

Saskatchewan Fossils - Mammals

Subject/Grade: Science 4, 7 & Earth Science 30

Lesson Title: Saskatchewan Fossils - Mammals

Stage 1: Identify Desired Results

Outcome(s)/Indicator(s)

Grade 4 Science

RM4.3 Analyze how weathering, erosion, and fossils provide evidence to support human understanding of the formation of landforms on Earth.

Indicator(s)

- j) Create models of different types (e.g., amber, imprint, cast, and mould) of plant and animal fossils.
- k) Discuss how fossils and the fossil record provide evidence of Earth's history, including the formation of various landforms.
- l) Predict the types of plant or animal fossils that would be found in Saskatchewan landforms in the past, present, and future.

Grade 7 Science

EC7.3 Investigate the characteristics and formation of the surface geology of Saskatchewan, including soil, and identify correlations between surface geology and past, present, and possible future land uses. [DM, SI]

Indicator(s)

- b) Explain how geologists use the fossil record to provide evidence of geological history

Earth Science 30

ES30-AH1 Correlate major changes in Earth's atmosphere over geologic time with corresponding changes in the biosphere and other components of the geosphere.

ES30-FO3 Assess the importance of the geologic time scale, radiometric dating and the fossil record to current understanding of Earth's geological history.

Key Understandings: ('I Can' statements)

- I can ... discuss how fossils provide evidence of Earth's history.
- I can ... give examples of fossils found in Saskatchewan and make predictions about the environment they lived in.
- I can ... model different ways of forming fossils.
- I can ... explain the geological time scale and fossil record in relation to Saskatchewan's geological history.
- I can ... explain the changes in the geological history based on evidence from fossils and stratigraphy.

Essential Questions:

- How do fossils provide evidence of Earth's history? What clues do fossils give us?
- What are some examples of Saskatchewan fossils? What was the environment like when this animal lived?
- What are the different ways of making fossils?
- What is the geological timescale?
- What are some of the stratigraphic layers in Saskatchewan?
- How do fossils and stratigraphy show evidence of a changing geological history/environment?

Teacher Background

This lesson focuses on Saskatchewan fossils. It begins with a matching activity where students try to match the fossil found in Saskatchewan to the picture of the animal that it came from. There is a PowerPoint that goes over each fossil with questions and fun facts. Then, this lesson plan splits into different activities and worksheets based on the age group of students.

- Younger students learn about how fossils are formed, the different types of fossils, basic sedimentary layering, and what clues fossils give us.
- Older students explore more detailed examples of Saskatchewan fossils and they learn about the process of fossilization, geological timeline, Saskatchewan stratigraphy, the fossil record.

Stage 3: Build Learning Plan

Set (Warm-up, Focusing the Learning): Time: 10-15 min

Matching Activity - hand out the matching activity to each group of students. Explain to students that they will have 10 minutes to try to match the fossil to the animal (see last two pages).

- As students work in groups on the matching activity, go around to each group and ask questions.
 - Why do you think this fossil matches with this animal?
 - What details are you looking at? What strategy are you using?
 - What does this animal remind you of?
 - What environment do you think this animal lived in and why?

Development:

Time: Depends

Saskatchewan Fossil PowerPoint - go through the presentation together as a class to go over the answers to the matching activity. Also, go through the questions to encourage discussions about the fossils.

Younger Students -

Guide students through the “Fossils!” worksheets and provide lots of demonstrations to the class. For example -

- Demonstrate the process of fossilization - Use play-doh to represent sedimentary rock layers. When an animal (plastic dino) dies it gets buried and preserved in the layers. Over time the soft tissues rot away and you are left with those hard parts, bones and shells (skeleton of the dino).
- Show an example of amber or a picture of an animal/bug preserved in amber.
- Use the play-doh to make imprints of shells, dino feet, scratch marks, leaf imprints, etc.

Then, let students colour and complete the worksheets.

