



# Science in Action: Daniela and Thaís

Student Book



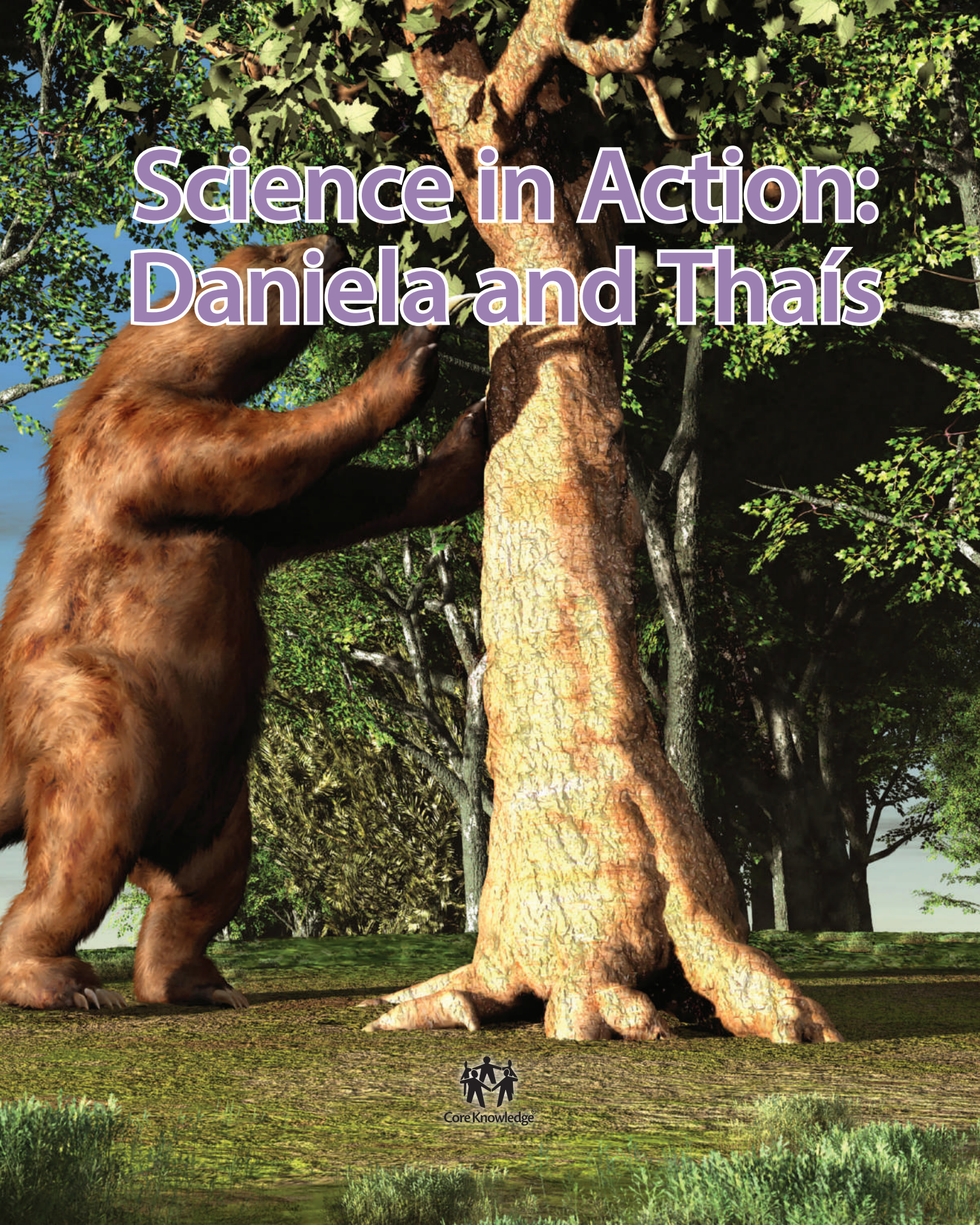
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# Science in Action: Daniela and Thaís



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The background of the entire page is a prehistoric landscape. On the left, a large, brown, shaggy dinosaur is partially visible. In the center, a massive, ancient tree with thick, gnarled roots stands prominently. The ground is covered in green grass and small plants. The sky is a pale blue with soft, white clouds. The overall scene is peaceful and naturalistic.

