

ACTIVITY GUIDE

Here are activities associated with the Secrets of the Lost Quarry program at the Royal Tyrrell Museum. Below is an activities-by-grade chart to help you decide which are the best activities for your class.

<i>Page</i>	<i>Activities by grade</i>	3	4	5	6	7
2	Styraco-Puzzle	●	●	●	●	●
7	Geology Crossword	●	●	●		
8	Fossil Treasure Hunt	●	●	●	●	●
14	Additional Activities	●	●	●	●	●

ACTIVITY 1

Styraco-Puzzle

Recommended for grades 3 – 7

A group activity that demonstrates how a dinosaur skeleton fits together.

The group is encouraged to compare the skeleton to that of a human.

Materials

- *Styracosaurus* puzzle pieces
- Scissors
- Poster board (large enough to assemble the *Styracosaurus*)
- Glue

Instructions

1. Distribute the pages of the *Styracosaurus* illustration to the students.
More than one skeleton may be required, depending on the size of your group.
2. Students colour the skeletal elements, and then carefully cut out the images along the dotted lines.
3. Students work together as a team to assemble the pieces. They should be careful to assemble it correctly before actually gluing it into place, using the silhouette below for reference.
4. When the *Styracosaurus* is assembled and centered on the poster board, glue it into place.
5. Compare the *Styracosaurus* to a human skeleton. Can you tell which bone is which?

Discussion

Styracosaurus is part of the ceratopsian family. What other dinosaurs do you think it is closely related to?

- *Triceratops* is the most well known relative, but there are also *Chasmosaurus*, *Torosaurus*, *Pachyrhinosaurus*, and *Centrosaurus*, among others.

What do you think this dinosaur ate? Why?

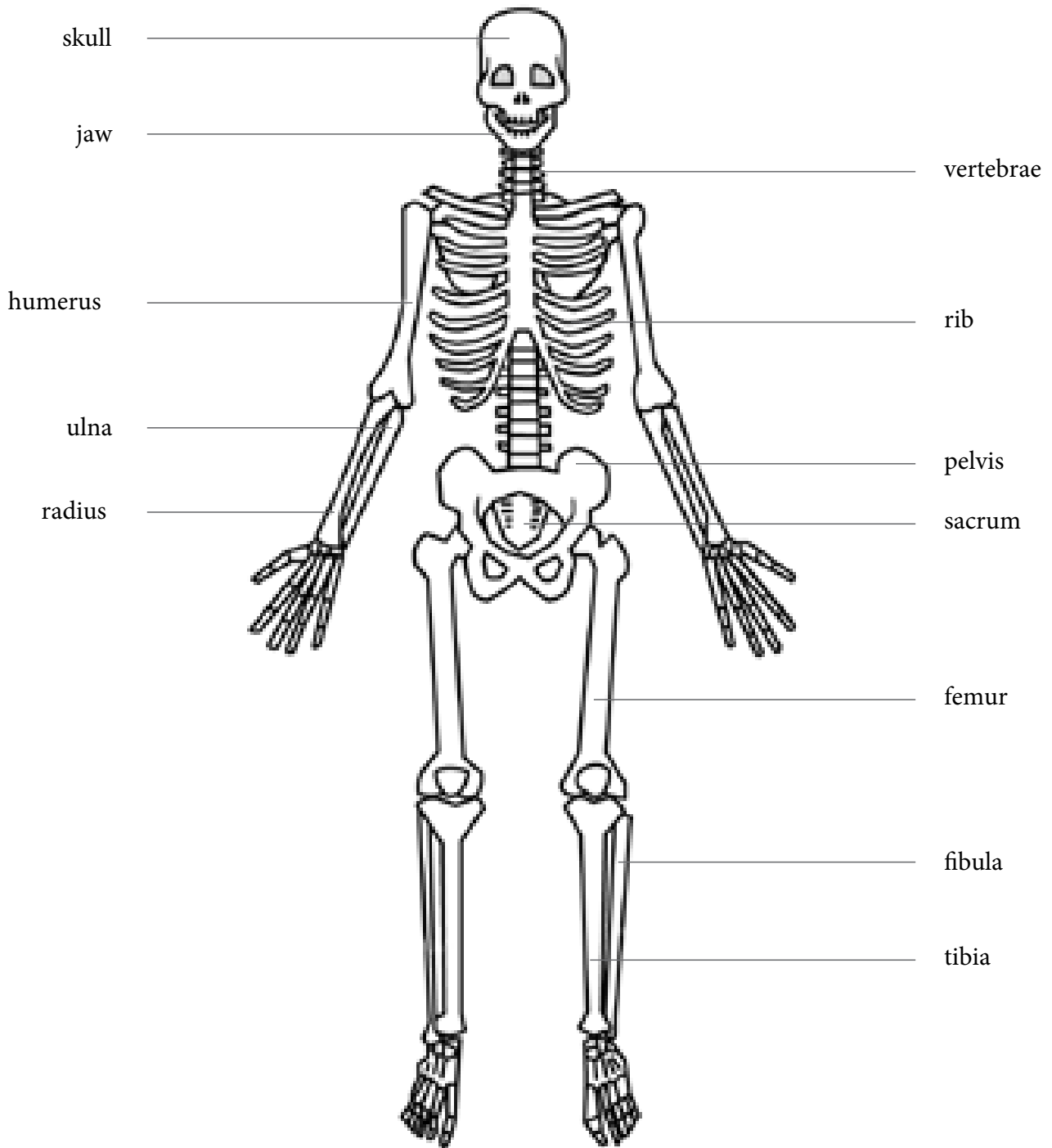
- Ceratopsians were herbivores. This is indicated primarily by their teeth, which are flat for shearing and grinding food.