Materials/Equipment:

- Matching Activity cut out, laminated and put into baggies or clipped together for each group.
- Projector and Saskatchewan Fossil PowerPoint
- Handouts for the appropriate grade level and the associated materials (see below)

“Younger” Additional Materials/Equipment

- Play-doh
- Objects (shells, plastic dinosaur, just the skeleton of the dinosaur, amber, etc.)
- Pencil crayons



Older Students -

- Will use laptops to research the process of fossilization and create a comic about what they learned (see student handout).
- Then they will research Saskatchewan fossils by going to GeoExplore Saskatchewan website. Share the link with your students. Have students read the section on vertebrate fossils.

GeoExplore Website -

<https://skgeolhighwaymap.maps.arcgis.com/apps/MapSeries/index.html?appid=a845cbb370f7401597806887318e2676>

- They will pick a fossil to create doodle notes/mini posters about (see student handout). Also, they will create a larger image of their fossil with the name so it can be included in the “Class Challenge.”

- “**Class Challenge**” - students will create a giant geological timeline that correlates with a **simplified** Saskatchewan Stratigraphy and fossils.

Reference - Saskatchewan Stratigraphic Chart included in this lesson after “older” student handouts.

- To help students out, you could create the “pieces” so students would have to assemble it and then add their own fossils to it.
- If you create the “pieces” laminate them so you can use them again.

Throughout the year, you can add more things to your timeline...

- which layers have gas, potash, etc.
- Discuss unconformities, stratigraphic correlation ...
- changes in environment - oxygen levels, climate, sea level...

“Older” Additional Materials/Equipment

- Laptops
- GeoExplore website
- Pencil crayons
- Blank printer paper

Class Challenge

- You will need to find empty wall space or a big bulletin board.
- Create the “pieces” using construction paper and other materials.
- Create the geological timeline first with clear big numbers.
- Then create a simplified version of Saskatchewan Stratigraphic chart.
- Laminate all the pieces and have students assemble it, like a puzzle.
- Then have students add their fossils with string pointing to the associated layer/time.

Stage 4: Determine Evidence for Assessing Learning

- Younger students - grade the worksheets based on curricular outcomes (Beginning, Meeting, Exceeding).
- Older students - create a marking scheme with student input or without student involvement that is handed out to students when they get their worksheets.
- Older students - have students write a reflection about their learning process with supporting evidence/examples as to how they met or exceeded the outcomes and what they learnt from the lesson(s). What were their main take-aways and how do they think these relate to the learning outcomes?

Extensions

Look at the GeoExplore Saskatchewan website for further information and a deeper understanding of the local context. It is a digital version of the original paper Geological Highway Map of Saskatchewan:

Main Website

<https://skgeolhighwaymap.maps.arcgis.com/apps/MapSeries/index.html?appid=a845cbb370f7401597806887318e2676>

