

SHOW ME THE Dinos

Grade Level: 3-5

Objectives:

Students will:

- use the online interactive map of Marsh/Felch Quarry
- Graph information contained in the map
- Theorize about historic habitat at Garden Park dinosaur area

Colorado Standards Met:

Math 2, 3, 5

Science 1, 3.1, 4.1

Reading/Writing 1, 2, 4, 5

Time Required:

2-3 class periods

Materials and Equipment:

- Internet access to www.handsontheland.org/felch/map.htm
- Graph paper
- Colored pencils, pencils, rulers
- Graphing software is optional

Other Resources:

Students can make graphs online at <http://nces.ed.gov/nceskids/createagraph/index.asp>

Other graphing software can be found at <http://www.educational-freeware.com/> and other sites.

Background

The Marsh-Felch Quarry #1 is located at the Garden Park Fossil Area north of Cañon City, Colorado. During the late 1800s, this area was the site of numerous fossil excavations. The type specimens (the specimens which define a particular species) for *Stegosaurus stenops*, *Ceratasaurus*, and *Allosaurus* were all discovered here.

The interactive quarry map allows access to the following information:
1) location of dinosaur specimens excavated, by species.
2) individual bones excavated, by bone type.
3) current location of the excavated specimens, by institution.
4) the map can also overlay each year of the excavation at Quarry #1.

Procedure

Give students a few minutes to explore the map on their own, to learn the controls and discover the types of information available. Ask the following questions to determine if students are able to interpret the information:

1. During what survey year was the greatest concentration of bones excavated? (1883)
2. What period of time is represented by the map? (1877-1901)
3. How many skull pieces were found in the entire Quarry? (14+)
4. In what institution is *Stegosaurus #43 "Roadkill"* currently located? (Smithsonian)
5. Neck bones from what species were excavated in 1886? (*Apatasaurus*)
6. Bones from what species of dinosaurs were excavated in the first year of work in this Quarry? (1877, *Diplodocus*, *Allosaurus*, *Brachiosaurus*)

Show Me the Dinos

The following page has "Show Me" cards. Each card asks for information to be represented in a visual way rather than just as a list. For example:

Specimens of what dinosaur species were excavated in 1877?

This question can be answered with a list: *Diplodocus*, *Allosaurus*, and *Brachiosaurus*. But how can it be represented visually? By pictures of each dinosaur species, perhaps?

But what if we also want to know how many bones of each species? How might the information be shown then? Two possibilities might be to count the bones for each species and show them in a bar graph, or students might draw bone symbols to represent each bone found.

Give each group of 4 or 5 students a "Show Me" card. Students will decide how to represent the information requested on the card and how to divide up the tasks. For each "Show Me" question the group will need to compile the information from the map, build their graphs, and present their information to the class.

At the conclusion of the presentations, the class will consider all the information represented by the graphs and hypothesize for the following questions. Ask students to support their hypotheses with examples from the graphs.

Why do you think so many dinosaur fossils ended up at this spot?

Based on the information you discovered on the map, what do you think the Garden Park area looked like when these animals were alive?