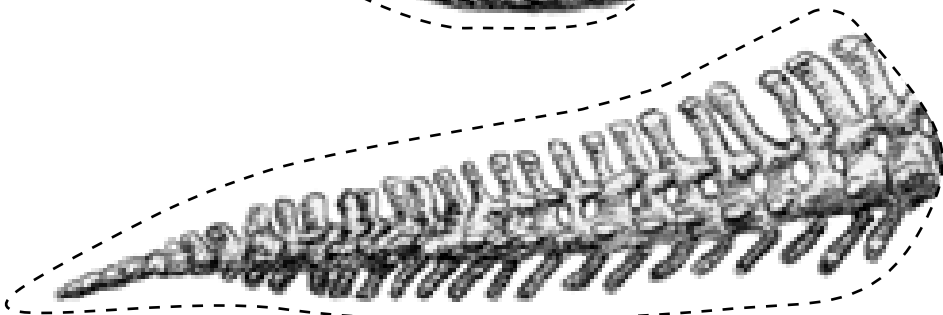
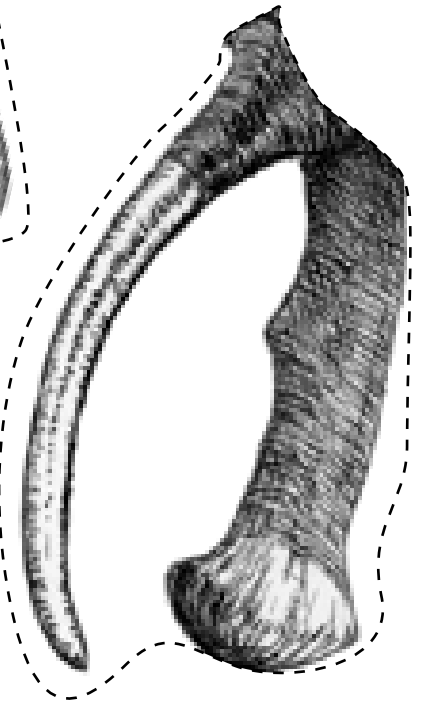
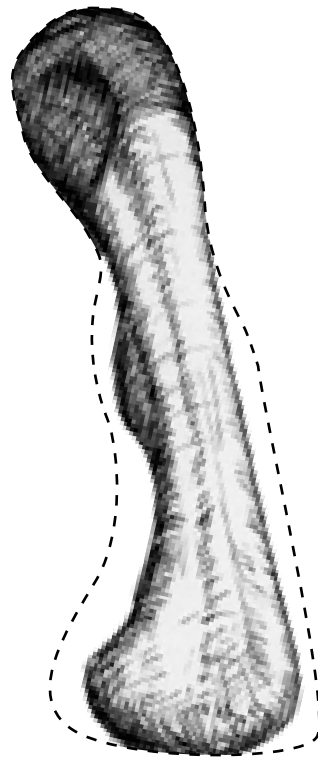
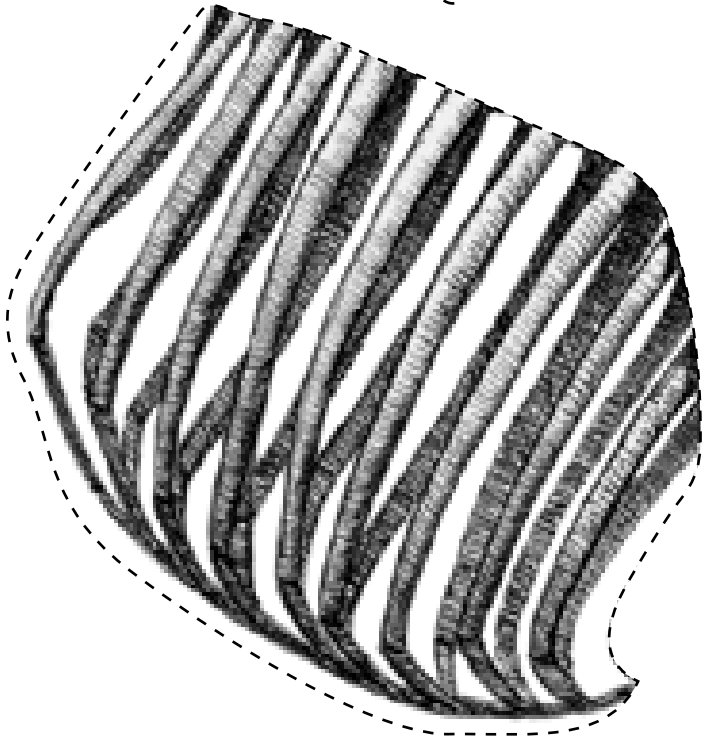
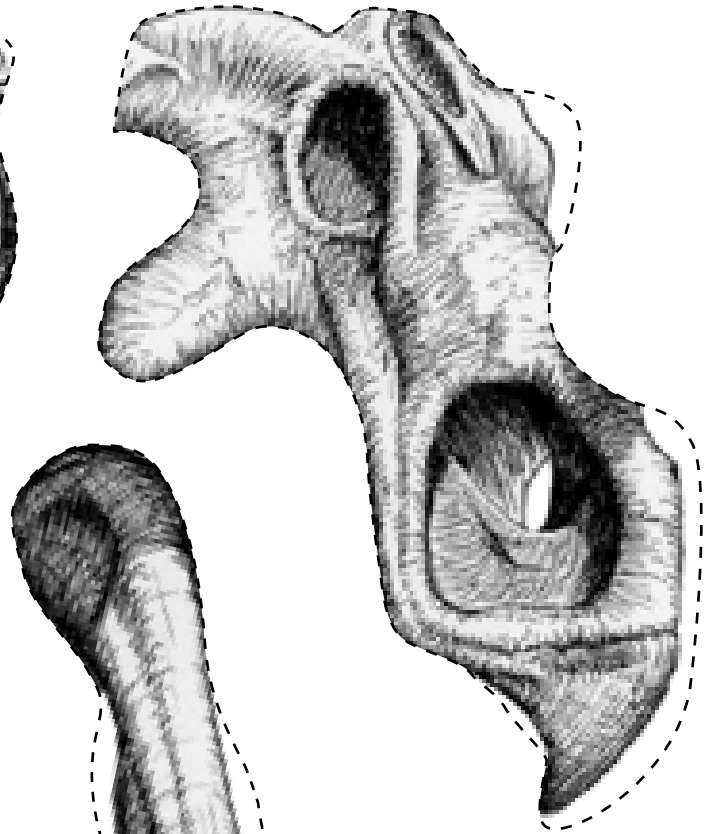
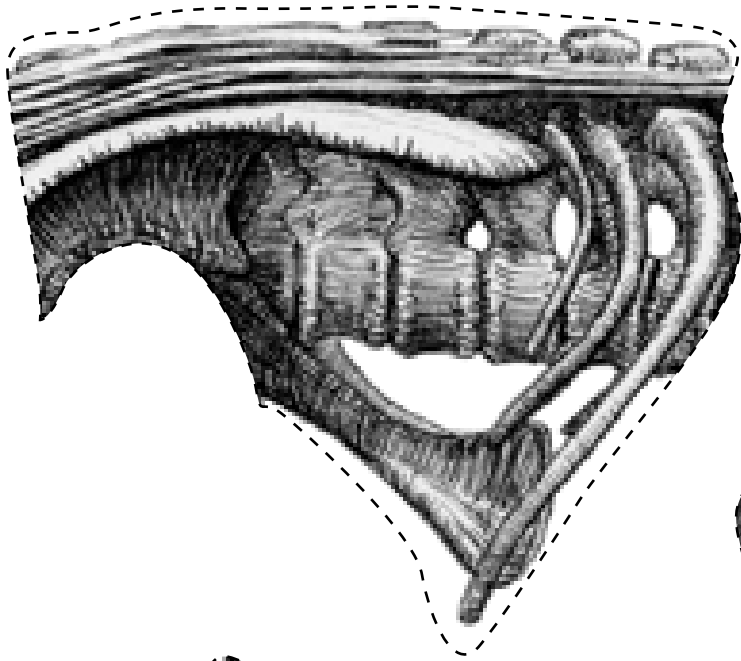
Why would this dinosaur have a frill and horns? Why do humans NOT have these features?

