


# Alberta's Fossil Heritage



**W**endy Sloboda is a dinosaur hunter! In 1987, when she was just 19 years old, Wendy made a very special find. This is her story.

“I’ve always loved looking for fossils. While I was growing up in Warner, near the Milk River, my parents and I went for walks to look for them. Then one day, when I was older, I was walking near Devil’s Coulee. On the dry, sandy soil, I found what I thought might be bits of dinosaur eggs. Soon scientists from the Tyrrell Museum came to investigate.

“In a few days we made a special find on a nearby hillside. We found nests that had whole fossilized eggs and baby dinosaurs! We were so excited. It was a unique find. Something like this could only happen in Alberta!”

## Alberta's Story

In the last chapter, you learned how the land helps to give Alberta its identity. In this chapter, you will find out how Alberta's **fossils** also help to make the province unique. You will learn what fossils can tell about Alberta's past. You will find out why fossils are important today and how they are protected. You will discover why fossils are an important part of our heritage—a part of the past that we still value because it helps make us what we are today.



This is a fossil of a baby dinosaur.

### words matter!

**Fossils** are the remains or shapes of ancient plants and animals that have turned to stone.

## ? Inquiring Minds

Here are some questions to guide your inquiry for this chapter:

- Why are fossils important to Alberta?
- How are fossils part of Alberta's identity?

Look for answers in this chapter. If you'd like to know more, look for information in other sources.



I wonder how fossils make Alberta unique. To find out more, I will

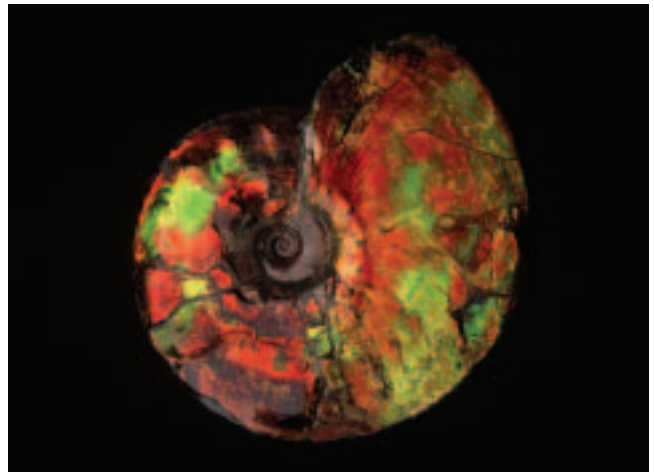
- ask questions as I read
- use the question words Who, What, When, Where, Why, How, and If

# What Do Fossils Tell About Alberta?

## **Skill Smart**

Look at the fossils below. What clues do they give about Alberta's past? With a partner, write a paragraph to share your ideas.

Fossils are remains of the past. They give us hints about what Alberta was like millions of years ago. Some fossils are pieces of an ancient plant or animal that have turned to stone over a very long time. Others show the shapes of plants or animals that have been pressed into mud and hardened over time. Fossils tell us stories. We can study them to learn about the plants and animals that no longer exist on Earth.



These fossils are now rock. What were they before?