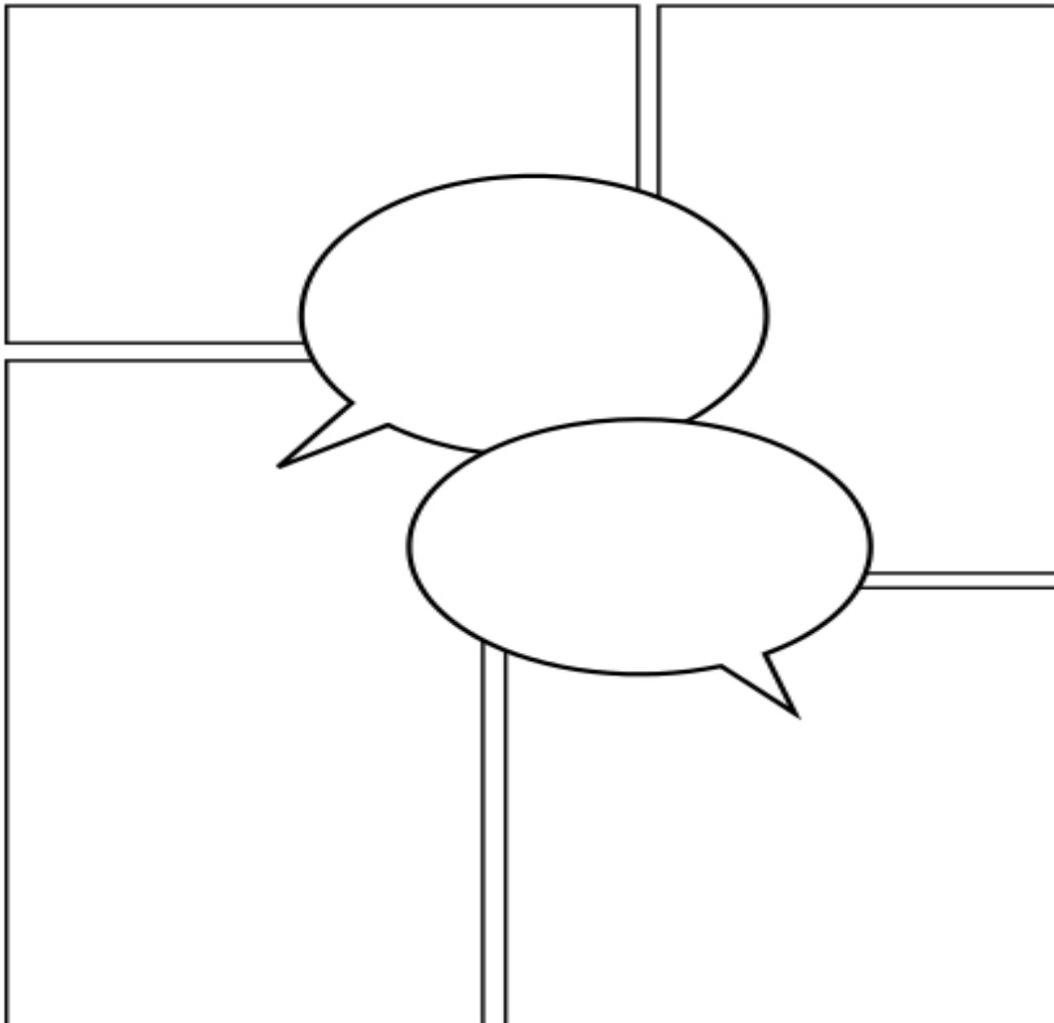
Name: _____



Giants of the Past: Dinosaurs, Extinction and Thunder Beasts

Vertebrates are animals with a backbone or spinal column (includes mammals, birds, reptiles, fish, amphibians and dinosaurs). If an animal gets buried quickly after it dies, its bones, teeth and other hard parts can be replaced with minerals over geological time. Today, paleontologists dig up these bones as fossils. In Saskatchewan, the most famous vertebrate fossils are dinosaurs and huge prehistoric mammals, but our province's fossil record also contains the remains of fish, turtles, birds, small mammals, crocodiles, marine reptiles and other prehistoric creatures.

Create a Comic about the Process of Fossilization



GeoExplore Saskatchewan



Go to [GeoExplore Saskatchewan](http://www.royalsaskmuseum.ca/pub/Fossil%20Video%20Contest/Mammoth_english.pdf) website and click on the "Fossils" tab. Read through the "vertebrates" page. Then, pick a Saskatchewan fossil to create a mini poster/doodle notes.

Include:

- Name of the fossil
- Drawing of the animal
- Geological Timeline showing the time period the animal lived in
- Question - that is answered somewhere within your mini poster/doodle notes
- Fun Facts
- Name of sediment layer the fossil was found in (Stratigraphic Layer)
- Environment/Habitat

After you finish, create a larger image of your animal with its name on it. We will use these later to create a giant Geological Timeline with Saskatchewan Stratigraphy and Fossils.

Class



Create a giant Geological Timeline correlating with Saskatchewan Stratigraphy and Fossils!

Kyle Mammoth

Mammuthus sp. (species unknown)

'Mammuthas' means 'mammoth' in the Otyak (Russian) language.
 Notable Specimens in Saskatchewan: 'Kyle Mammoth'

Size: As their name suggests, Mammoths were large. They were about the size of a modern Asian elephant and weighed an estimated 5 tonnes.

Age: The Kyle Mammoth lived in the Pleistocene, about 15,000 years ago.