# Science in Action: Daniela and Thaís

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# Daniela's Dinosaur Dreams

## Daniela's Big Dream

Daniela lives by the ocean in Veracruz, Mexico. She goes down to the beach every day. She watches the waves crash on the shore. Daniela loves whales. Whales are her favorite animal. Daniela really likes the big sperm whales. Daniela dreams of learning all about animals.





## A Love for Dinosaurs

Daniela learns that whale ancestors might have had legs a long time ago! This makes her curious. If whales once walked on land, what other animals did, too? Daniela decides she wants to study dinosaurs. She starts reading books and watching shows about whales and dinosaurs. Her passion for dinosaurs starts.



## Museum Guide

In her mom's hometown of Chihuahua, there is a dinosaur museum. Daniela learns so much about dinosaurs that she can name every dinosaur there. She likes sharing what she knows about dinosaurs with other people. She gets so good at talking about dinosaurs that she gets to be a tour guide during the summers at the museum.





## Studying Hard

In school, Daniela works hard to learn everything she can about dinosaurs. Some people do not understand her love for dinosaurs. They tell her to study something else. At one point Daniela thinks about giving up. But one special teacher, Mrs. S., believes in Daniela. She tells Daniela to keep studying and never give up on her dream.



Mrs. S can see that Daniela is very interested in dinosaurs. Mrs. S. helps Daniela find resources to learn more about dinosaurs. Daniela gets books about dinosaurs. She gets articles about dinosaurs. Mrs. S also helps Daniela find websites on dinosaurs.





## A New Adventure

In high school, something special happens. Daniela goes on a trip to a dinosaur museum. She meets a scientist, Dr. de León. He discovered her favorite dinosaur! He is very impressed with how much she knows about dinosaurs. He invites her to join his team looking for dinosaur fossils in the Mexican desert. She is so excited!



## Growing Up

Daniela travels to a desert with Dr. de León's team. They are in the desert to look for dinosaurs. But the desert is hot and dry. How could dinosaurs have lived there a long time ago?



A long time ago, what is now the desert was the edge of the ocean. The surface of the earth moved. The water came and went. The land changed into a desert.



## A Dino Discovery!

On that first trip to look for dinosaurs, Daniela realizes she can see what the desert used to look like. This helps her locate **fossils** of the animals that used to live there. She finds the skeleton of a duck-billed dinosaur. The fossil includes the leg and arm! It feels like a dream come true!



Before she graduates from high school, Daniela also starts working as an illustrator. An illustrator draws what the dinosaur bones and dinosaur looked like. Some skeletons are too broken to fix. Illustrators draw what the unbroken skeleton would look like. Then, Daniela starts making her own discoveries!



Before she starts college, Daniela starts getting research papers published. For people studying science, this is very important. She wrote a paper on avian tracks in Mexico with another scientist. Then she and her fellow scientists published a paper when they discovered evidence of oviraptorosaurs in Mexico. This was the first instance of that type of dinosaur in Mexico.





# Daniela Barrera Guevara: Studying Dinosaurs

## Daniela Digs Dinosaurs

Remember Daniela, the girl from the last chapter? Well, here she is now, all grown up!

A lot of people go straight from high school to college. Daniela was busy discovering and drawing dinosaurs. She also was writing papers and was in charge of leading dinosaur discovery projects. Because of all her work, professors at the University of Alaska Museum of the North reached out to her. They wanted Daniela to go to college there!



## Off to College

First, she moved from Mexico to Anchorage, Alaska, where the school is located. The Museum of the North, which is part of the school, is located there, too.



Then, she was invited to a dinosaur **dig site**

in Montana! So, she moved from Alaska to Montana. She lived there and in North Dakota for three months. In Montana, they looked for *Tyrannosaurus rex* **fossils**!