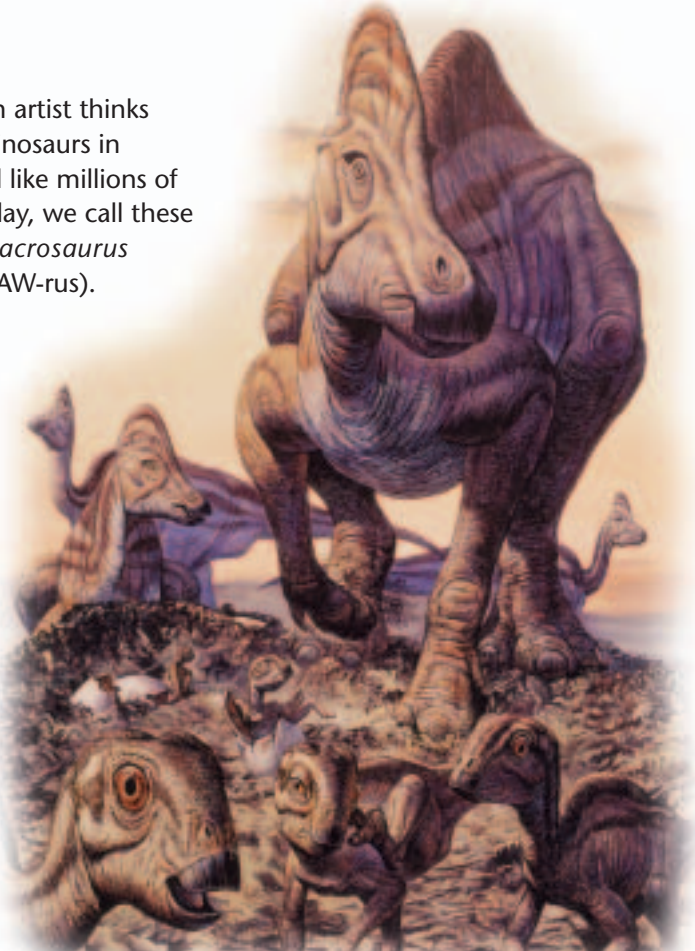
# What Are Other Clues to the Past?

**Imagine this!**

Dinosaurs are walking through huge swamps and ponds with sandy shores. In the distance, there are forests with hundreds of dinosaurs guarding their nests. The nests have eggs in them, each one about the size of a volleyball. Some eggs nearby have just hatched. The babies are over half a metre long. They can't walk yet, and they don't have crests on their heads as their parents do. ♦

How do we know that this scene could once have happened in Alberta? If you said that fossils help to tell us, you were right. Remember when Wendy found the fossil eggshells? Dinosaur fossils like the ones Wendy found are another clue to Alberta's past. They tell us where the dinosaurs lived. They tell us what types of dinosaurs lived here. They tell us how big the dinosaurs were. Fossils can also give clues about what the land might have been like millions of years ago.

This is what an artist thinks some of the dinosaurs in Alberta looked like millions of years ago. Today, we call these dinosaurs *Hypacrosaurus* (hi-PAC-row-SAW-rus).



I wonder what kinds of dinosaurs lived in Alberta. I will check the Internet to find out more.

## Thinking It Through

Think about the land around your community. How is it different from Alberta long ago, as it is described on this page?

# Why Do We Find Fossils in Alberta?

## words matter!

Scientists who study fossils to learn about very old forms of life are called **paleontologists** (pay-lee-on-TOL-o-jists).



One of the most famous **paleontologists** in the world is Dr. Phil Currie, professor at the University of Alberta.

These paleontologists are digging for fossils in the badlands, near the Red Deer River. What can you tell about the land from this photograph? What makes the land perfect for finding fossils?

Fossils do not form very often. Millions of animals die and leave no traces. Alberta is unique because so many fossils are found here. There are very few other places in the world with as many fossils. Why does Alberta have so many fossils?

Fossils are found in Alberta because of the way the land formed. In Chapter 1, you learned that the land changed over time. In some places, there were earthquakes and volcanoes. Plants and animals were covered over and preserved. They became fossils buried below layers of dry soil and rock.

Over millions of years, water and Alberta's strong winds carried away the soil and rock. In parts of Alberta's hot and dry grasslands, many fossils were uncovered. This was the area known as the badlands, but these lands aren't "bad" for fossils. They are perfect!



# Finding Information on the Internet

What do you know about Alberta's badlands? You can use the Internet to find out more. But beware! There are thousands of sites, and not all of them have accurate information. Follow these guidelines:

- Ask your teacher or a librarian to help you choose a "search engine." A search engine is a way to find sites.
- You will need to type in a topic. Choose a few keywords. Find out how to use the words *and* or *not* to find sites that are more likely to have the information you need.
- Look at the sites on your list. Identify museums or universities. They are likely to have reliable information.



## Practise the Skill

1. **Searching:** Use the Internet to find answers to these questions.
  - a) Where are the badlands?
  - b) How far are the badlands from your community?
  - c) What plants and animals can you find in the badlands?
2. **Sorting:** How many sites did you visit? What made you skip some sites and not others? Which ones were most useful?
3. **Selecting:** Now share your answers to these questions.
  - a) Did you all use the same search engine?
  - b) Did you use the same Web sites?
  - c) Did you all have similar answers? If not, how can you check which information is accurate?

