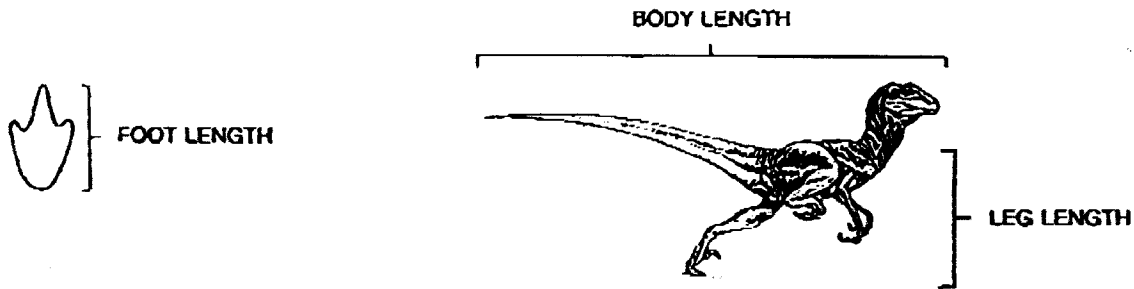




Interpreting Dinosaur Trackways

As with most aspects of geology, you will again play detective to reconstruct past history. In this case, your only clues are footprints found in rocks deposited 100 million years ago!

Using just a set of footprints, it is possible to easily determine the type of dinosaur (meat eater or plant eater), the leg length, the body length and the speed the dinosaur was traveling.



NOTE: USE METRIC UNITS!

Familiarize yourself with the terms shown above – foot length, body length and leg length. Foot length is the distance from the back of the heel to the front of the longest toe (usually the center toe). Leg length is the distance from the toe to the hip of the dinosaur, and body length is the distance from the tip of the tail to the tip of the nose of the dinosaur.

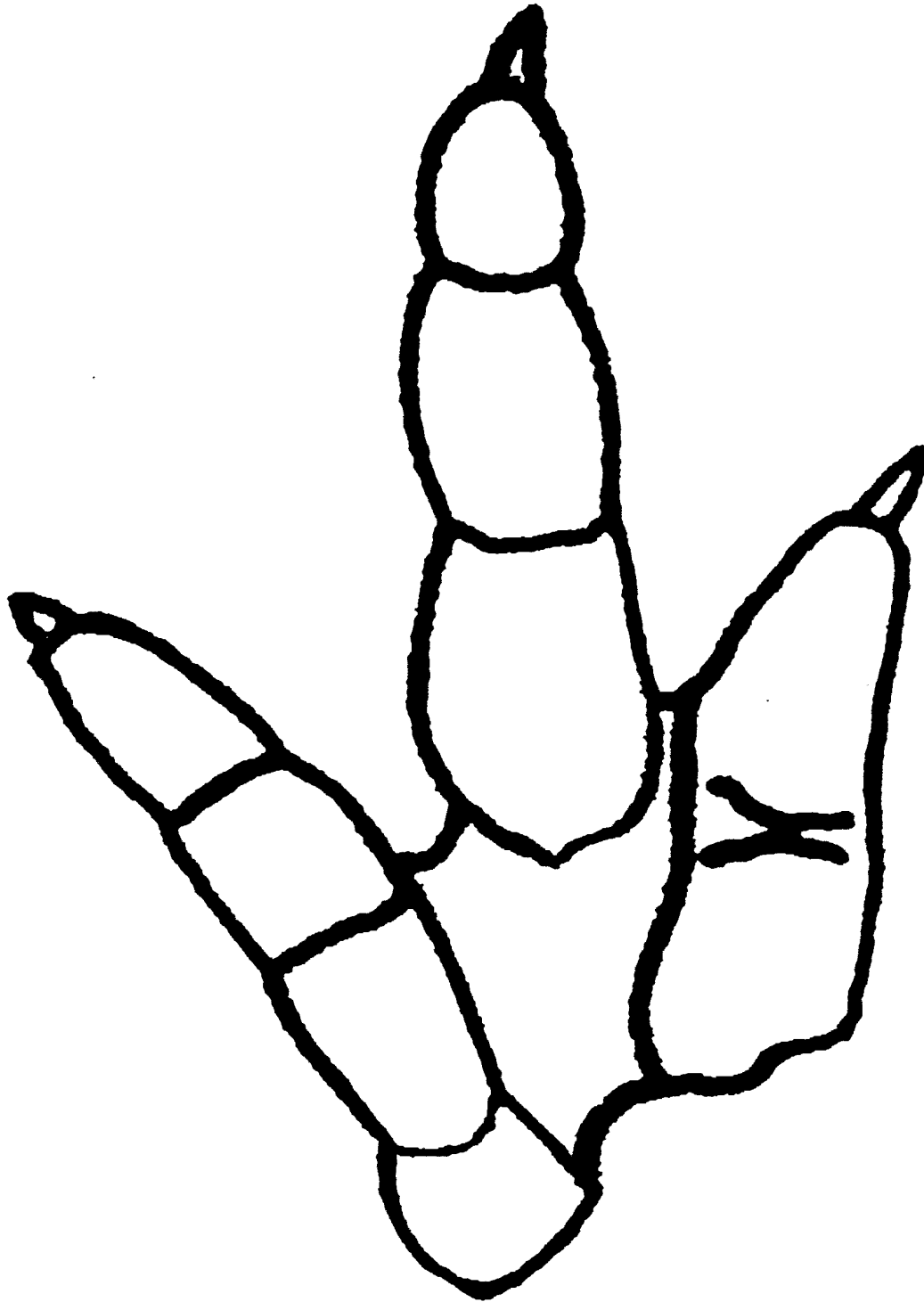
Use the foot print on the next page to measure the length of the footprint (from heel to longest toe, in meters, 100 cm=1 m). Enter the value in data table #1.

