TEACHERS

FOSSILS IN YOUR BACKYARD
Activity Overview

BIG IDEA

Millions of years ago, dinosaurs roamed all over our planet—Why is it then that we only find dinosaurs in certain geographical locations? These patterns can be explained by dating the rock formations on the surface of the Earth.

OBJECTIVE

Students will use the provided map to gain a sense of the variety of fossils found in their county.

BACKGROUND

Many of the rocks on or near the surface of Montana are from the time of the dinosaurs. Have students imagine what forces may bury or uncover layers of rock. Some forces that may expose fossils include large flood events, wind storms, earthquakes, volcanic events, and plate tectonics. Just because we don't find dinosaurs in one area doesn't necessarily mean that they didn't live there at some point in time, it simply means that any evidence of their existence is still buried or may have already weathered away and disappeared. However, there are specific "ingredients" that need to be present in order for a fossil to form in the first place—See Making a Fossil.

This activity is an excellent introduction to MOR's Dinosaurs Under the Big Sky exhibit. Fossils in your Backyard can be used as an extension to a lesson on plate tectonics and aligns well with the activity A Changing Landscape.

FOSSILS IN YOUR BACKYARD
Museum Instructions

MATERIALS

Student activity sheets, clipboards, pencils (Pens, crayons, and markers are not allowed in exhibit spaces)

ACTIVITY TIME

30 minutes

LOCATION

INSTRUCTIONS

This activity can be used to explore fossilization, erosion, and geologic time.

Montana is a very special place for fossils because it was an excellent location for deposition in the past, and it is a great location for erosion in the present. Deposition is the laying down of sedimentary rock layers, and typically only happens in wet climates, where many rivers flow, or in oceans and seas. Most fossils that have ever been found are actually from animals that lived in the water.

Erosion is the gradual wearing away of these sedimentary layers. As a sedimentary layer is eroded away, fossils can become exposed at the surface. After fossils are exposed, paleontologists can go collect them. It's easier to find a location where fossils are already exposed, instead of just digging down in a random spot and hoping for the best!

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FOSSILS IN YOUR BACKYARD
Museum Instructions (Cont.)

INSTRUCTIONS (CONT.)

A Geologic map shows you where different layers of rocks have been exposed by erosion. In some areas ancient rocks have been exposed, and in other areas the rocks are relatively newly deposited. To find dinosaurs, we must look in areas that have Mesozoic rocks that are exposed, since that is the time period in which dinosaurs lived. Work through the first page of the student's activity page, identifying counties with Mesozoic rock layers.

For the second half of the Activity, have students plot the locations of ten dinosaur finds on the map. They can split up in to groups and have each group taking a different section. The location each fossil was discovered at is mapped on the exhibit panels.

The location of some of Montana's best known dinosaur dig sites deserve special mention and marking on the map as well:

Makoshika State Park is located to the east of Glendive in Dawson County.

Hell Creek is located north of Jordan, in Garfield County.

Egg Mountain is west of Choteau, in Teton County.

Rudyard Field Station is just west of Havre, in Hill County.

FOSSILS IN YOUR BACKYARD

Classroom Overview

MATERIALS

Sheets of felt (5-6 pieces); dinosaur or animal toys; images of eastern Montana MOR Outreach Kit: Fossils

ACTIVITY TIME

45 Minutes

INSTRUCTIONS

This activity can be used as a lesson regarding geologic time and fossilization. Tell the students that they will be exploring how organisms, specifically the bones of dinosaurs, become fossils.

Read the steps of fossilization (found in the Background Information from Activity 1 – MOR Fossils) to your students. Use felt and a plastic dinosaur, along with photos of eastern Montana, to provide a visual demonstration of fossilization while describing these steps. Alternatively, have your students read this description (printable handout in the Appendix).