## Daniela at a Dig Site

In Montana, Daniela worked on the dig site. As part of her schoolwork, she had to train to be a **quarry** master. A quarry master is like a teacher in a classroom. They organize the dig site. They tell people how to dig. They tell people where to dig. And they help tell what dinosaurs they are finding.





## Find a Fossil

Many fossils are found in rock. People must be careful when breaking the rock away from the fossils. Fossils can be a different color from the rock around them. Daniela uses a brush to clean the loose rock away.





## Protect the Fossil

Fossils can break easily. Daniela and her team wrap the fossils in a cast.

She uses plaster and cloth to make the cast on the bone, just like the cast a person gets when they break a bone. This helps keep the fossil together when they move it.

Daniela checks that the fossil is wrapped well.





## Move the Fossil

Once the fossil has a strong cast, Daniela gives a thumbs-up to move the fossil. The fossil will be moved to a lab. There are more tools there to clean the fossil.



In the lab and at the museum, Daniela has more tools to clean up the fossil. Daniela and her team work hard to make the fossil look like a fossil and not a rock. When people visit the museum, they will see it is a Tyrannosaurus skull!



## Daniela's Favorite Dinosaurs

*Coahuilaceratops*: This dinosaur was found in a dig in Daniela's home country, Mexico. Daniela is excited to learn that it might be one of the first dinosaurs with horns. Its horns are up to four feet long and longer than horns on other dinosaurs. Its name comes from words that mean horned face and great horn

*Daspletosaurus wilsoni*: This dinosaur looks like a small Tyrannosaurus rex. It has short front arms and a large head. Its teeth are big and sharp. It also has spiky parts around its eyes. Part of its name is from the man that first discovered it. His name is Jack Wilson. The other part of the dinosaur's name means frightful lizard.

*Oviraptor*: This dinosaur is small compared to other dinosaurs. It has feathers and a crest on its head. It looks like a bird. The Oviraptor is one of the first dinosaurs to have feathers. It has a beak and no teeth. It also walked on two back legs like a bird. It is believed that the Oviraptor grew to about five feet long.





## Dino Digs

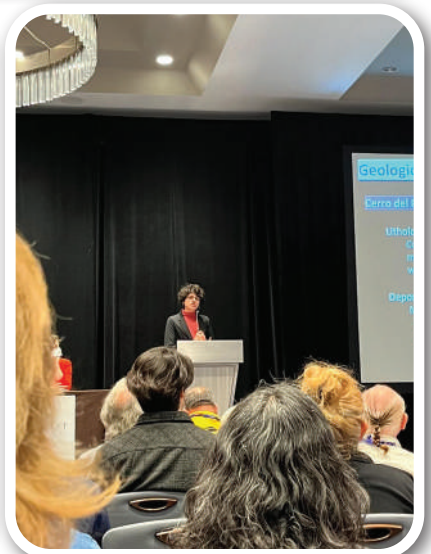
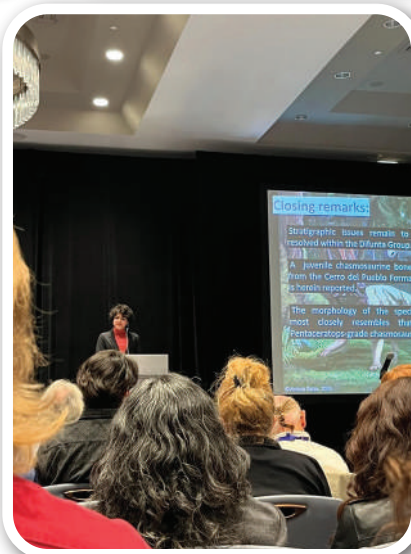
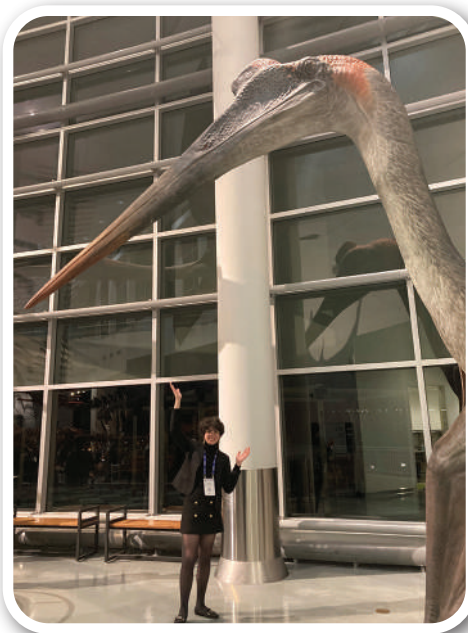
The areas Daniela digs for dinosaurs are deserts. But millions of years ago, all those areas were beaches. Not only does Daniela study how dinosaurs **change** over time, but she also studies how areas change over time. It is like she is uncovering a giant puzzle from the past. Every new discovery is exciting!