# Where Are Fossils Found in Alberta?



What other fossils can be found in Alberta? I'll ask a librarian to help me find out more from books and CDs.

Most of Alberta's fossils are found in the badlands, but they are also found in other parts of the province. The map below shows some of the places in Alberta where fossils have been found. Match the numbers on the map with the photographs on the opposite page to see which fossils have been found in these locations. You can see that many different types of fossils have been uncovered. Not many other places in the world have such a variety of fossils.

## Alberta's Fossil Finds



Petrified wood is also a fossil. It is wood that has turned to stone. Petrified wood is the provincial stone of Alberta. Why do you think it was chosen?

### Skill Smart

- What would you do if you found a fossil?
- Post your ideas on the bulletin board.
- Read what other students think.



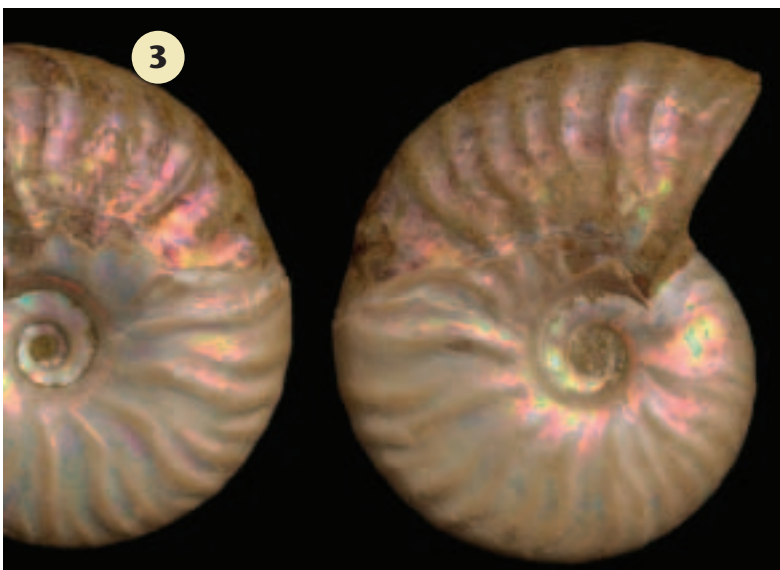




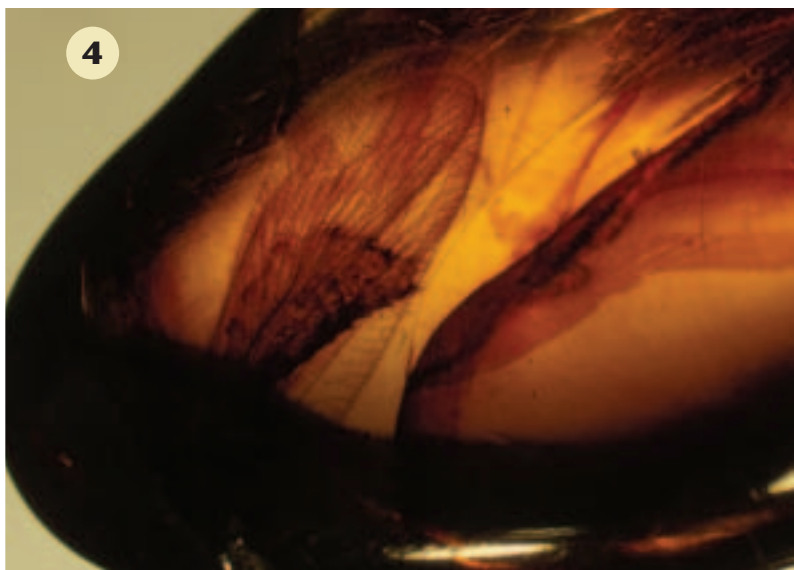
Many different types of fossils have been found near Drumheller, in the badlands.



Fossils of small sea creatures have been found at Castle Mountain, near Banff.