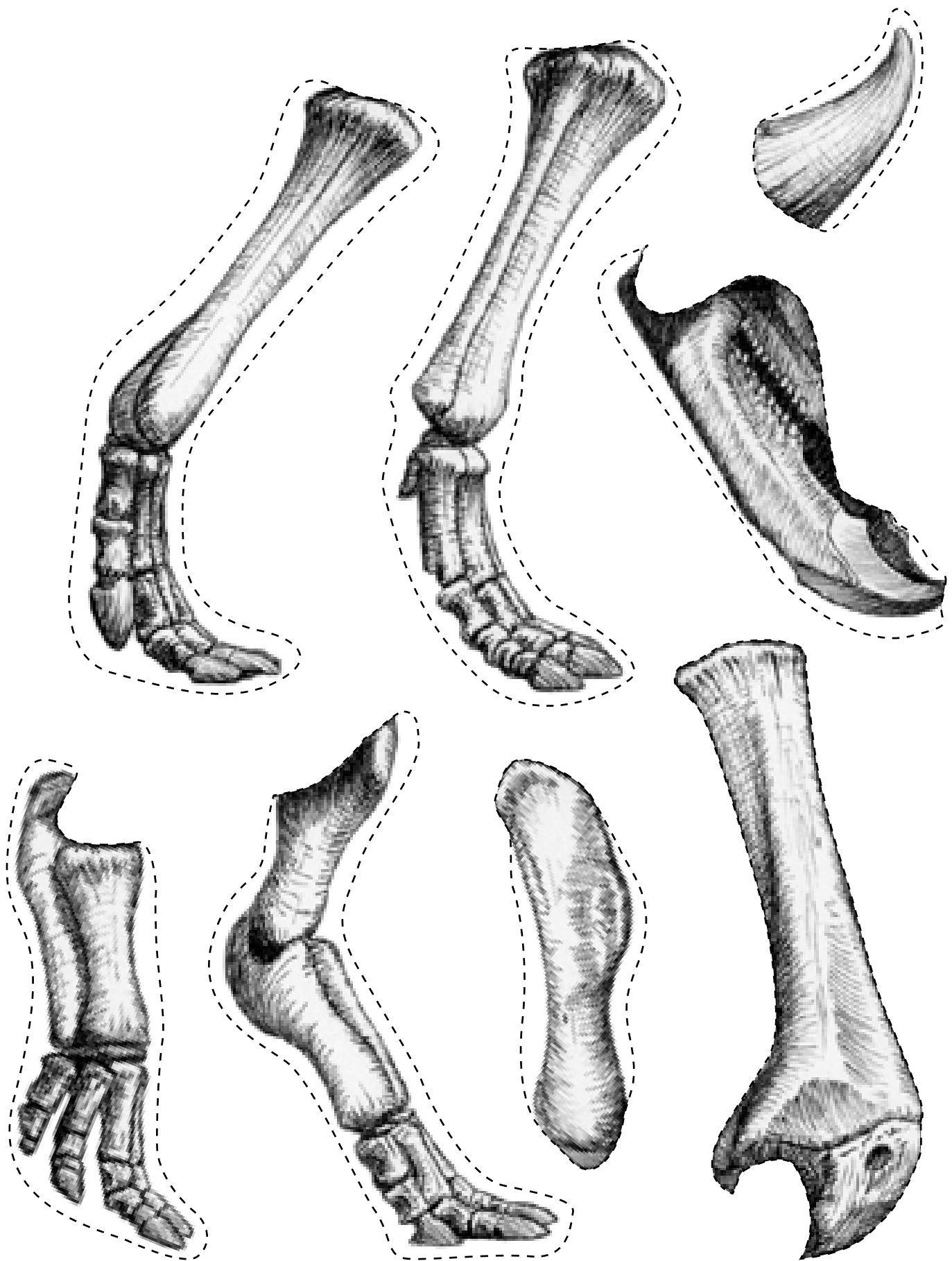
- The horns and frills are thought to be both decorative, for attracting a mate, and for defence, in territorial or mating battles, and against predators.

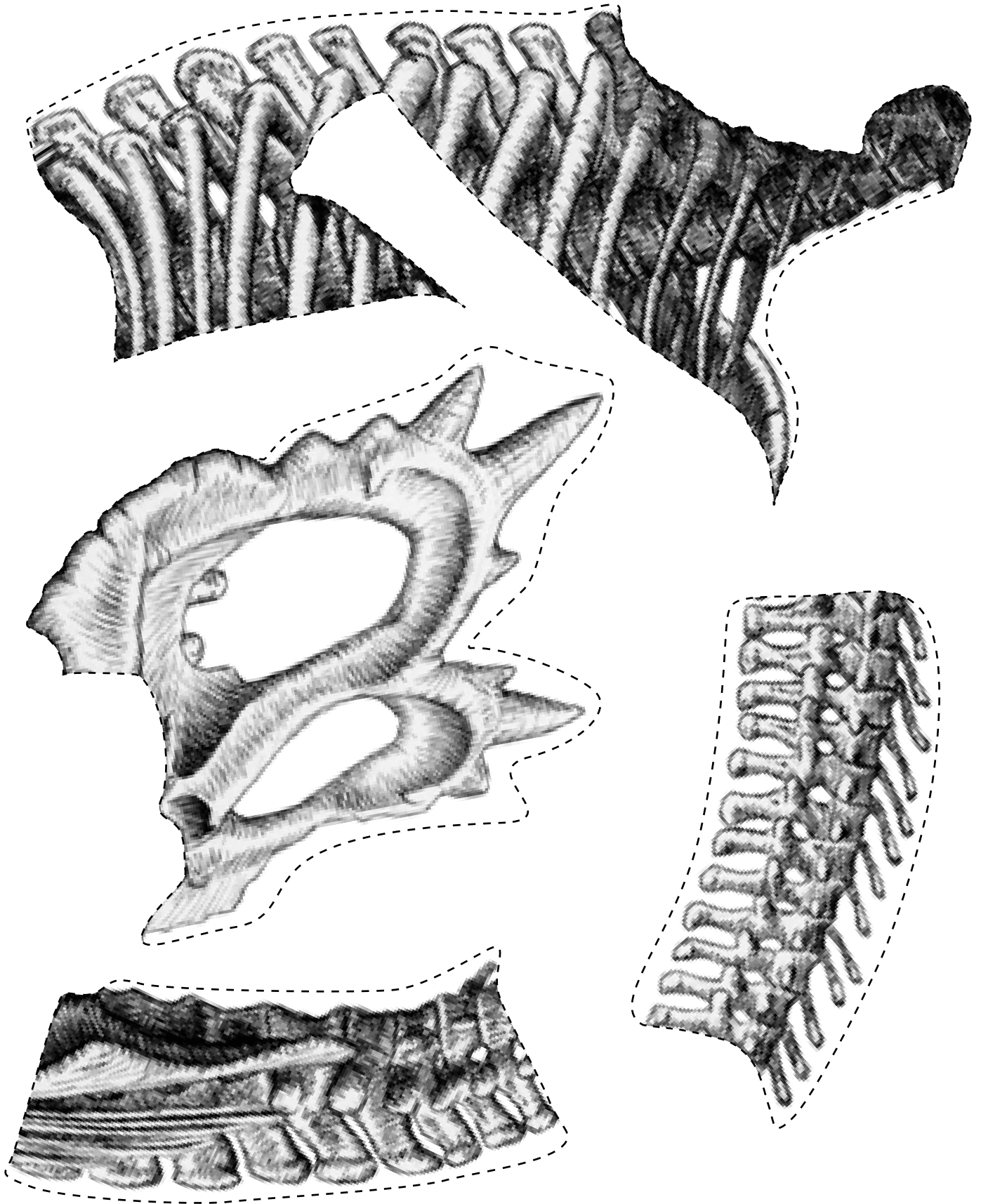
Ceratopsians are often found in bonebeds, which are mass graves of many individuals found together in the same layer of rock. What might cause this to happen?