## The Big Picture

Daniela still studies dinosaurs at the Museum of the North at the University of Alaska. One of Daniela's jobs is to understand how animals like dinosaurs change over time. She loves sharing what she learns with others by writing papers and giving talks. Learning about the past helps everyone understand the world today.



# Inspired by . . .

To be **inspired** by someone means they made us want to try something.

## Mary Anning, Fossil Hunter

- Born in England in 1799
- Learned how to hunt for fossils from her family. Her dad would find fossils and sell them for money. Soon her whole family was hunting for fossils.



## Neat Work

- Discovered many fossils that helped people understand more about the past
- Excavated, or dug out of the earth, the first Ichthyosaurus which her brother had found
- Uncovered the skull of a Plesiosaurus
- Influenced many people in the study of dinosaurs and the past



Daniela Barrera Guevara was inspired to get into science by Mary Anning. Daniela is inspired by her work with Dr. Elizabeth Friedman Fowler and Dr. Denver Fowler.

Daniela has a special friendship with two people that influenced her. Dr. Elizabeth Friedman Fowler and Dr. Denver Fowler met Daniela in Mexico. The husband-and-wife team were impressed with Daniela. They saw her amazing discoveries. They asked her to come to the United States to work with them. Daniela traveled to Montana to work with her favorite paleontologists.



Dr. Denver Fowler, Curator  
and Paleontologist



Dr. Elizabeth Friedman  
Fowler, Paleontologist



# Thaís's Teacher-to-Scientist Dream

## Thaís's Beginning

Thaís (*Tah-ees*) Pansani is a scientist from Americana, Brazil. Americana is a small town in the countryside. Thaís lived with her mom, dad, and sister. Her dad's job made the family move a lot. Thaís went to many different schools in São Paulo. She was used to moving and meeting new people. Thaís enjoyed spending time with her family and exploring new places.



## A Dream of Teaching

When Thaís was little, she dreamed of being a teacher. She didn't think about being a scientist. Thaís used a small chalkboard to teach her stuffed animals. She loved playing teacher and giving lessons. Thaís likes to help others learn. She dreamed of having a classroom one day. Thaís felt happy when she was teaching her pretend students.





## A New Interest

At age twelve, Thaís watched nature shows on TV. She saw the ocean, forests, and animals. Thaís loved learning about how people protect Earth. She wanted to help save the world. Thaís decided that becoming a **scientist** could help her protect nature. From that day forward, Thaís dreamed of ways to keep the planet safe.



## A Love for Biology

When Thaís started high school, she took her first biology class. She loved it right away! Thaís learned about plants, animals, and the environment. She enjoyed learning how life works together. Thaís loved everything about **nature**. She asked questions and wanted to learn more. She knew that biology was what she wanted to study for the rest of her life.





## Wanting More

Thaís wanted to learn more than what her teachers taught in class. She asked her teachers for extra books. Thaís was very curious. Her teachers saw how much she wanted to learn. They helped her find more books and answers to her questions.



## Thaís's Family Support

Thaís's parents never told her to be a scientist, but they didn't stop her either. They always said to their daughters, "Do what you love." Her sister wanted to be a journalist and moved to São Paulo. Thaís kept dreaming of being a biologist. Her family encouraged her to follow her dreams.