Geographic range: *Mammuthus* is known from much of North America, but also Europe and Asia. In Saskatchewan, often found in gravel pits, isolated mammoth bones and teeth have been found at several locations in Saskatchewan. However, there has only been one associated skeleton of mammoth discovered in Saskatchewan, and it was found near the town of Kyle in 1964.

Habitat: The geology of the area around the Kyle Mammoth suggests the region was covered by a shrinking glacier, resulting in presence of stagnant ice and isolated ponds. With their long fur, mammoths were well adapted to the cold, glacial temperatures during the last 500,000 years. The Kyle Mammoth would have shared its habitat with early horses and early bison.

Food Preference: *Mammuthus* foraged on shrubs, mosses, shreds of trees, and when available, flowering plants. Their grinding molars were also well designed for eating grasses, another common source of food.

Relations
Mammuthus is related to modern elephants. Some of the earliest ancestors of the elephant are nearly 50 million years old. There may be as many as 10 separate species of *Mammuthus*.

https://www.royalsaskmuseum.ca/pub/Fossil%20Video%20Contest/Mammoth_english.pdf

Teacher Reference - Saskatchewan Stratigraphy

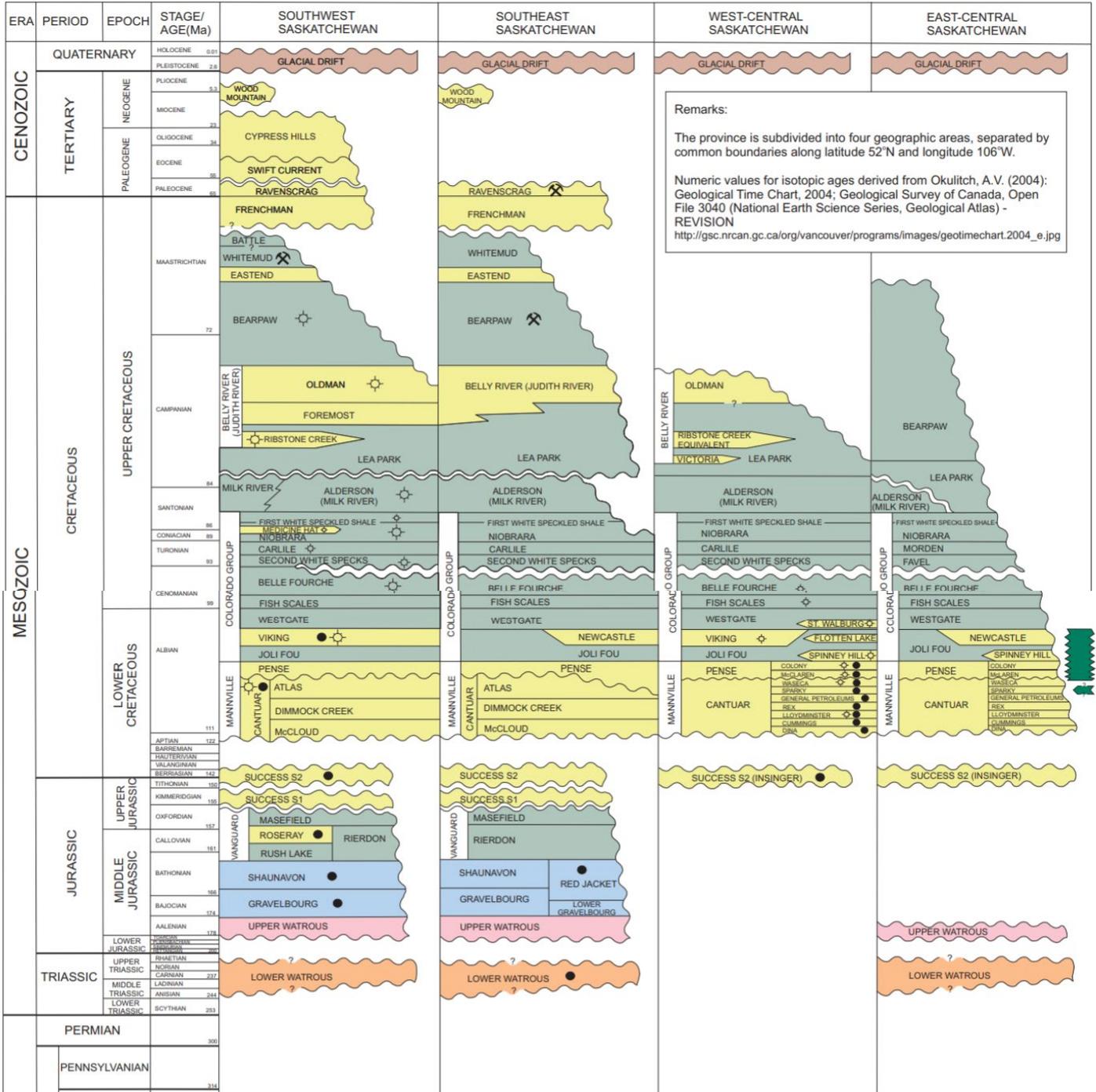
<https://sgshome.ca/pub/GeoscapeFiles/LessonPlans/1.3%20Saskatchewan%20Stratigraphic%20Correlation%20Chart%20Aug11.14.pdf>