Ask your students to look at the first two steps of fossilization – death and burial. Ask, what kind of climate did the dinosaurs now found in Montana live in? Students should describe a climate that is moisture-rich, that supported the plants some dinosaurs ate. This climate also supported the rivers, streams, and inland sea that provided sediment to bury some dinosaurs after their death. This was a time of deposition. Now have your students look at the final two steps of fossilization – uplift, erosion, and discovery. Think about eastern Montana today. Ask, "What kind of climate is best for revealing and discovering fossils?" Students should describe an arid climate where erosion and weathering uncover fossils. While paleontologists worldwide can find dinosaurs in other climates, the arid environment of eastern Montana helps fossil discovery by making fossils easier to find on the earth's surface.

Looking at the geologic map, point out that different amounts of erosion have happened at different places through Montana. That is why in some counties only Cenozoic rock formations –the most recent – are at the surface, and in some counties Archaean rock formations – the most ancient – are at the surface. Igneous (volcanic) rocks intrude into several different areas throughout Montana. No fossils can be found in igneous rock formations – why do students think that is?

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FOSSILS IN YOUR BACKYARD
Classroom Overview (Cont.)

INSTRUCTIONS (CONT.)

Suppose several animals were found while prospecting for fossils – a dead antelope on the surface, a saber-toothed tiger just below the surface, and a few meters down some dinosaur bones. (You can demonstrate this by placing the animals in the appropriate layers of felt). Which animal died first? Last? How can they tell?

NAME _____

Fossils in your Backyard (Cont.)

Did you know that Montana is a great place to find fossils? That is because a lot of the rocks on or near the surface in Montana are from the age of the dinosaurs – the Mesozoic Era – from 245 to 66 million years ago. This special type of map is called a Geologic Map. It shows the type of rocks at or near the surface in Montana.

1. Shade all counties with Mesozoic rocks.

2. Find your county on the map and circle it.

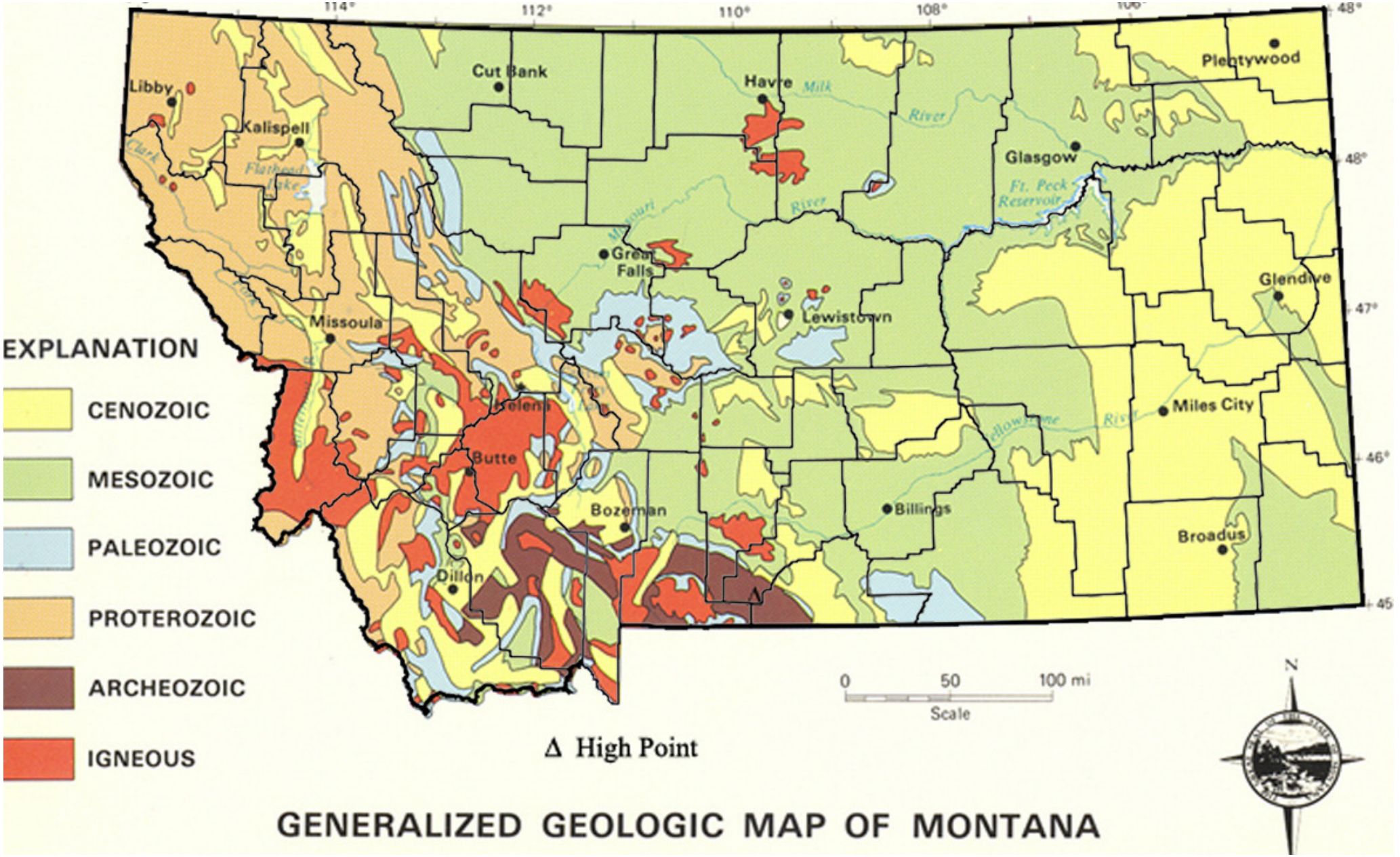
3. Would you expect to find any dinosaur fossils in your county? (Are there any Mesozoic rocks in your county?)