## Getting into University

In Brazil, the best schools for science are very hard to get into. Thaís studied hard for the entrance exam. She worked every day to prepare. After lots of studying, Thaís was accepted into the Federal University of São Carlos (Universidade Federal de São Carlos). She was so excited to start college! Thaís was proud of herself. She was ready to learn even more about biology and the world.



## Choosing Her Path

In college, Thaís learned more about biology. She loved everything about life on Earth. But she became especially interested in paleontology. Thaís wanted to know how life has changed over millions of years. She read books about fossils and animals from the past. By the end of her first year, Thaís knew she wanted to study the past and learn about the animals that lived long ago.





## Exploring the Past

Thaís went on trips to caves to study fossils. She dug in the dirt and looked at the rocks to find clues about the past. Thaís loved being outside and exploring nature. She found fossils that tell stories about animals from the past. She especially liked learning about ancient mammals like giant sloths and giant armadillos. Thaís was amazed by how fossils help us understand the world. She enjoyed learning about how life was so different long ago.



## Thaís the Paleontologist

Now, Thaís is a paleontologist. She studies how life on Earth has changed over time. Thaís loves learning about past animals and the world of the past. She works with fossils to learn about how things were a long time ago. Thaís has found a way to study the past and the creatures that lived in it. She is helping protect the world by learning about it. Thaís is proud to follow her dream of being a scientist.



## Thaís Rabito Pansani: Saving Earth

### Thaís in School

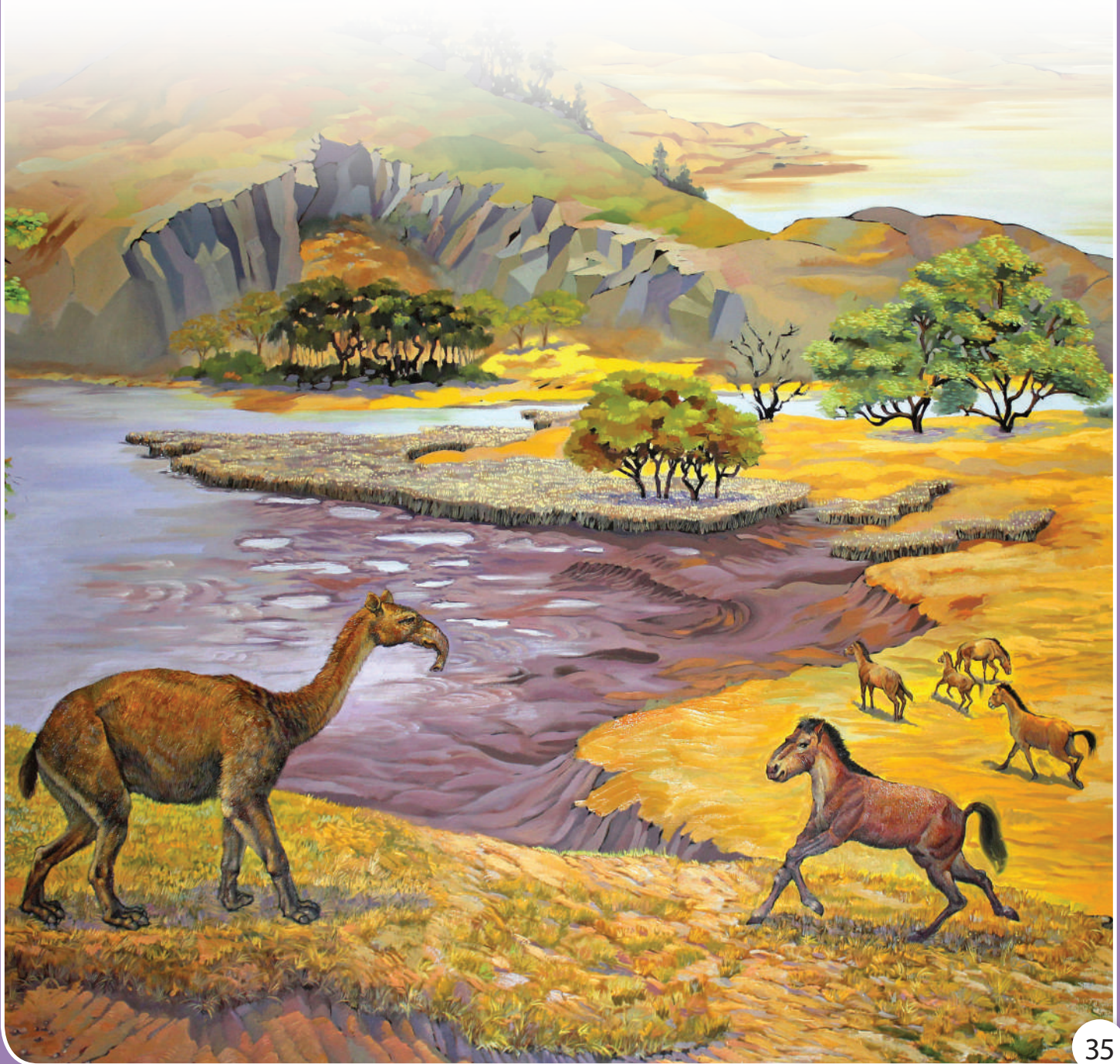
Thaís loves to learn. When she was in elementary school, she wanted to be a teacher. As she got older, Thaís had to choose what to study in college. She liked **biology**. She liked paleontology. Biology is about living animals and plants. Paleontology is the study of animals and plants from the past.