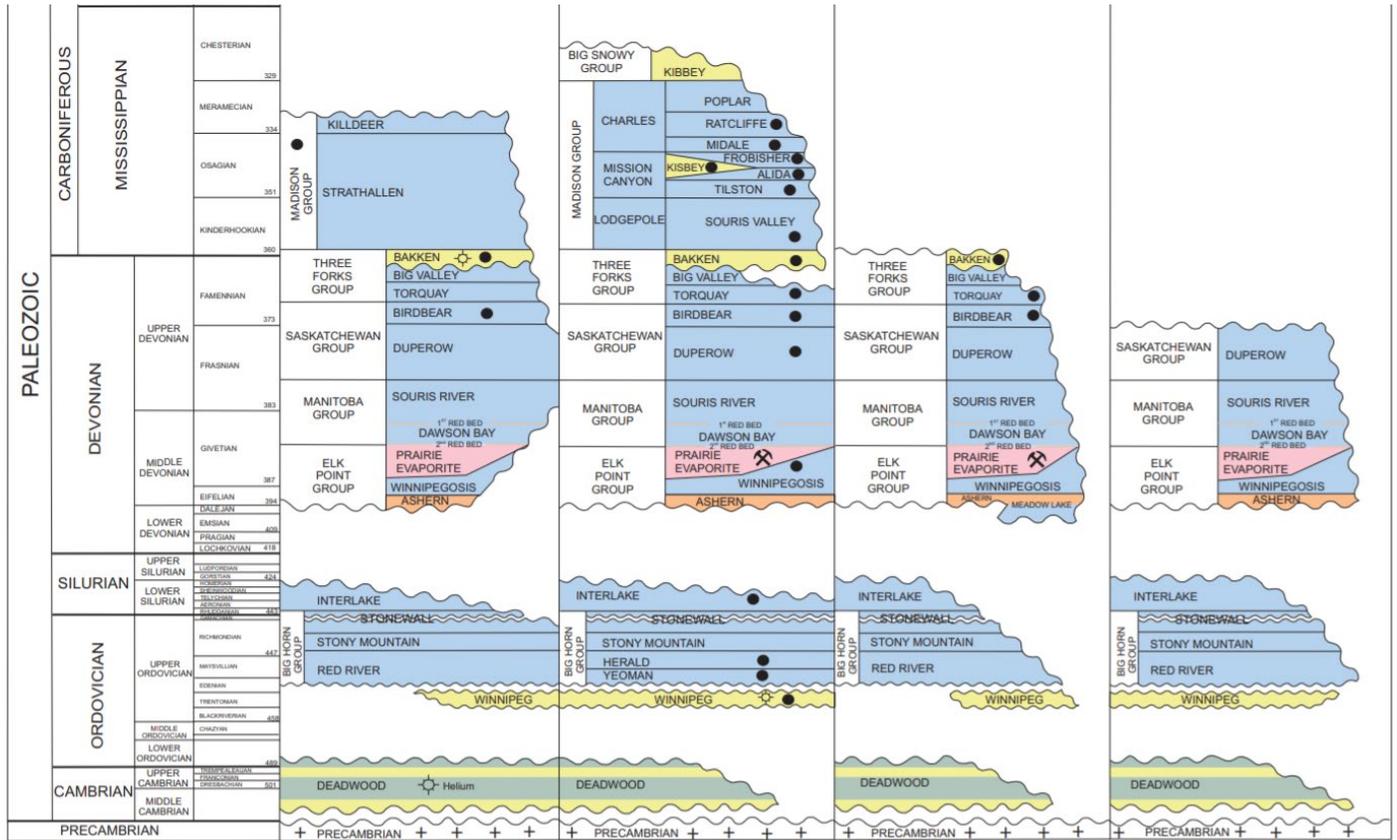


Ministry of the Economy

Stratigraphic Correlation Chart

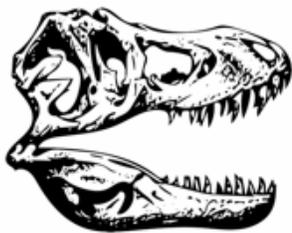
For updates, see <http://economy.gov.sk.ca/StratigraphicCorrelationChart>





- SANDSTONE
- CARBONATE
- GLACIAL DRIFT
- RED BEDS
- SHALE
- EVAPORITE
- PRECAMBRIAN
- KIMBERLITE
- UNCONFORMITIES
- GAS
- OIL
- M MINE

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Fossils!

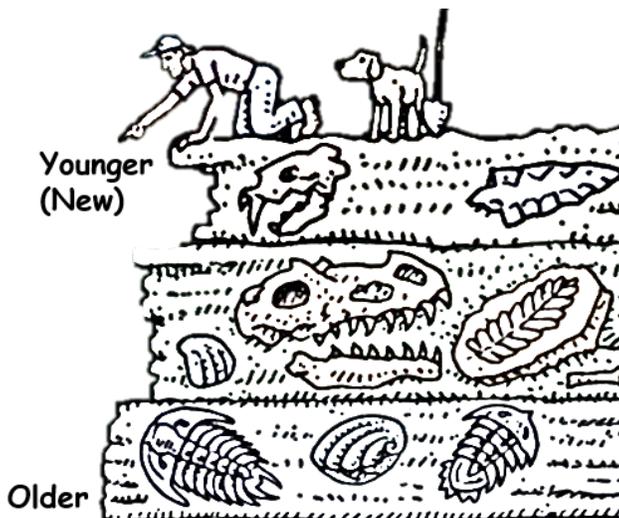


Answers: fossil paleontologist sedimentary bone amber evidence

The word fossil means "dug up."

A _____ is the hard remains or evidence of a living thing that lived long ago.

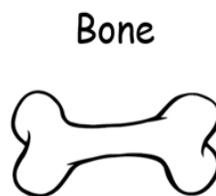
Fossils are found in _____ rocks.



Fossils can be divided into two groups.

Body

Fossils are the remains of the animal or plant.



The hard _____ or shell is preserved, while the soft tissue rots away.

_____ is hardened tree sap that protects and preserves soft tissue.

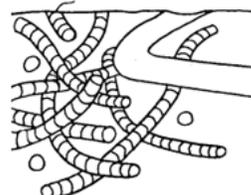
Trace

Fossils are the _____ that an animal existed.

Footprint



Burrows



Coprolite





By studying fossils, we can learn how an animal or plant looked, where they lived, when they lived and how they died.

A scientist who studies the remains of plants and animals that lived long ago is called a

_____.

Draw your own fossils. Circle if they are a "Body" or a "Trace" fossil.

Fossil 1

Trace or Body

Fossil 2

Trace or Body

Fossil 3

Trace or Body

As we dig up the Earth, we discover clues about our Earth

Which fossil is the oldest? _____

Matching Activity Cut Outs

