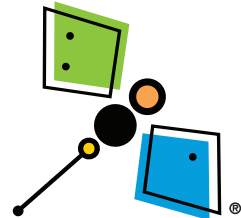


# DragonflyTV: GPS Activity 8

## Can You Dig It?



**Museum of the Rockies**  
Bozeman, MT  
[www.museumoftherockies.org](http://www.museumoftherockies.org)



### Baby Dinosaurs

We're Nicole and Ellen, and we're dino-crazy! And we're also lucky, because we live in Montana, an excellent place to study dinosaur fossils. We went to Egg Mountain, an important dinosaur dig site, to go fossil hunting! Molly, an educator from the Museum of the Rockies (MoR), came with us. MoR has the largest collection of dinosaur fossils in the United States. At Egg Mountain we observed an interesting dinosaur leg bone, which had been found previously by MoR paleontologists. This thigh bone, called a femur, came from a *Maiasaura*, a plant-eating duck-billed dinosaur. Our question: Was this dino young or old when it died?

The staff at the museum let us look at some resin replicas of *Maiasaura* bones. The *Maiasaura* femur cast we saw there was much smaller than the one we saw in the field. To help sort things out, we viewed an interesting display that shows the femur bones of *Maiasaura* dinosaurs at different life stages. This data helped us estimate that the dinosaur we found at Egg Mountain was almost an adult when it died—but how old is an adult? MoR scientists think *Maiasaura* could live to be about 30 years old. Our measurements indicated the dinosaur whose femur we found in the field was almost an adult when it died. We concluded that it was about 20 years old when it died at Egg Mountain.



MUSEUM OF THE ROCKIES



touch history



## Icebreaker

Look for a relationship between skull size and body length among various dinosaurs.

### DragonflyTV Skill: Observing

 **45 minutes**

#### Guide your kids as they

- 1) Read through the body and skull measurements of dinosaurs listed on the dinosaur measurement chart.
- 2) Find objects in the room or adjacent areas that are comparable in size to the skulls and/or bodies of the dinosaurs listed. Use the tape measures to make the comparisons.
- 3) Measure their own skull length (top of head to chin) and body length, and add that to the data.
- 4) Create a chart comparing the dinosaur sizes to common objects. For example, an adult *Maiasaura* skull is about as long as a small skateboard.
- 5) Make a graph (X-Y chart) that plots body length against skull length. Does the graph suggest a relationship you can use to predict another dino's length from its skull size?

#### You'll need:

- a dinosaur measurement chart (below)
- a metric tape measure (10 meter), 1 per pair of students
- access to household items ranging in size from 10 cm to 2 meters
- paper
- pencils

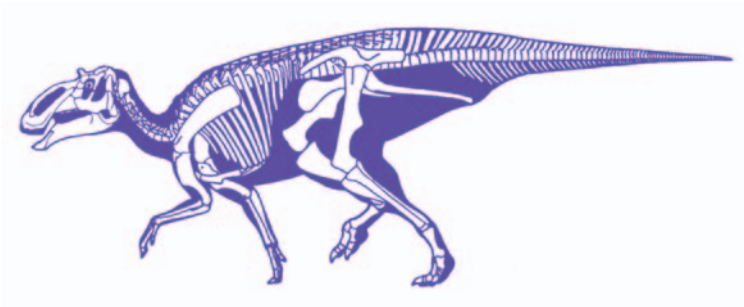
Type of dinosaur	Approximate body length	Approximate skull length
<i>Maiasaura</i> (adult)	8 m (26 feet)	75 cm (30 inches)
<i>Maiasaura</i> (nestling)	0.60 m (2 feet)	12 cm (5 inches)
<i>Orodromeus</i>	1.5 m (5 feet)	9 cm (3.5 inches)
<i>Daspletosaurus</i>	8.5 m (28 feet)	110 cm (43 inches)
<i>Einiosaurus</i>	7 m (23 feet)	150 cm (59 inches)



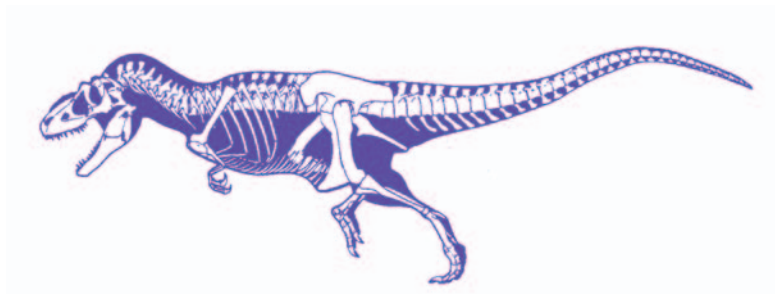
For more simple activities like this one, surf to [pbskids.org/dragonflytv/superdoit/index.html](http://pbskids.org/dragonflytv/superdoit/index.html)



*Einiosaurus* (EEN-ee-o-sore-us)



*Maiasaura* (MY-uh-sore-a)



*Daspletosaurus* (das-PLEET-o-sore-us)

## DFTV Science Helper

Fossilized remains from all of the dinosaurs in the chart have been found in the Two Medicine Formation (a rock layer) in Montana. These dinosaurs lived during the Late Cretaceous period, approximately 74-80 million years ago. *Maiasaura* (MY-uh-sore-a) is a duck-billed plant eating dinosaur. *Orodromeus* (ore-oh-DROH-me-us) is a small bipedal (walked on two legs) plant eating dinosaur. *Einiosaurus* (EEN-ee-o-sore-us) is a plant eating ceratopsian dinosaur (a dinosaur with horns and a frill similar to Triceratops). *Daspletosaurus* (das-PLEET-o-sore-us) is a meat eating dinosaur similar to *Tyrannosaurus rex*.