## Thaís Becomes a Research Scientist

Thaís decided to study biology at first, but she still loved learning about Ice Age mammals. Thaís decided to be an active paleontologist. She studied paleoecology. That is the study of how the environment was in the past. She wants to learn about how the world used to be to help save the world now.





## Thaís at the Smithsonian

Thaís worked with the Smithsonian Institute. She wrote a paper. Her paper had to support an important idea. Thaís studied megafauna. These are very large animals.

They are extinct now, but their fossil remains are studied by scientists. Thaís studied the giant ground sloth.



Giant ground sloths could grow to twenty feet long. They could weigh as much as two cars.



## The Giant Ground Sloth

People thought giant ground sloths lived in Brazil a long time ago before humans arrived. But she noticed that some of the fossils looked different. She did some tests on the fossils. She found evidence that the sloths lived near humans. This became the important idea Thaís wrote about.



## Why Her Idea Is Important

People believe that humans first arrived in the Americas about 14,000 years ago. The evidence Thaís presented was different. It showed that people were living in the Americas about 25,000 years ago. People have discovered many places where people lived about 20,000 years ago.



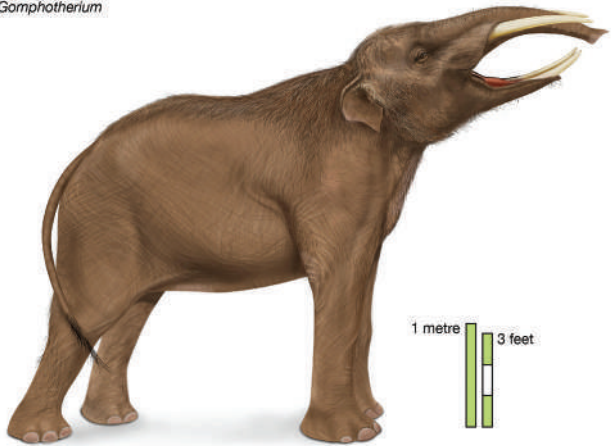
## Other Megafauna Thaís Studied

*Gomphotheres:* These animals looked like elephants. They had long tusks that helped them dig for food or reach tall trees. Scientists believe the gomphotheres chewed their food by moving their jaws from side to side. Thaís wonders how gomphotheres moved through the land. She wonders what else they could do with their tusks. By looking at their bones and **teeth**, Thaís can learn what they ate.