- Natural disasters are thought to be the number one cause. Hurricanes and floods were common during the Mesozoic Era, and an inland sea covering much of North America only served to increase this risk. Animals could become caught up in a flood, and thousands of individuals may die at once. Then, after rotting and being picked apart by scavengers, they might become buried and fossilized.





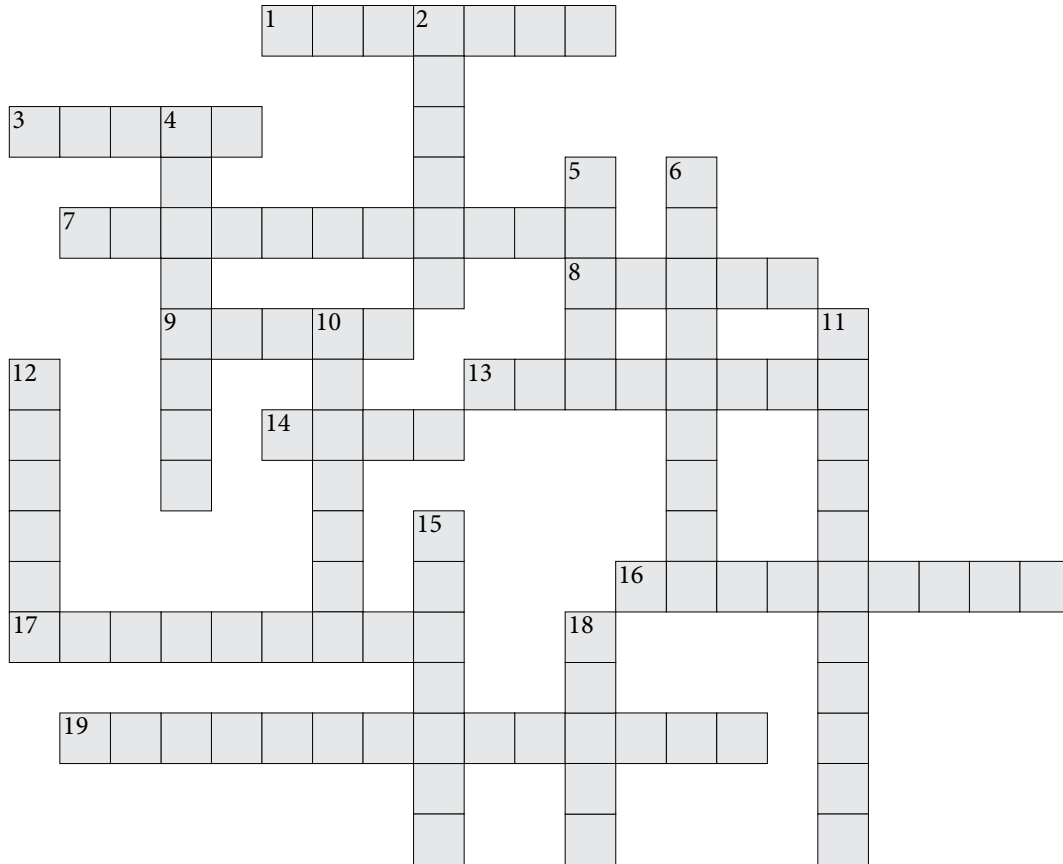




ACTIVITY 2

Geology Crossword

Recommended for grades 3 – 5



Across

1. The name of this basic rock type is derived from the Latin word 'fire'.
3. Molten rock under the surface of the Earth is called ____.
7. Fossils are usually found in ____ rocks.
8. Sweet treat that sometimes comes in 'rock' form.
9. There are ____ basic rock types.
13. Metamorphic rocks are formed by heat and ____.
14. This sedimentary rock is a 'fossil fuel'.
16. A person who studies rocks and minerals is called a ____.
17. Sedimentary rocks are made of tiny pieces called ____.
19. Layers of sedimentary rock are referred to as ____.

Down

2. When lava explodes from a volcano, we say that it ____.
4. This sedimentary rock forms from mud.
5. Rock changing from one basic rock type to another is called the 'rock ____.'
6. This sedimentary rock forms from sand.
10. Water, wind, ice, and heat break down rocks in a process called ____.
11. The name of this basic rock type means "to change" or "to transform".
12. You can tell a hill is made of sedimentary rock because it has formed in ____.
15. Traces or remains of ancient life found inside rocks are called ____.
18. Weathering of rocks is most often caused by ____, wind, and ice.

ACTIVITY 3

Fossil Treasure Hunt

Recommended for grades 3 – 7

Fossil hunters during the Great Canadian Dinosaur Rush did not always keep detailed notes—it is not always clear what their directions meant. Students can read the fictional journal entries below, and then try to match each entry with one of the quarry sites on the maps attached.

Background Information and History

Each of the journal entries is fictional, but the people who wrote them are real historical figures in palaeontology. Here is some information about each person for your reference:

Lawrence M. Lambe

Originally wanting to be a soldier, Lawrence Lambe chose a career in palaeontology after contracting typhoid fever in his youth. He worked for the Geological Survey of Canada as a scientific artist and was the first professional palaeontologist to explore Alberta's badlands.

Barnum Brown

Nicknamed “Dr. Bones” by the people who worked with him, Barnum Brown worked his entire career collecting fossils for the American Museum of Natural History. His work along the Red Deer River uncovered not only dinosaurs, but also the first remains of mammals from the Palaeocene. He also introduced the plaster and burlap technique of jacketing fossils to Canada.