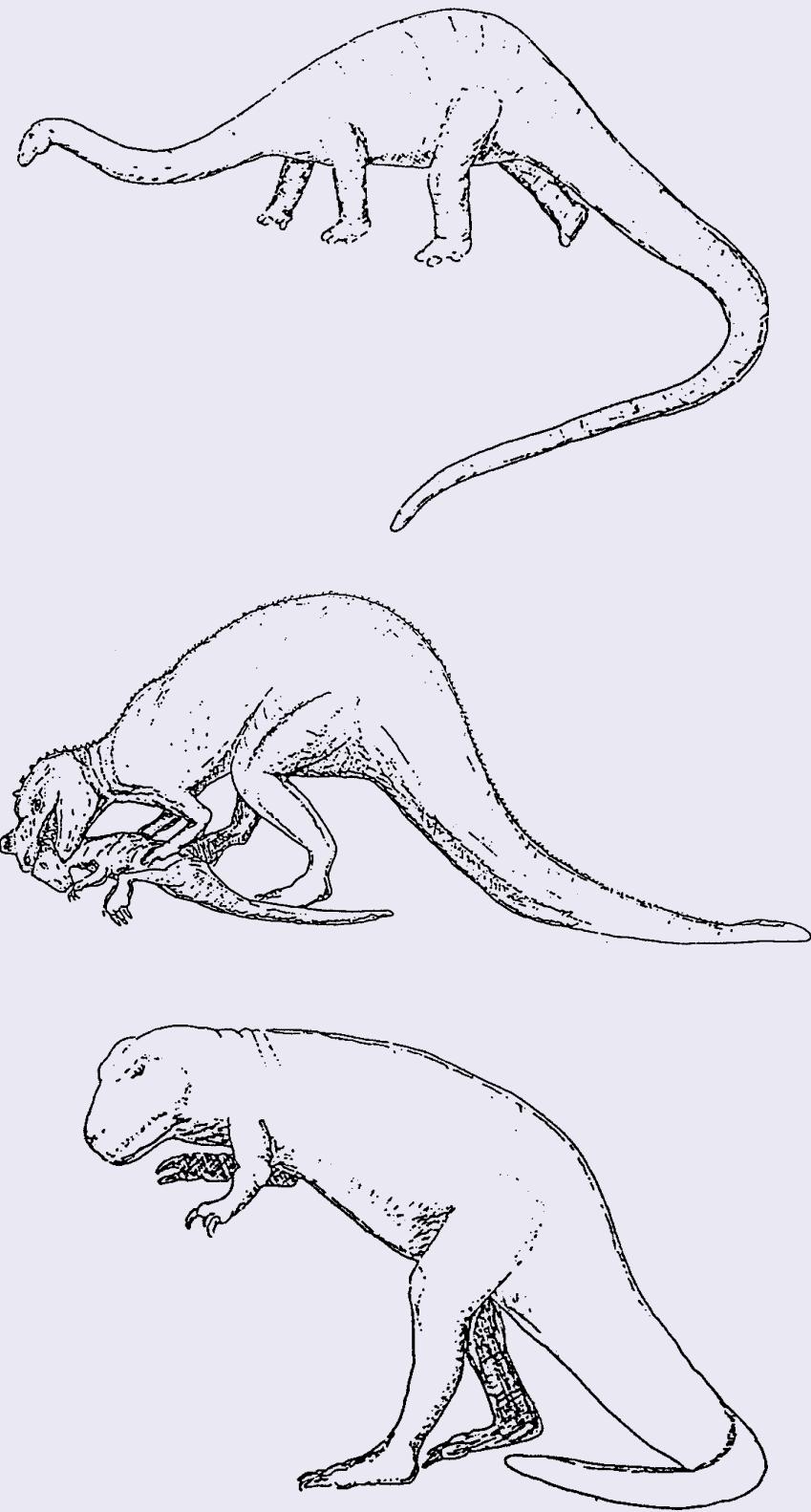
Scientists do not know the answers to these questions, but they have some theories.

Look at the information signs from the Garden Park Fossil area to read one of their ideas. The signs can be found on the Marsh-Felch Quarry website, in the resource section of the lesson plan page.

Marsh and Felch had ideas about how the fossils came to rest in this area, too. Felch wrote a little about his idea in a letter in October 1887. Can you find other letters in which they discuss this topic?

Dinosaur Species Excavated at Marsh-Felch Quarry #1

1877



SHOW ME

How many different species of dinosaur were excavated at the Marsh-Felch Quarry #1 in each year it was active?

How many different species total were discovered there?

SHOW ME

Which type of bone (neck, forelimb, rib, etc.) was found most frequently in each year?

As an average over all years?

SHOW ME

For which species of dinosaur were the following types of bones found?

Skulls
Forelimbs
Necks
Tails

SHOW ME

Fossils for which species of dinosaurs are now located at each of these institutions?

Smithsonian Institution
Yale University
Carnegie Museum

SHOW ME

Each “group” of fossils is identified on the map by a number.

How many bone groups were discovered in each year of Quarry activity?

In which year were the most bone groups found? In which year were the least bone groups found?

SHOW ME

Were the dinosaur species found at the Marsh-Felch Quarry predominately herbivores or carnivores?