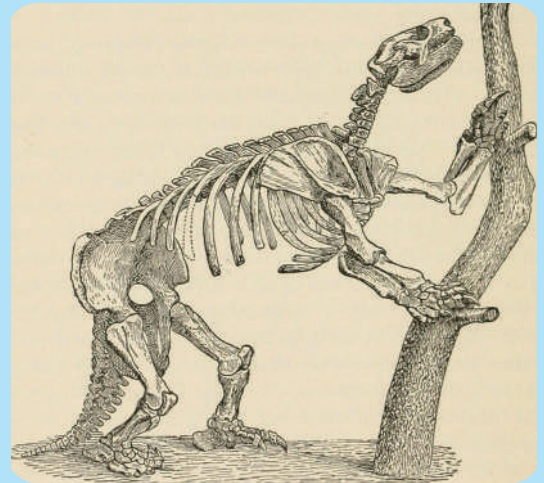
*Palaeolamas:* Thaís is interested in palaeolamas because they were found in South America. They were like llamas but much bigger. Thaís looks at their fossils to learn how they lived. She looks at their fossils to see what they ate. Scientists believe that the palaeolamas mainly ate leaves, grasses, and fruits.

*Saber-toothed Cats:* These cats had long, sharp teeth. They could also open their jaws very wide. Scientists are not sure how the saber-toothed cat used its large teeth. They think they used their teeth to hurt or wound an animal. A common saber-toothed cat is the saber-toothed tiger. However, they are not closely related to the tiger that lives now.

Gomphotherium



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**Giant Armadillos:** These animals were the size of a car! They had thick, hard shells. The shells protected them from danger. She wonders if they used their shells for other reasons. A type of giant armadillo from the past is the glyptodon. Its name means “grooved teeth.” They could not pull their head into their shell. So, they also had armor on their head. Their tails had rings of bones. They would use their tail as a weapon.

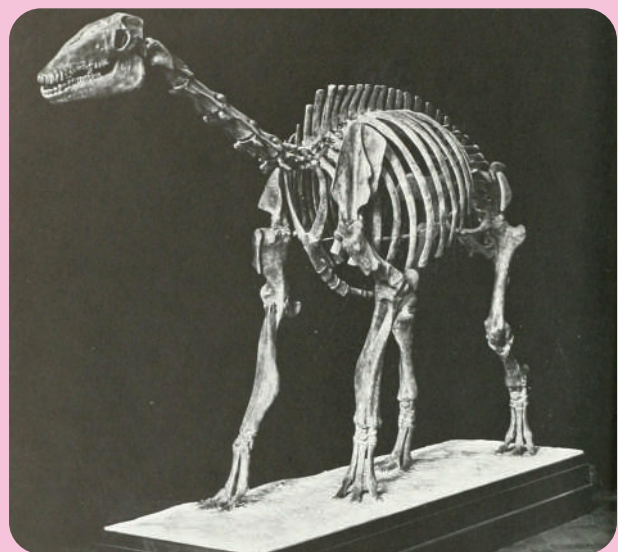
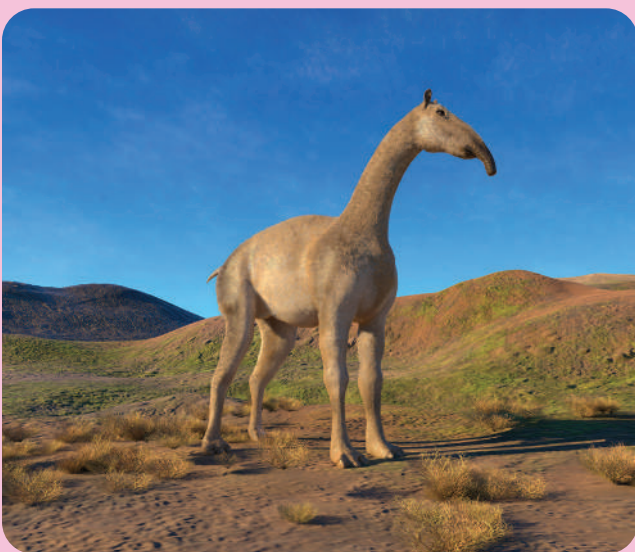
### *Toxodon*

An animal that lived in South America and looked like a hippo is the Toxodon. Its name means “bow-tooth” because the teeth were curved. The teeth had no roots and would continue to grow. Scientists believe that the toxodon only ate plants. Thaís wonders if the toxodon lived near other animals that only ate plants.