Charles Hazelius Sternberg

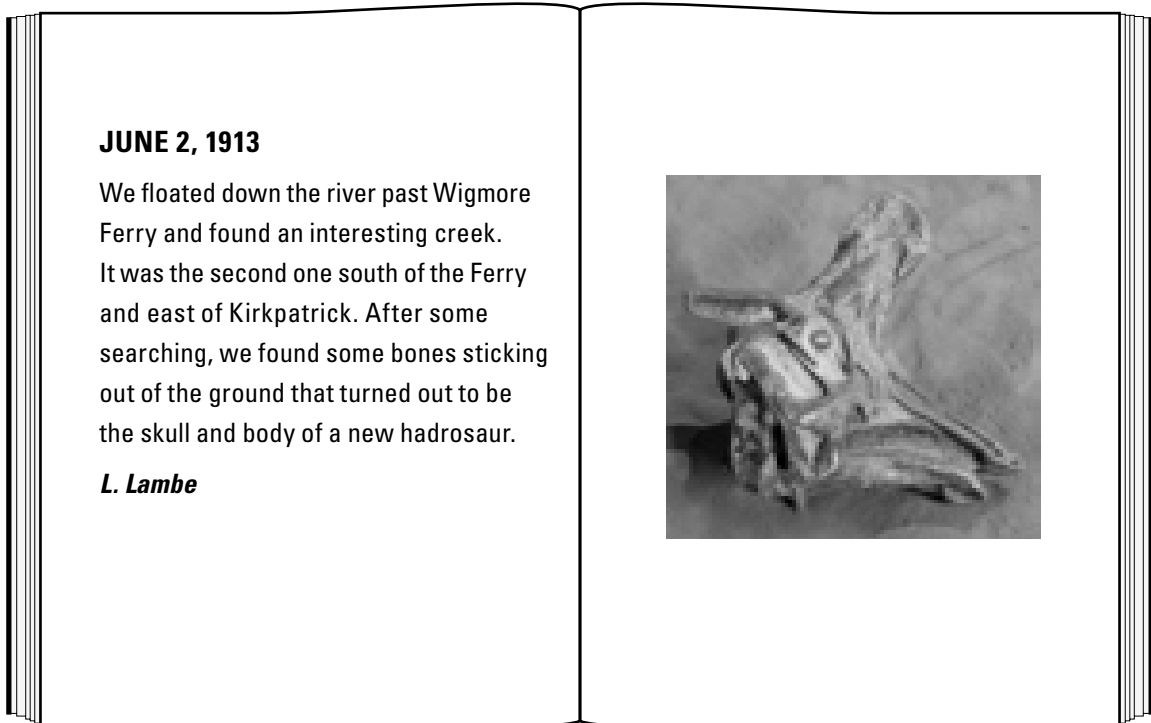
One of the best-known fossil hunters in the world, Charles H. Sternberg, began collecting fossils at the age of 15 on his brother's ranch in Kansas. He was hired by the Geological Survey of Canada to compete with Barnum Brown in 1912. He wrote numerous accounts of fossil collecting, and uncovered tens of thousands of specimens for the museums of Canada.

Levi Sternberg

The youngest son of Charles Hazelius, Levi was a skillful fossil hunter who was famous for his sense of humour. He collected fossils with his father and brothers in the Alberta Badlands from 1912-1917, then went on to work for the Royal Ontario Museum. He perfected a latex casting technique for duplicating fossils, upon which the technicians at the Royal Tyrrell Museum base their casting technique.

William Cutler

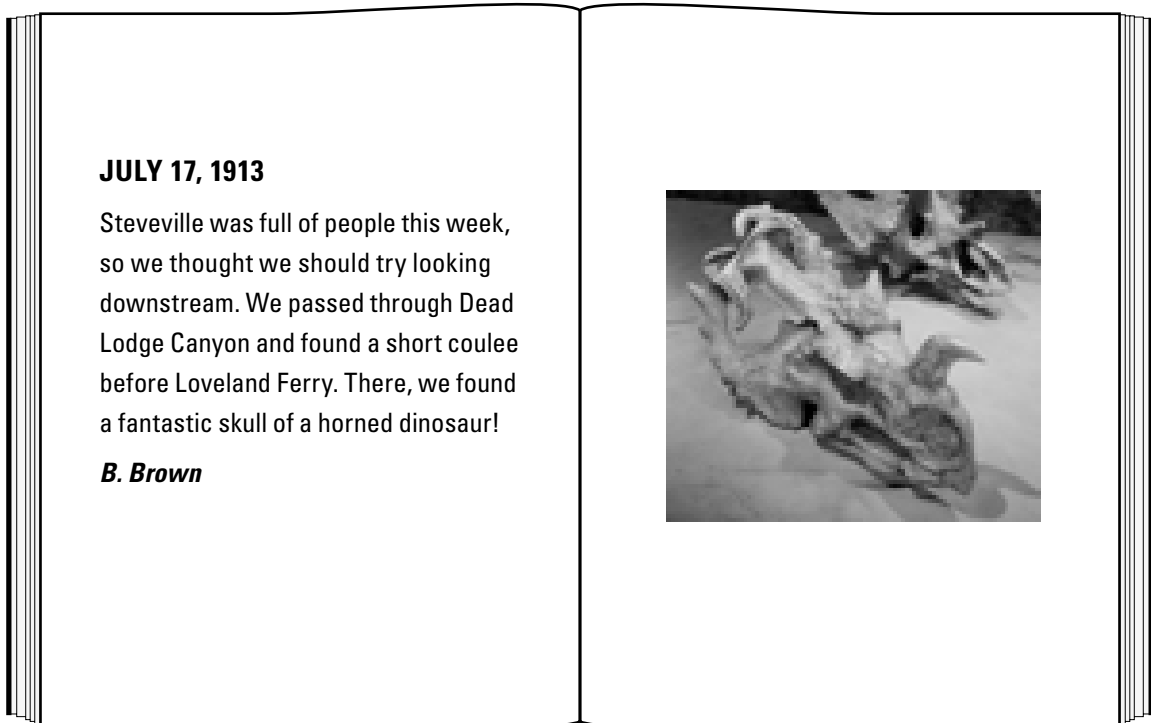
William Cutler came into palaeontology by luck: he discovered the partial skeleton of a horned dinosaur in the Red Deer River area and offered the specimen to Barnum Brown, in exchange for instruction in collecting techniques and on the condition that the dinosaur would be named after him. Brown agreed, and the new species of dinosaur was named *Monoclonius cutleri*. He continued to collect fossils for the University of Manitoba.



JUNE 2, 1913

We floated down the river past Wigmore Ferry and found an interesting creek. It was the second one south of the Ferry and east of Kirkpatrick. After some searching, we found some bones sticking out of the ground that turned out to be the skull and body of a new hadrosaur.