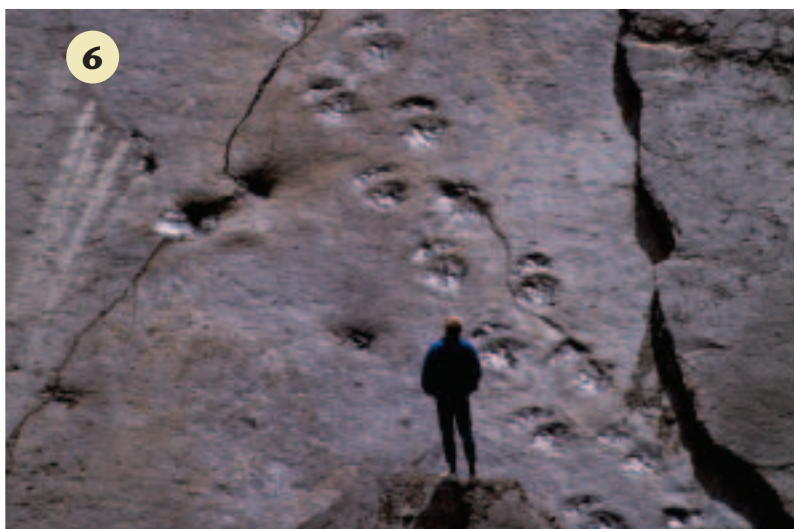
Ammonite, a fossilized shell, has been found at Magrath, near Lethbridge.



Amber, a fossil made from ancient tree sap, has been found at the coal mines near Taber.



Sea reptile remains have been found in the tar sands near Fort McMurray.



Dinosaur tracks can be seen at Grande Cache, near Jasper National Park.



# How Did Alberta Become Known for Fossils?

## words matter!

The *iinisskimm* [in-nis-kim] are special stones with great spiritual importance. Some, but not all of them, are fossils.

From the earliest times, the First Nations of Alberta knew that there were fossils in the land. The Blackfoot called some of the fossils they found *iinisskimm*, or “buffalo stones.” They knew that these fossils came from animals from the past. They called the animals “grandfather of the buffalo.” These *iinisskimm* are still considered sacred.

This Piikani pouch was used to store *iinisskimm*. It belonged to Charlie Crow Eagle, who lived near Lethbridge.



This is a model of *Albertosaurus*. Tyrrell took the bones to Calgary, but they were so big, he could not get them all into his wagon!

## Tyrrell's Find

In 1884, a fossil find made Alberta famous around the world. Joseph Tyrrell was looking for coal. He was also mapping the land between the Oldman River and the Red Deer River. With his crew, he camped in the badlands, close to where Drumheller is now.

Tyrrell soon made an exciting discovery. He found the bones of a huge, meat-eating dinosaur. It would later be called *Albertosaurus*, after the province where it was found.

# What Happened to Alberta's Fossils?

Tyrrell reported his discovery, and before long, collectors began coming to Alberta to look for fossils. The badlands became known as the most important fossil field in Canada. Soon there was a rush to find fossils! Many more people came to Alberta, eager to see what they could uncover.

In 1909, a collector named Barnum Brown came to the Red Deer Valley. Brown worked for an American museum. He found so many fossils that he was known as "Mr. Bones." Brown sent thousands of fossils back to the United States.

Then people began to wonder why the fossils were being taken out of Canada. In 1912, the Canadian government hired its own fossil hunters. The fossils they found are now displayed at the Canadian Museum of Nature in Ottawa and at the Royal Ontario Museum in Toronto.

Over the years, many thousands of fossils were discovered and shipped away from Alberta.

## Thinking *It Through*

Why do you think people felt it was important to keep the fossils in Canada?

Barnum Brown spent five years searching for fossils in Alberta.



## Should Alberta's Fossils Be Protected?

Brianna Hunt lives near Lethbridge. One day, she was walking with her dad next to a river. She saw an interesting rock and picked it up. It was a fossil. What do you think Brianna should have done with this fossil? What would you do?



Fossils can be worth a lot of money. Some people who find fossils sell them. There are many private collectors who want to buy fossils. You can even buy them on the Internet.

There are some people in Alberta who dig up fossils to sell or keep. Should they be allowed to do so? Read the following views to learn more about what different people think about this issue.