4. Near what cities in Montana would you want to go to to look for dinosaur fossils?

Next, plot on the map the locations of dinosaur dig sites in Montana, which can be found on exhibit panels throughout the exhibit. Or, plot on the map four famous Montana dinosaur sites: Makoshika State Park, Hell Creek, Egg Mountain, and Rudyard Field Station.

Where might you travel if you wanted to find fossil mammals like wooly mammoths and saber-toothed cats?

Where might you travel if you wanted to find fossil evidence of the first life on earth?



GENERALIZED GEOLOGIC MAP OF MONTANA

This map is used with permission from the Montana Bureau of Mines and Geology

Fossils in your Backyard

NAME _____

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NAME ANSWER KEY

Fossils in your Backyard (Cont.)

Did you know that Montana is a great place to find fossils? That is because a lot of the rocks on or near the surface in Montana are from the age of the dinosaurs – the Mesozoic Era – from 245 to 66 million years ago. This special type of map is called a Geologic Map. It shows the type of rocks at or near the surface in Montana.

1. Shade all counties with Mesozoic rocks. **Any county with green should be shaded**

2. Find your county on the map and circle it. **Answers will vary**

3. Would you expect to find any dinosaur fossils in your county? (Are there any Mesozoic rocks in your county?)

Answers will vary

4. Near what cities in Montana would you want to go to to look for dinosaur fossils?

Answers will vary, but can include Cut Bank, Havre, Glasgow, Great Falls, Lewistown, Billings, an Glendive