L. Lambe

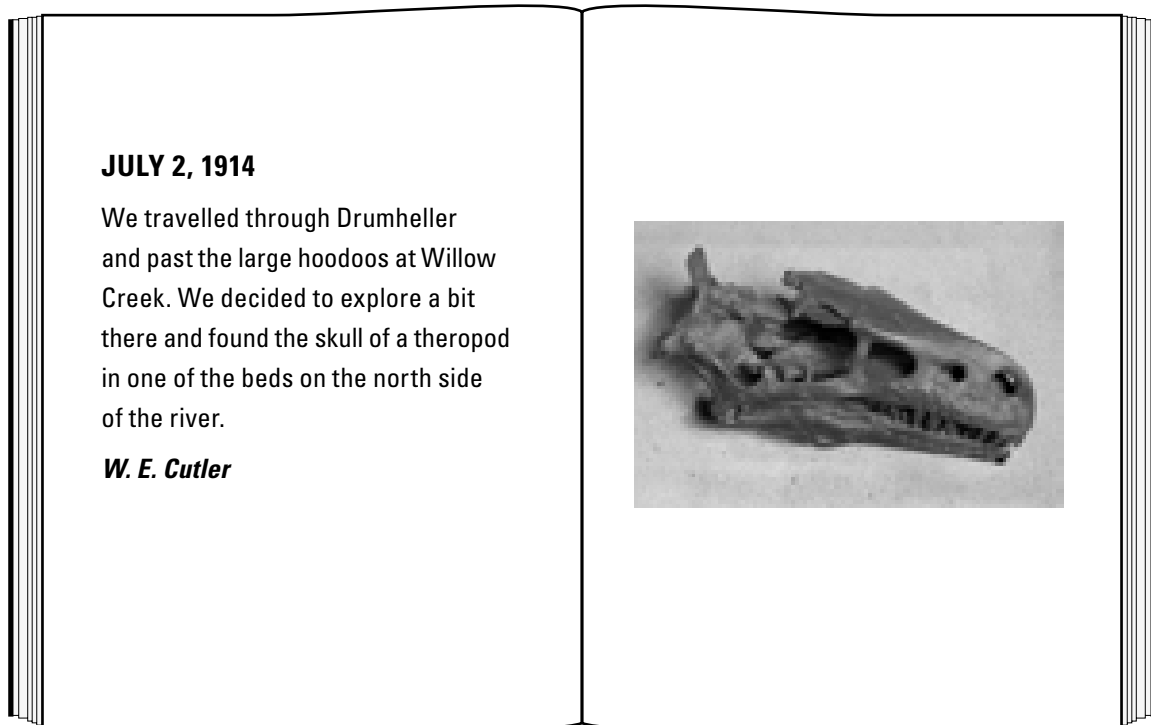


JULY 17, 1913

Stevenville was full of people this week, so we thought we should try looking downstream. We passed through Dead Lodge Canyon and found a short coulee before Loveland Ferry. There, we found a fantastic skull of a horned dinosaur!

B. Brown

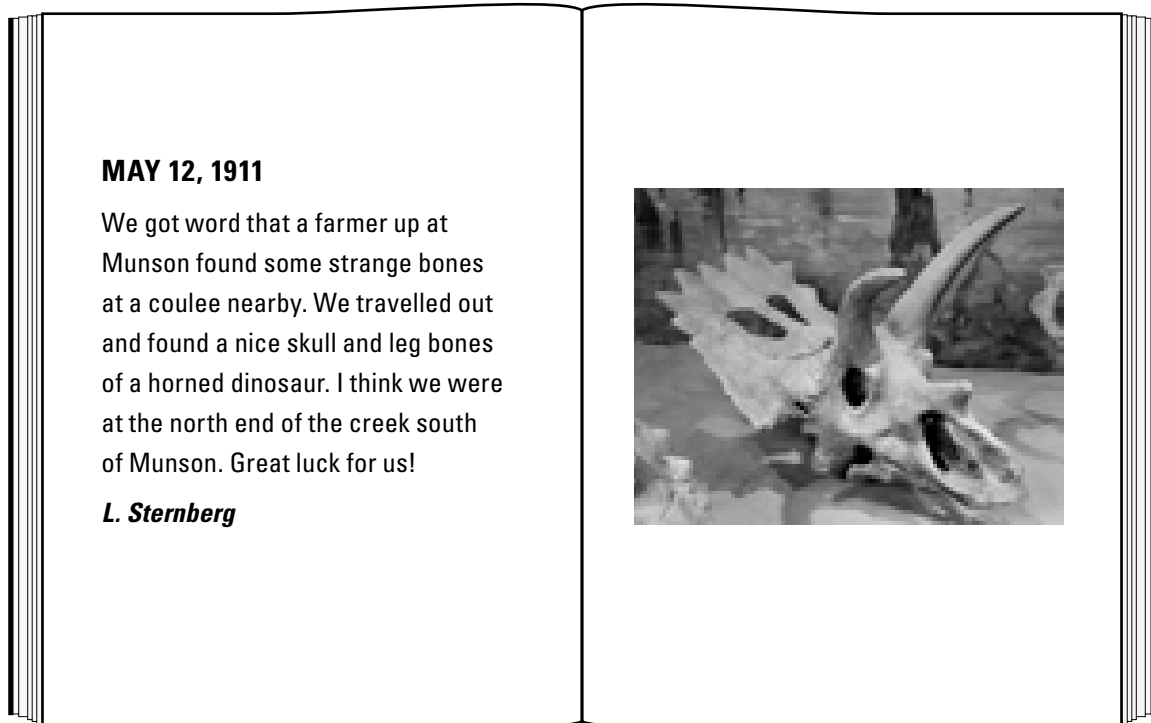




JULY 2, 1914

We travelled through Drumheller and past the large hoodoos at Willow Creek. We decided to explore a bit there and found the skull of a theropod in one of the beds on the north side of the river.

