Name Period Date

Unit 5 | Handout _____

Data in Stride

Purpose: To see a relationship between the size of a footprint and an animal's speed.

Background: Assuming that most dinosaur trackways represent normal movement (typical gait) the size of the dinosaur and its speed can be estimated by the tracks and the length of its stride. The true size of a dinosaur is best measured from preserved bones. Based on comparative anatomy, a single bone can give a rough indication of the size of the organism. By empirical study (measurement of many organisms) it has been found that most dinosaurs hind feet are one quarter (1/4) of the leg length. Based on the length of the leg, the overall length of the "track maker" can be determined by comparison to models of similar species. Well preserved tracks are needed for this kind of estimate.

Instructions: You will calculate the speed of a dinosaur merely from its footprint. A study conducted by Over (1995) provides us with the math in order to do this.

1. Calculate leg length. Leg length is equal to 4 x (foot length).

2. Calculate the relative stride length (RSL) RSL = stride length ÷ leg length.

3. Calculate the dimensionless speed (DS). DS = (RSL - 1) ÷ 1.1.

4. Calculate the speed. $speed = \left(\sqrt{leglength \bullet 9.8}\right) \bullet DS$

To convert m/s to mph:

1 m/s = 2.236 mph

Take your actual speed (m/s) and multiply it by 2.236 to get mph.

Dinosaur	Foot Length (m)	Stride Length (m)	Leg Length (m)	Relative Stride Length	Dimensionless Speed	Actual Speed (m/s)	Actual Speed (mph)
Hadrosaur	0.3	1.4					
Struthiomimus	0.23	1.34					
Velociraptor	0.25	2.72					
Euoplocephalus	0.4	1.87					
Stegosaurus	0.35	1.90					