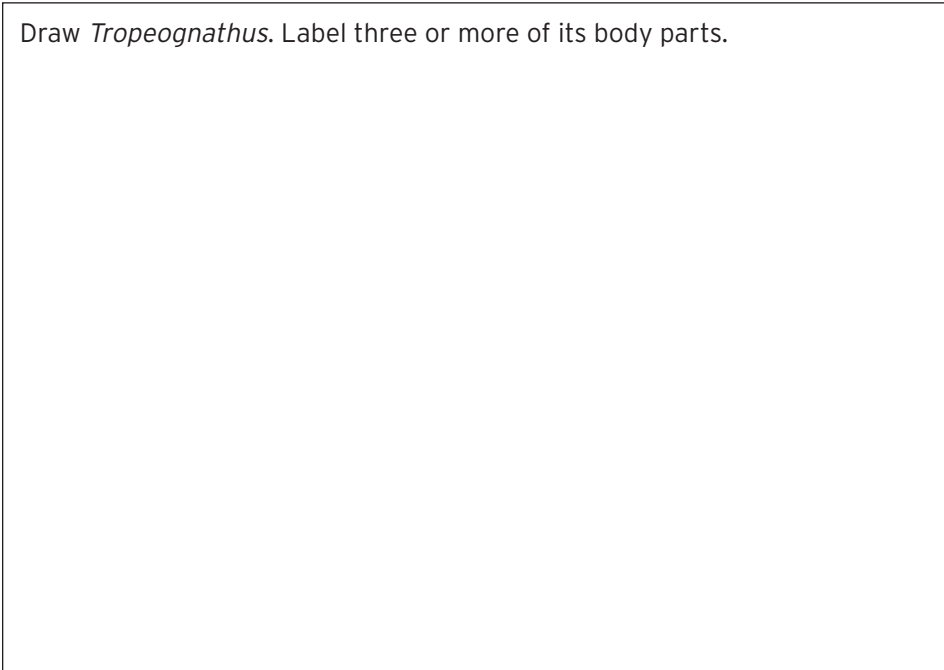
Pterosaur Bodies

Type of pterosaur	Wingspan (size)	Beak	Teeth
<i>Pterodaustro guinazui</i>	8 feet (2.5 m)	long and round on the end	many small teeth used to filter food out of the water
<i>Dimorphodon macronyx</i>	4 feet 7 inches (1.4 m)	short	two kinds of sharp teeth to catch different kinds of prey animals
<i>Pteranodon longiceps</i>	20 feet (6 m)	very long and pointy	no teeth

Student Worksheet

1. Find the giant *Tropeognathus* pterosaur hanging above the entrance.

Draw *Tropeognathus*. Label three or more of its body parts.

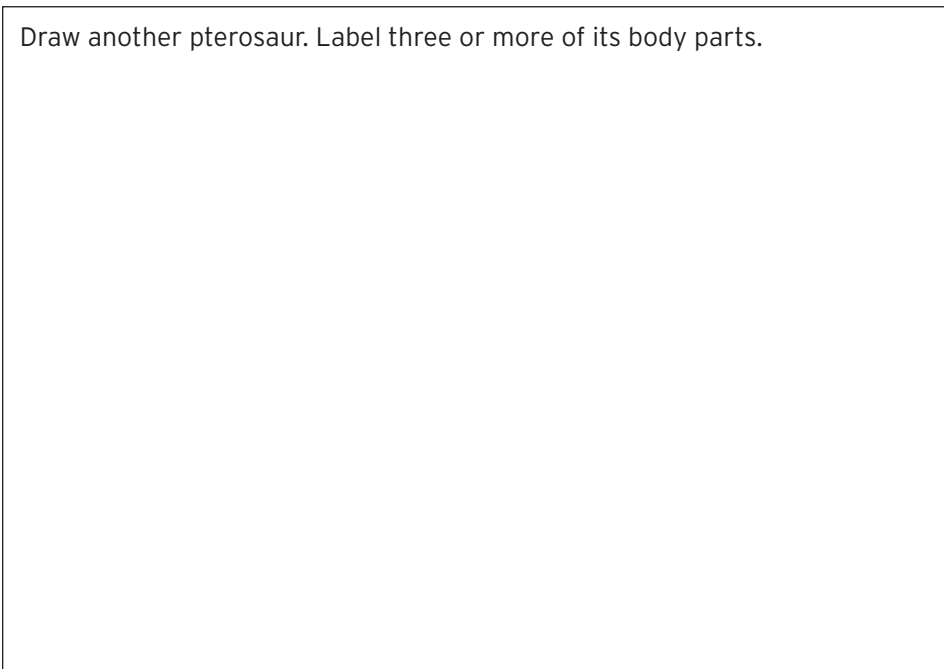


Describe its body parts.