To calculate leg length, multiply the footprint length by 4.05. Record this answer in data table #1, and then convert to feet and record.

To calculate body length, multiply leg length by 3.50. Record this answer, and then convert to feet.

To convert from meters to feet, multiply meters by 3.28.

Move on to page 3...



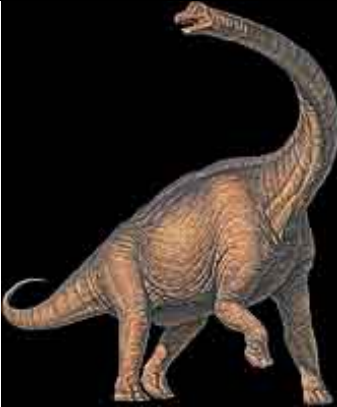





Kayentapus - right footprint
full-size



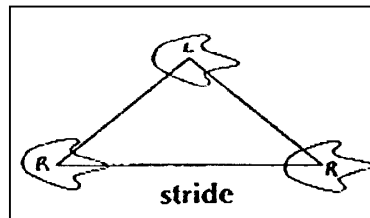
Interpreting Dinosaur Trackways

You can see that a single footprint can yield a lot of information about the size of the animal. But what type of dinosaur was it? Was it a carnivore (meat-eater) or an herbivore (plant-eater). Analyze the descriptions below to figure out what type of dinosaur made the print on the previous page. Record your answer in the data table.

	 <p>Photo from Heritage Museum Web page</p>	 <p>Painting by Joe Tucciarone</p>	<p>Classification: Herbivore (plant-eater) – Poorly defined toes with little of no claw impressions and <u>large</u> pad marks.</p>
		 <p>Painting by Joe Tucciarone</p>	<p>Classification: Carnivore (meat-eater): Well-defined toes with good claw impressions and small or no pad marks.</p>

You can also calculate the speed at which a dinosaur was traveling if you can find a “trackway”. A trackway is a set of at least 3 or 4 successive footprints. Look at the trackway in the photo at left.

You can determine the speed at which a dinosaur was moving by measuring the stride length. The stride length is the distance from the heel of a foot to the heel of that same foot (see diagram below). You can also go toe to toe if that is easier.





Interpreting Dinosaur Trackways

To calculate the speed of the dinosaur, use the following formula:

$$speed(miles / hr) = (1.755)(d_{stride})^{1.67} (l_{leg})^{-1.17}$$

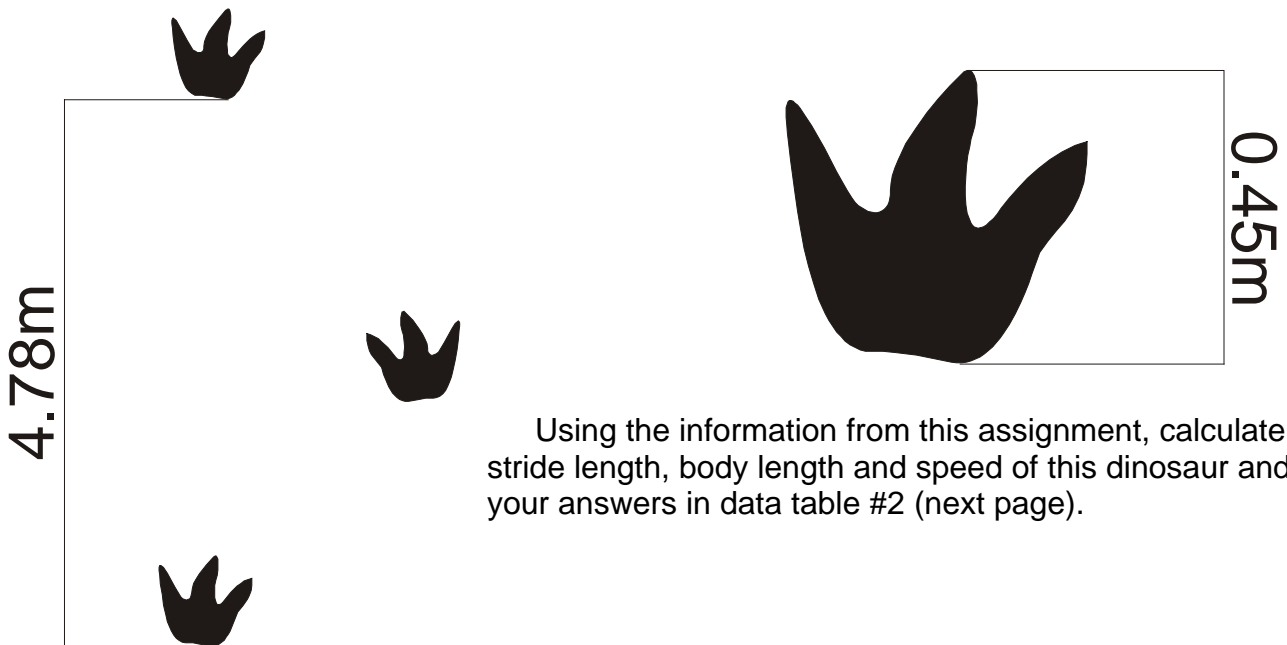
d_{stride} = stride distance in meters, l_{leg} = leg length in meters.

Here's an example. Let's say you found a trackway where the stride distance is 2.0 meters and the leg length is 8.0 m. Enter the following into your calculator:

1.755*2.0^{1.67}*8.0^{-1.17} [ENTER]

To enter exponents on your calculator, use the power key (on the right side of the calculator, looks like this : ^). To enter the -1.17, use the (-) key (that's negative, NOT minus) and then the number 1.17.

Use the diagrams below to calculate the speed of this dinosaur.



Using the information from this assignment, calculate the stride length, body length and speed of this dinosaur and record your answers in data table #2 (next page).



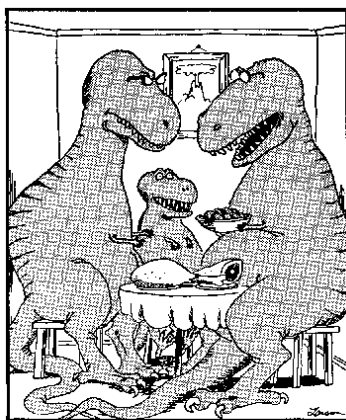
DATA TABLE #1

Length of footprint (in meters)	
Leg length (in meters)	
Leg Length (in feet)	
Body Length (in meters)	
Body Length (in feet)	
Dinosaur Classification (Carnivore or Herbivore)	

DATA TABLE #2

Foot length (in meters, see diagram previous page)	
Leg length (in meters, see page 1 for formula)	
Body length (in meters, see page 1 for formula)	
Stride distance (in meters, see diagram previous page)	
Speed of dinosaur (in miles/hr, see formula previous page)	

Have your calculated speed checked by Mr. Horton. If it's correct, you will be given a map to hunt down and analyze two dinosaur trackways. The quicker you get done, the more points you get!!!



"Hey! I'm trying to pass the potatoest! ... Remember, my forearms are just as useless as yours!"



"Now this end is called the thagomizer ... after the late Thag Simmons."



Although it lasted only 2 million years, the Awkward Age was considered a hazardous time for most species.



Outside trackway #1 – Measure and calculate the data in data table #3 using the trackway of this dinosaur.

Data Table #3

Foot length (in meters)	
Leg length (in meters, see page 1 for formula)	
Body length (in meters, see page 1 for formula)	
Stride distance (in meters)	
Speed of dinosaur (in miles/hr, see formula page 4)	
Classification (carnivorous or herbivore)	

Use outside trackway #2 for data table #4.

Data Table #4

Foot length (in meters)	
Leg length (in meters, see page 1 for formula)	
Body length (in meters, see page 1 for formula)	
Stride distance (in meters)	
Speed of dinosaur (in miles/hr, see formula page 4)	
Classification (carnivorous or herbivore)	