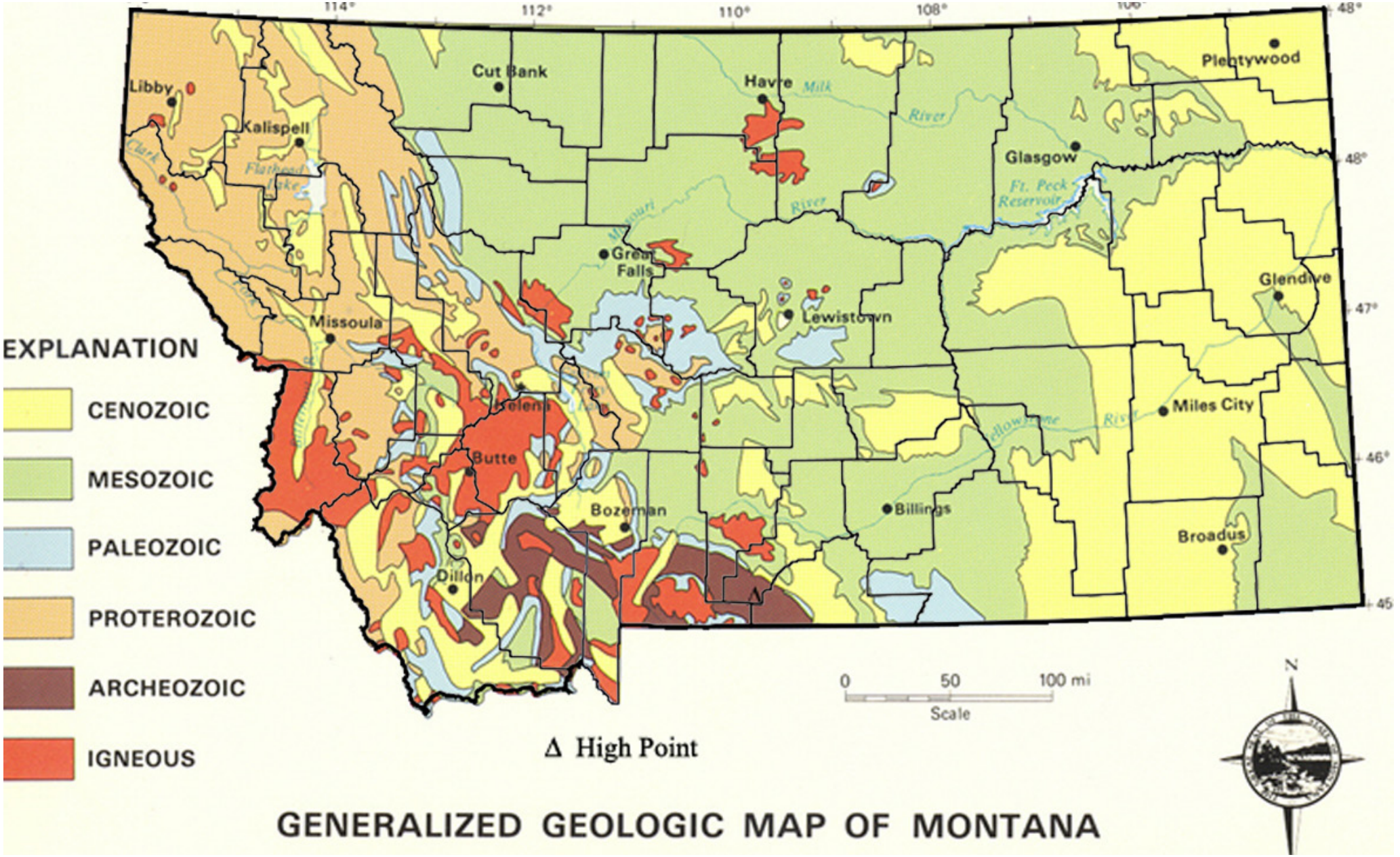
Next, plot on the map the locations of dinosaur dig sites in Montana, which can be found on exhibit panels throughout the exhibit. Or, plot on the map four famous Montana dinosaur sites: Makoshika State Park, Hell Creek, Egg Mountain, and Rudyard Field Station.

Where might you travel if you wanted to find fossil mammals like wooly mammoths and saber-toothed cats?

Any area shaded with yellow on this map.

Where might you travel if you wanted to find fossil evidence of the first life on earth?

Any area shaded with brown on this map.



Fossils in your Backyard

NAME ANSWER KEY

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