### *Macrauchenia*

Thaís also studies Macrauchenia. It had a long neck and a body like a camel. Its name means long neck. Thaís wonders how Macrauchenia used its long neck. The Macrauchenia had three toes on each foot. It also had a rounded snout. Scientists think the snout was used to get leaves. Fossils show it had forty-four teeth in its mouth.





## What Thaís Does Now

Today, Thaís continues to study. Thaís spends time studying fossils and analyzing how animals lived and how humans lived with them.

Thaís loves her work because it helps her learn more about Earth's history. She also shares what she learns with other scientists and students. Thaís is proud to be a scientist and she hopes her work will inspire others to study and learn about the world around them.





## Keep Learning Like Thaís

Thaís worked hard in school to follow her passion for science. She didn't stop asking questions or reading about animals. Now she helps others learn about them, too. Just like Thaís, you can be curious and keep learning about the things that excite you! Whether it's animals, plants, or anything else, studying what you love can lead to amazing discoveries. So, keep reading, keep asking questions, and follow your dreams. One day, you might be a scientist like Thaís, learning about the world and making discoveries that help everyone understand it better!



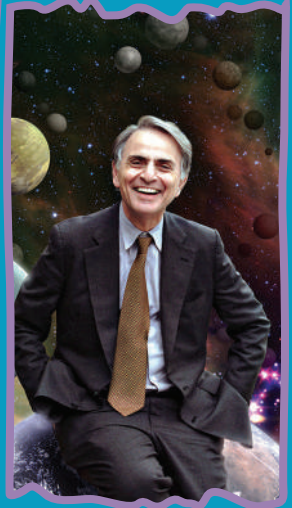


# Inspired by . . .

To be **inspired** by someone means they made us want to try something.

## **Carl Sagan, Astronomer and Science Writer**

- Born in Brooklyn, New York, in 1934
- Graduated from the University of Chicago
- Taught at Harvard University and Cornell University
- Interested in the possibility of life on other planets



## **Neat Work**

- Worked for NASA on its space programs
- Provided ideas about what the other planets in our solar system are like
- Contributed to many probes sent by NASA to other planets, such as the Viking landers to Mars and Mariner probes to Venus

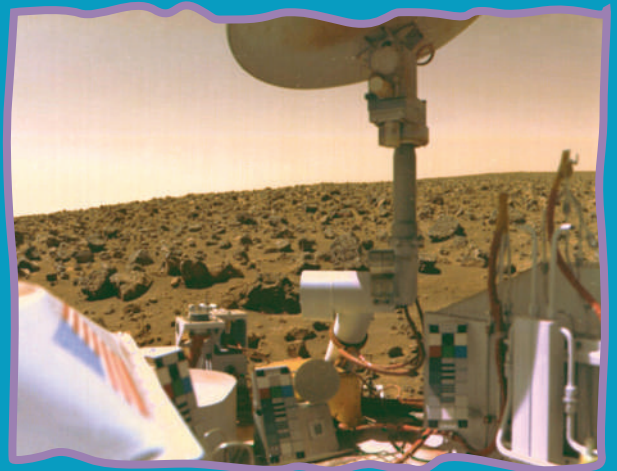


The Viking Lander was the first U.S. spacecraft to land on and take photos of Mars

Thaís Rabito Pansani was inspired to get into science by Carl Sagan.

During his life, he wrote papers and science fiction books. Some of those books were made into movies. In 2001, NASA announced the construction of the Carl Sagan Center in California. The Carl Sagan Center has laboratory modules, a gallery for people to walk around, and an auditorium. Astrobiologists will be able to do research at the Carl Sagan Center, too.

Though he is known as a planetary scientist, a scientist who studies and theorizes what other planets are like, Carl Sagan has influenced many people. He also was a person who worked at making sure that people understood more about science. He became famous as the host of a television show, *Cosmos*. Each episode showed how parts of life, the universe, and everything in it are related. For ten years, the show was the most-watched series on television.



The Viking 2 lander took a selfie on the surface of the planet Mars.







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