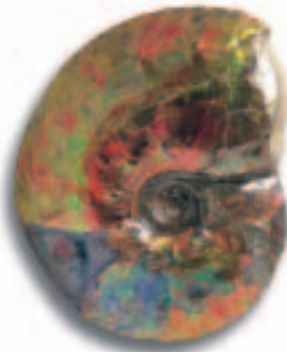
Thousands of fossils get washed away by the rain. There is no way paleontologists can get them all, so collectors should be able to have some.

I love the dinosaur tooth I bought! I can imagine the animal that had that tooth. Fossils help bring the past alive for me!



People who collect fossils could be taking remains of an animal we know nothing about. An expert has to look at the fossils.

Alberta has so many fossil remains. What difference does it make if I have a few teeth and anklebones?



These pieces of jewellery are made from ammonite, a kind of fossilized snail. Some companies have permission to find ammonite and use it in jewellery.

Fossils are a valuable resource. We'd be upset if people went into a park and started cutting flowers or trees. We should be just as upset when they take fossils.

## Over to YOU!

1. As a group, discuss each of the viewpoints. Which opinion do you agree with the most? Why? Did your opinion change after reading these viewpoints?
2. How do you think Alberta's fossils should be protected? Brainstorm some ideas in your group.

## How Do We Protect Our Fossils?



If fossils were not protected, how would I learn about Alberta's past?

Until 1978, anyone could collect fossils in Alberta. People who found fossils could keep them or sell them. No one recorded who collected the fossils or where they were kept.

In 1978, that changed. Alberta passed a law to protect its fossil heritage.

- The province now owns all fossils that are found in Alberta. People are allowed to collect fossils that are lying on the ground, but they must report anything they find.
- In some areas where many fossils are found, no one can pick them up. Only paleontologists are allowed to dig for fossils, and they need a special permit to do so. The fossils they find are sent to museums, where they are preserved and studied.

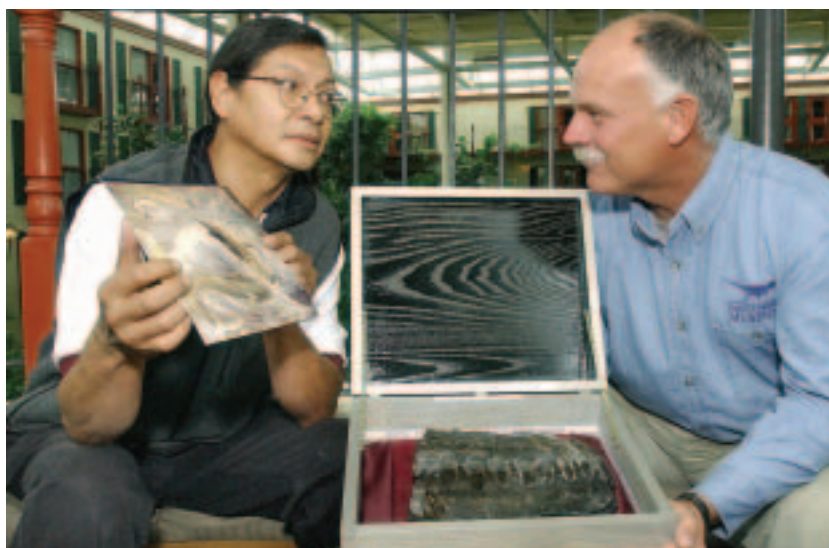
Brianna Hunt and her dad reported their find to the Royal Tyrrell Museum. A scientist at the museum told them that it was a fossil of a squid. Brianna was happy to hear that she could keep the fossil because she found it on the surface of the ground, outside a protected area.

### ALBERTA VOICES

#### *Sharing a Discovery*

[We] want to share this discovery with the rest of the world and agree to have the remains of this creature removed from our lands. [We] have a great respect for our Mother Earth through our culture and spiritual beliefs. Through this agreement, we are contributing in a positive way.

*Chief Chris Shade  
Kainai First Nation*



Rick Tailfeathers, of the Kainai First Nation, is presenting a curator at the Royal Tyrrell Museum with a *mosasaur* fossil found on Kainai land. This is only the second *mosasaur* found in Alberta.