How do you think *Tropeognathus* used its body parts?

2. Keep exploring. Pick another pterosaur to study.

Draw another pterosaur. Label three or more of its body parts.



What is the name of this pterosaur?

Describe its body parts.

How do you think this pterosaur used its body parts?

ANSWER KEY

Student Worksheet

1. Find the giant *Tropeognathus* pterosaur hanging above the entrance.

Draw *Tropeognathus*. Label three or more of its body parts.

Describe its body parts.

(Answers may include: It has a large body with large wings, and a short, thick beak. It has many large teeth, eyes, and nostrils on its head.)

How do you think *Tropeognathus* used its body parts?

(Sample answer: I think that Tropeognathus used wings to fly, its eyes to find food, and giant beak and teeth to catch the food.)

2. Keep exploring. Pick another pterosaur to study.

Draw another pterosaur. Label three or more of its body parts.

What is the name of this pterosaur?

(Answers will vary based on student's selection.)

Describe its body parts.

(Answers will vary based on student's selection.)

How do you think this pterosaur used its body parts?

(Answers will vary based on student's selection.)

Student Writing Guidelines

Writing Prompt:

Based on your reading, your visit to *Pterosaurs: Flight in the Age of Dinosaurs*, and your discussions, write an essay in which you describe the body of one kind of pterosaur.

Be sure to include:

- the scientific name of your pterosaur
- a drawing of your pterosaur with three or more body parts labeled
- a description of your pterosaur including size and shape of the body, and anything else that you have learned about this kind of pterosaur

Support your discussion with evidence from the reading and your visit to the *Pterosaurs* exhibition.

Use this checklist to ensure that you have included all of the required elements in your essay.

- I introduced pterosaurs as my topic.
- I clearly named one type of pterosaur and described it.
- I included an illustration of this pterosaur.
- I labeled my illustration to identify at least three body parts.
- I used information from "Flying Pterosaurs" to explain pterosaurs in detail.
- I used information from the *Pterosaurs* exhibition to explain pterosaurs in detail.
- I included a conclusion at the end.
- I proofread my essay for grammar and spelling errors.

Assessment Rubric

Scoring Elements		1 Below Expectations	2 Approaches Expectations	3 Meets Expectations	4 Exceeds Expectations
RESEARCH	Reading	Does not reference information from the text.	Presents information from reading materials using facts, vocabulary, examples, or other references but may lack accuracy or relevance.	Presents information from reading materials using facts, vocabulary, examples, or other references but may lack relevance.	Presents accurate and relevant information from reading materials to inform or explain using facts, vocabulary, examples, or other references.
	AMNH Exhibit	Does not reference information from the exhibit.	Presents information from Museum exhibit content using examples, quotes, or other references but may lack accuracy.	Presents information from Museum exhibit content using examples, quotes, or other references relevant to the purpose of the prompt.	Accurately and effectively presents important information from Museum exhibit to inform or explain content using examples, quotes, or other references.
WRITING	Focus	Does not address the prompt.	Addresses the prompt, but significant sections of writing are off topic.	Addresses the prompt with minimal distractions.	Addresses the prompt with no distractions.
	Development	No detail is included to explain the topic.	Informs or explains by presenting details.	Informs or explains using accurate details.	Informs or explains by providing accurate and relevant information.
	Conventions	Lacks cohesion and control of grammar, usage, and mechanics appropriate to grade level.	Demonstrates an uneven command of standard English conventions appropriate to grade level.	Demonstrates a command of standard English conventions, with few errors as appropriate to grade level.	Maintains a well-developed command of standard English conventions, with few errors. Response includes language and tone appropriate to the purpose and specific requirements of the prompt.
SCIENCE	Content Understanding	Content is irrelevant, inappropriate, or inaccurate.	Shows uneven understanding of disciplinary content related to the topic.	Presents generally accurate disciplinary content related to the topic.	Presents accurate and relevant disciplinary content to enhance understanding of the topic.