W. E. Cutler

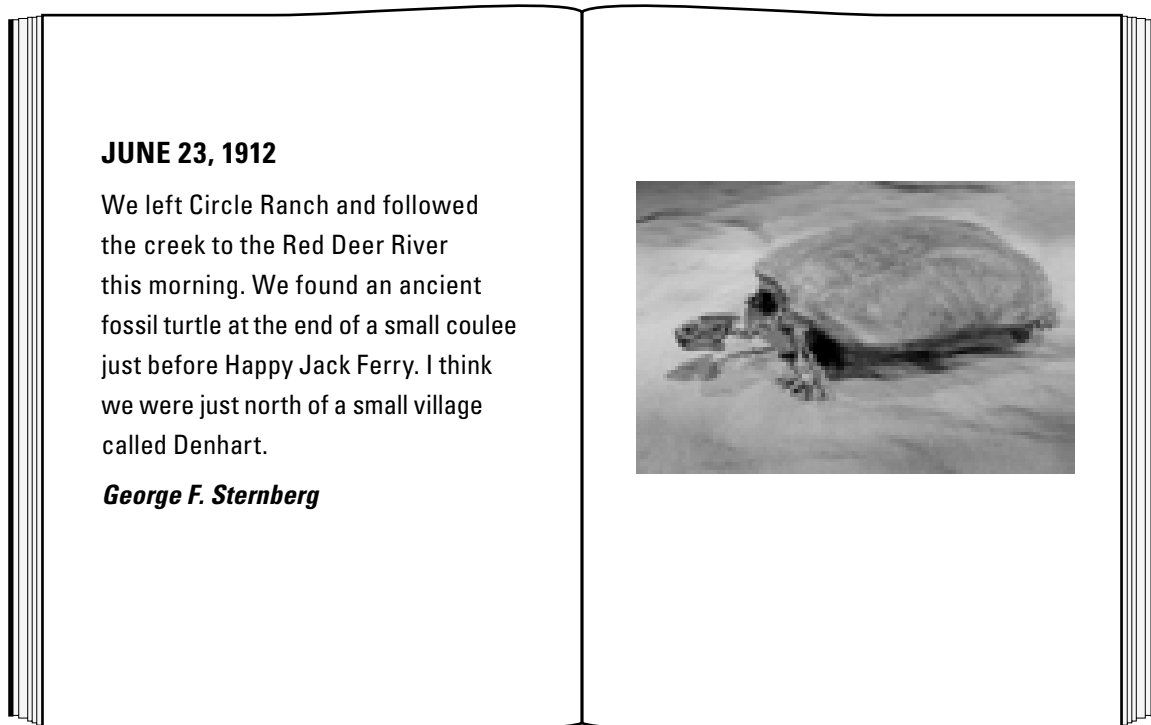


MAY 12, 1911

We got word that a farmer up at Munson found some strange bones at a coulee nearby. We travelled out and found a nice skull and leg bones of a horned dinosaur. I think we were at the north end of the creek south of Munson. Great luck for us!

L. Sternberg

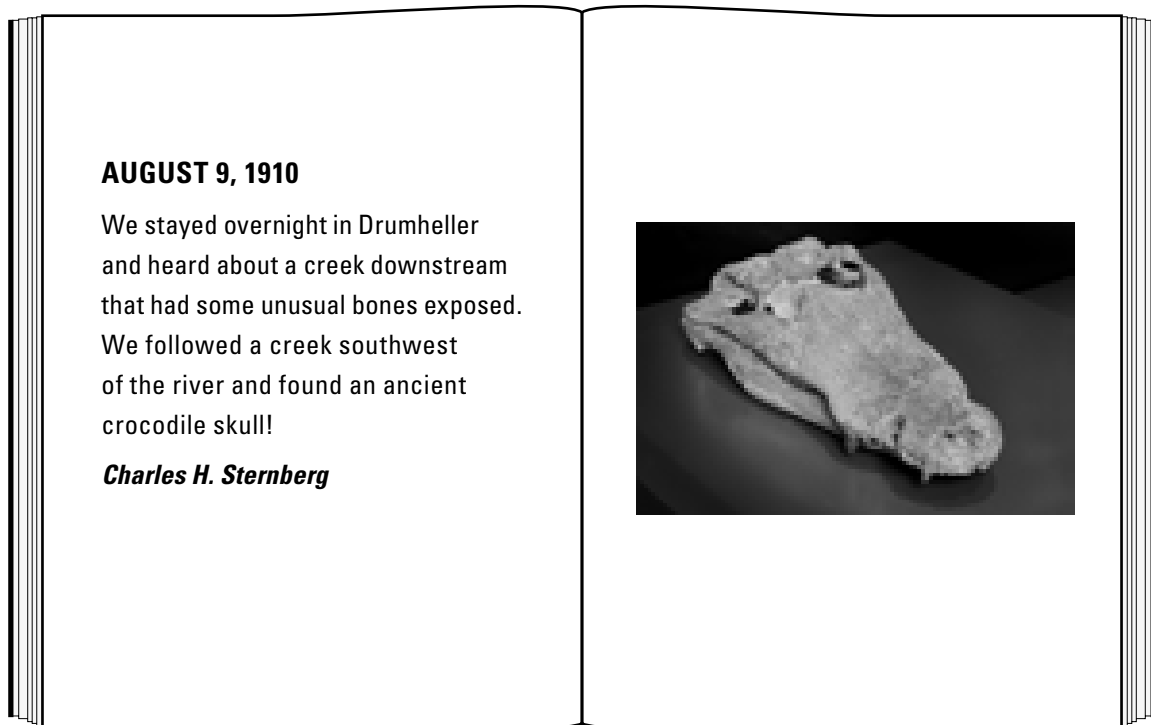




JUNE 23, 1912

We left Circle Ranch and followed the creek to the Red Deer River this morning. We found an ancient fossil turtle at the end of a small coulee just before Happy Jack Ferry. I think we were just north of a small village called Denhart.

George F. Sternberg



AUGUST 9, 1910




We stayed overnight in Drumheller and heard about a creek downstream that had some unusual bones exposed. We followed a creek southwest of the river and found an ancient crocodile skull!