Illustrations by Greg Paul



## Investigation Finding Fossils



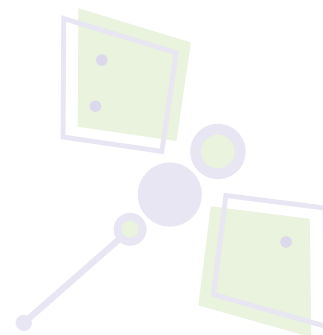
1 hour, plus prep time in advance

### Preparation

- 1) If you are using cake as your stratum material, bake several squares, rounds, or rectangles, so that you can construct a stratigraphy model of 5 layers. Use white cake, and mix different food colorings into each before baking, so you can refer to "the green layer" or "the blue layer" as the students discuss their findings.
- 2) Before stacking the layers, embed a few small objects into each. It's not necessary to embed so many objects that each section you give to the kids necessarily has every object in it.
- 3) The bottom layer represents the oldest layer, and each layer above represents a more recent layer. Embed objects in at least 3 layers, or all 5 if you wish. It's okay to have an "empty layer."
- 4) Use canned frosting if you wish to "cement" the layers together slightly. You may choose to frost the entire stack once assembled, but this will increase the sloppiness of the activity.
- 5) When you are ready to begin the activity with kids, cut the model into sections, so that each student group has a section to work on. The sections may be whatever shape you like. A section with a square base area of approximately 3 inches on a side should be large enough. You can tell the kids that each layer represents a certain era in geologic time. Example: the top layer represents the most recent 3 million years. The second layer represents 3-10 million years ago, etc.

### ▶ You'll need:

- a stratigraphy model (constructed out of layers of sheet cake, or from layers of craft Styrofoam)
- objects to "bury" in the model (coins, rocks, other small artifacts)
- plastic "tools" (knife, fork, tweezers)
- trays
- small tubs for collection dishes
- poster board
- markers
- tape





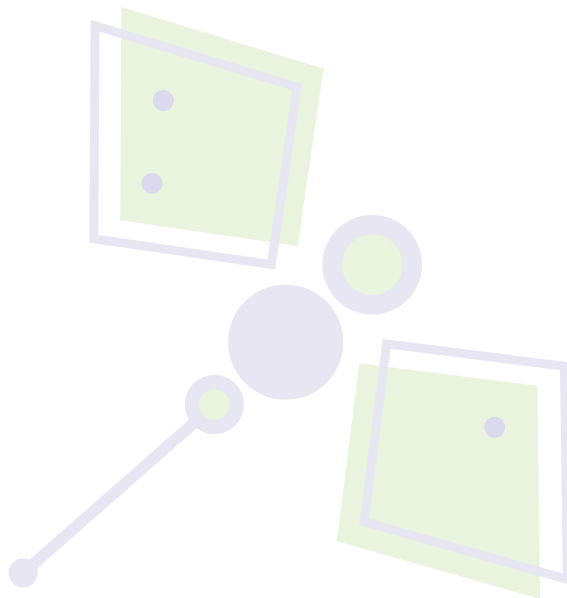
## Investigation Finding Fossils

### Guide your kids as they

- 1) Receive a stratigraphy "column." Determine which end of the column represents the oldest stratum and which represents the newest.
- 2) "Excavate" each stratum, one at a time, with the plastic tools, looking for "fossils" (i.e., the embedded objects) in each layer. Work slowly and carefully, writing down each discovery in a notebook, along with the layer that it was found in.
- 3) Prepare a poster board display indicating what kinds of objects were found and in which layers. Prepare to share and discuss with the other groups.

### DFTV Science Helper

Use your own creativity in constructing the stratigraphy model. Baking cakes is inexpensive but time-consuming; using Styrofoam layers is more costly, but may save you time. You're looking for a material out of which you can construct strata, and in which you can bury artifacts at different levels of the strata.





## DFTV Kids Synthesize Data and Analysis

Discuss questions such as the following:

- 1) According to our evidence, which objects "lived" longest ago? Which "lived" most recently?
- 2) According to our evidence, what can we conclude about dimes and pennies? What conclusions could be disputed?
- 3) According to our evidence, what conclusions can we make about dimes and glass marbles?
- 4) What possible explanations are there for Group One's discovery of marbles in two very different layers?

Layer	Group one	Group two	Group three	Group four
1	no discoveries	coin (penny)	coin (penny)	coin (penny)
2	glass marble	glass marble	coin (dime)	no discoveries
3	lg paper clip	sm paper clip	sm paper clip	sm paper clip
4	glass marble	sm rock	sm rock	sm rock
5	aluminum foil	aluminum foil	no discoveries	aluminum foil

### DFTV Adult Tip

Two main lessons should come out of this exercise. First, strongly make the point that fossils are found in different rock layers and therefore come from different eras in time. That is, fossil finds are characterized by the era during which the creature lived. The difference between 65 million years ago and 30 million years ago is a big difference! Second, fossil evidence is often incomplete, and multiple interpretations are possible.



### Keep Exploring!

Can you find dinosaurs in your state? What about fossils that aren't dinosaurs? To find dinosaur fossils in your state, the land must have exposures of sedimentary rock from the Mesozoic Era. Other kinds of fossils can be found in rock exposures from different eras. Contact your local science museum to determine what kinds of fossils, dinosaur or otherwise, have been found in your state.