## Why Was Dinosaur Provincial Park Created?

In the early 1900s, one Albertan was worried about the number of fossils being taken away. This person was George Anderson. In 1914, he started a campaign to protect the fossils. To keep people from taking the fossils away, he wanted to turn the Red Deer Valley into a protected area. Anderson wrote about his idea in the local newspaper. He sent letters to the Canadian government and to the Alberta government. For years, nothing happened.

Anderson did not give up. Slowly, more people became interested in his idea. Newspapers began to show their support. Finally, in 1955, Dinosaur Provincial Park was created.

In 1979, Dinosaur Provincial Park became a World Heritage Site. World Heritage Sites are places that are important to the whole world. The park has the world's richest collection of fossils from 75 million years ago. Fossils of dinosaurs, crocodiles, fish, insects, and plants have been found there.



These are fossil bones in the ground at Dinosaur Provincial Park.



### **Skill Smart**

Prepare a short speech to explain why you think Dinosaur Provincial Park is important. You could record your speech.

Paleontologists come to Dinosaur Provincial Park to study the fossils. On the hillsides, visitors can see layers of rock and tour the dinosaur “bone beds.”



## Dinosaur Provincial Park

I had a great time when I visited Dinosaur Provincial Park, near Drumheller. The park is in the badlands. You can go on hikes through the park with a guide. My guide taught me lots about the dinosaurs, plants, and animals that lived here millions of years ago. I learned that large rivers used to flow through the area. Now, there are just creeks. I also found out that cacti grow in the badlands.



The best thing about the park was seeing fossils right in the ground. I felt just like a paleontologist!

I'm happy I live in Alberta. No other province has a Dinosaur Provincial Park!

## Why Is the Royal Tyrrell Museum So Important?

The Tyrrell Museum opened in 1985. It was named after Joseph Tyrrell. The museum was built in Drumheller, close to Dinosaur Provincial Park and close to where Tyrrell found *Albertosaurus* in 1884.

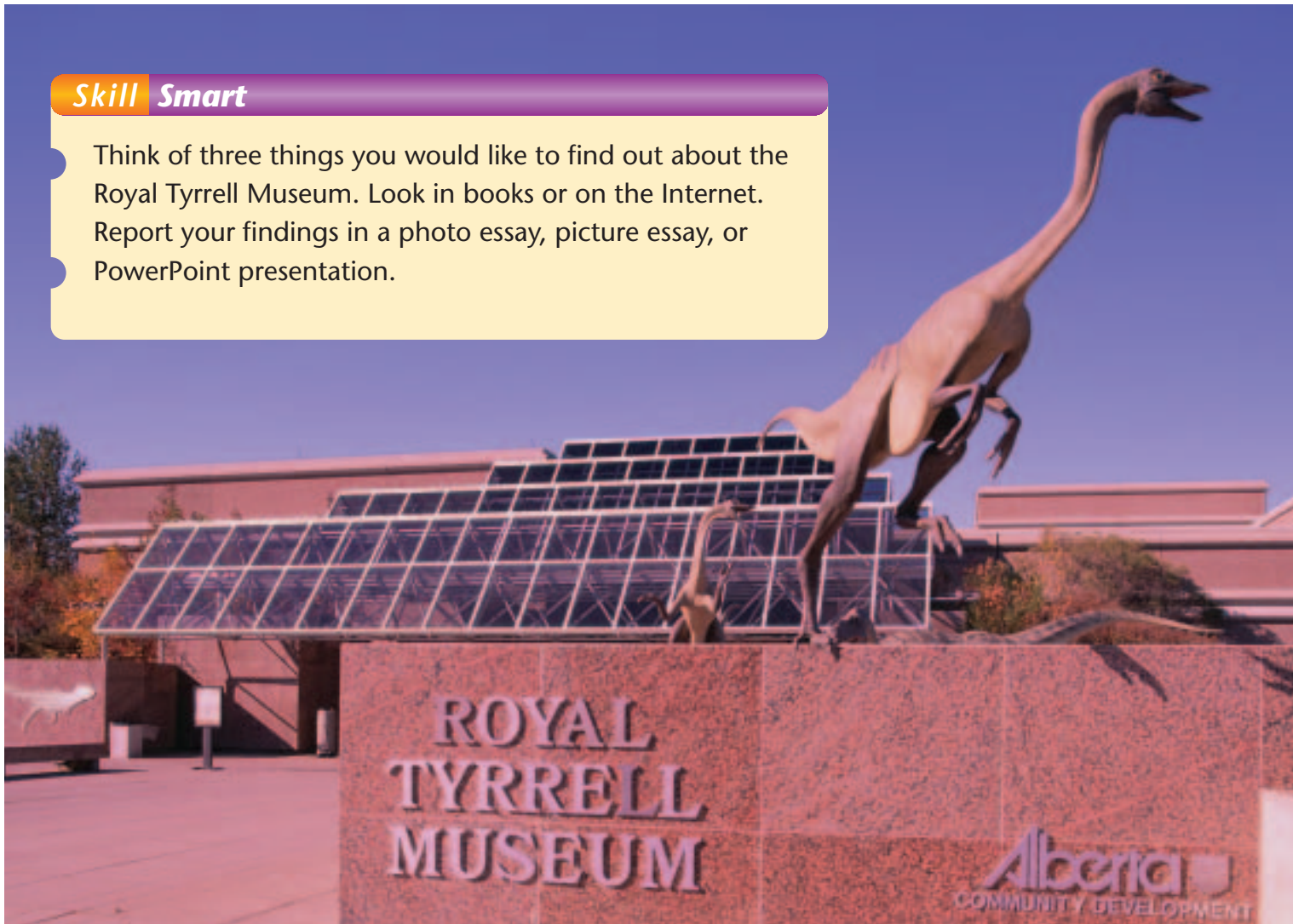
Because of the museum, Alberta's fossils can remain in the province. Paleontologists in Alberta now have a place to study their finds, and people living in the province can see the fossils on display. Visitors and scientists come from all over Canada and the world to learn about life in Alberta millions of years ago.