Charles H. Sternberg



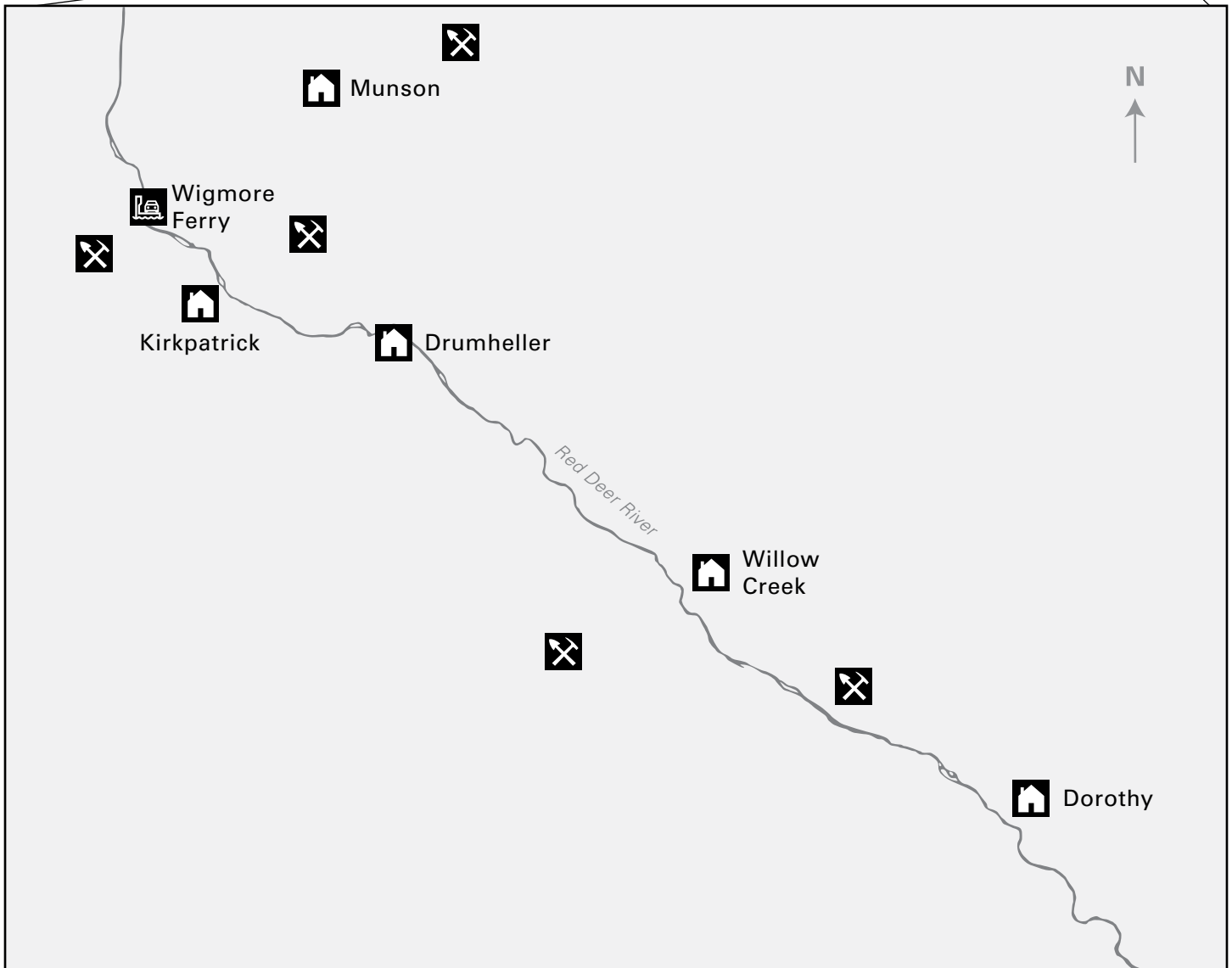
Fossil Treasure Hunt

LEGEND

-  Quarry Site
-  Settlement
-  Ferry






Drumheller Valley (circa 1910 – 1930)

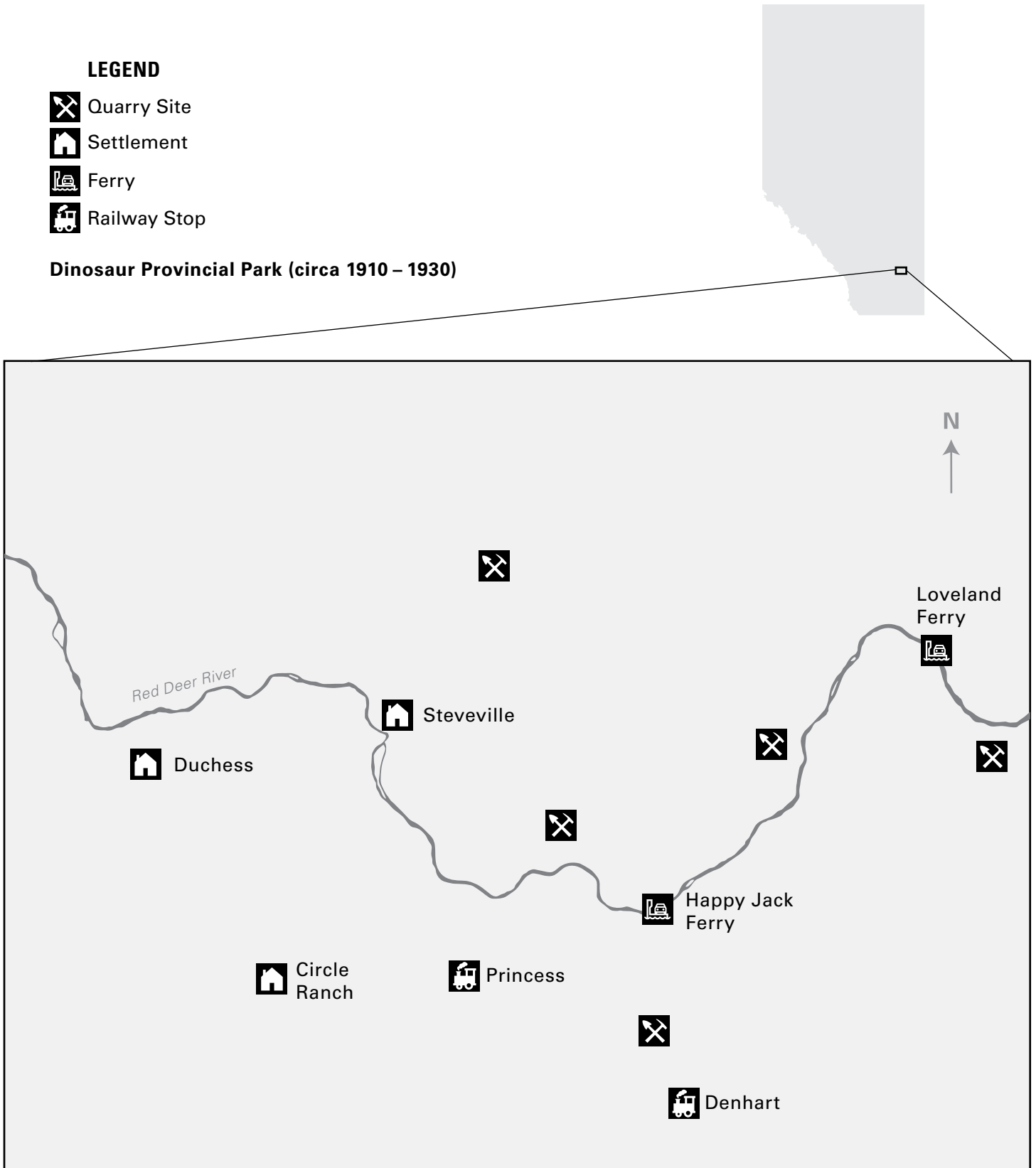


Fossil Treasure Hunt

LEGEND

-  Quarry Site
-  Settlement
-  Ferry
-  Railway Stop

Dinosaur Provincial Park (circa 1910 – 1930)



ACTIVITY 4

Additional Activities

Recommended for grades 3 – 7

School Fossil Hunt

1. Divide the class into groups. Have each group choose a “fossil” to hide somewhere in the school/school yard area, such as an old shoe, or special rock, (something that will not be missed if it gets dirty, broken, or lost).
2. Have each group hide their fossils one at a time, so other groups don’t have a chance to spy on them and see their hiding spots.
3. Each group creates a journal entry to describe the route to their treasure. Try writing directions using cardinal points, i.e., north, south, east, west
4. Have the class work together to solve each group’s clues, one at a time and gather up all the “fossils” that have been hidden.

Guess My Town/City

1. Use a map of Alberta, Canada, or the world.
2. Break students up into teams of 3 - 4.
3. Each team chooses a town or city on the map.
4. Working together, the team creates three clues to describe the location of the town on the map. The students should try to use cardinal points and other physical features on the map to help.
Example: This town is north of the St. Lawrence River in Ontario.
5. After the clues have been created, pair up teams. Each team goes through their three clues and the other team gets three guesses before the answer is revealed. Rotate the teams so that they can try each other’s.