I want to know more about *Albertosaurus*. Did it only live in Alberta?

### Skill Smart

Think of three things you would like to find out about the Royal Tyrrell Museum. Look in books or on the Internet. Report your findings in a photo essay, picture essay, or PowerPoint presentation.



In 1990, the Tyrrell Museum was renamed the Royal Tyrrell Museum. What do you think the name "Royal" says about the importance of the museum?



# What Are Fossil Fuels?

## words matter!

We call oil, gas, and coal **fossil fuels** because they come from the remains of ancient plants and animals. These fuels can be used for heat and energy.



I wonder how fossil fuels help to give Alberta its identity.

## Thinking It Through

Some fossils have turned into fuels that people can use to produce power and energy. How might your life be different if you did not have power for your favourite machines? Explain.

In this chapter, you have seen how Alberta's fossils help to give the province its sense of identity. But do you know another way that ancient plants and animals are important to Alberta?

Some of the plants and animals that were buried long ago did not turn into fossils. Over a long time and under the weight of the rock that covered them, they turned into coal, oil, and gas. We call these resources **fossil fuels** because they come from ancient plants and animals.

Alberta is rich in fossil fuels, just as it is in fossils. Fossil fuels are very important to Alberta today. Many people work in the coal, oil, and gas industries. Coal, oil, and gas from Alberta are sent to other provinces and other countries. They can be used to heat homes or provide power for items like computers and ovens. Gasoline from fossil fuels is used to run cars and other machines.



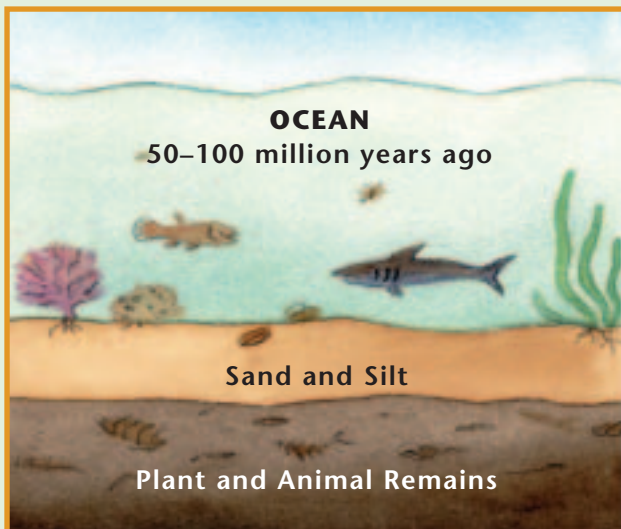
The dark area in this photo is a coal seam, which is a layer of coal underneath different kinds of rock. Coal seams like this one are found in many places where fossils are also found.



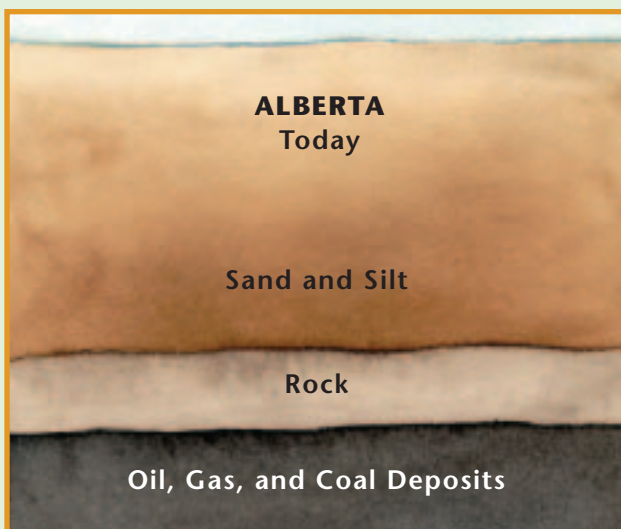
## HOW FOSSIL FUELS FORM



It's hard to believe, but at one time, much of Alberta was covered by ocean. Over time, millions of tiny plants and animals that lived in the ocean died. Slowly they were covered by layers of silt and sand.



Over millions of years, the oceans began to disappear. The remains of plants and animals were buried deeper and deeper. Heat and pressure of the silt and sand turned them into oil, gas, and coal.



Today, we remove the oil, gas, and coal from the ground by using many different methods. You will learn more about this in the next chapter.

# Set Your Skills in Motion

## Ask Your Own Questions

With a partner, brainstorm some questions you would like to ask about Alberta's fossil heritage. Use the Internet to try to find answers to your questions. Look back at the steps on page 51 for hints.



## Create a Web

Print the words *fossil heritage* in the centre of a page. Show how fossils are protected. How are they part of Alberta's identity? Use photos, drawings, or words.

## Make a Chart

How did the land look millions of years ago? How does it look today? What has stayed the same? Look through the text, visit the library, or check the Internet for information. You could use technology to make your chart.

## Plan a Tour

In a small group, plan a tour in Dinosaur Provincial Park. Plan what you will tell visitors about Alberta's fossil heritage as you go on a hike. What might they see, hear, or smell? What will you do at the park? Now role-play your tour by showing another group around the park.

## Give Your Opinion

Look back at the Skill Smart on page 52. What was your opinion then? What is your opinion now? Ask your teacher to help you make a flow chart. Show what you would do if you found a fossil today.



# Look What You Have Learned!

Alberta's fossil heritage helps to make the province unique. Very few other places have as many fossils. We protect our fossil heritage in several different ways. We have laws that prevent people from taking fossils away, and special areas like Dinosaur Provincial Park are protected. The Royal Tyrrell Museum preserves and displays fossils for all Albertans. Fossils and fossil fuels are also important to Alberta today. They are part of Alberta's identity.

Review the inquiry questions for this chapter:

- Why are fossils important to Alberta?
- How are fossils part of Alberta's identity?

Tell about what you have learned by writing a short report. Think about the types of plants and animals that were in Alberta millions of years ago. What did they leave behind? How do they help to make Alberta what it is today? Add pictures to your report and share with a younger student.

## Take Time to Reflect

Before you go on to the next chapter, think about what you have learned in this one.

- How did you use technology to find information?
- Which words can you use to ask questions?
- What did you learn that will help you the next time you use technology to find information?



Choose something from this chapter to save for your Alberta Treasure Chest.