"Speed of Walking"

Tehani Finch, Howard University GK12 Program

September 27/October 11, 2007

I. DCPS Standards:

8.1.7 Use tables charts and graphs in making arguments and claims in presentations about lab work.

8.1.12 Apply simple mathematical models to problems (e.g. the formula d=vt)

8.7.7 Plot and interpret distance versus time graphs for constant speed.

II. Goals:

Students will understand the meaning of a distance vs. time graph.

Students will understand the significance of the units of distance, time, and velocity.

III. Objectives:

Students will plot two graphs showing two different speeds.

Students will contrast the graphs and explain the relationship between the slope of the graph and physical speed.

IV. Prerequisite Knowledge: Familiarity with basic equations such as v=d/t.

A. **Speed** – Roughly, "how fast you're going; distance/time.

B. Slope = "Rise over Run" = the vertical change of a line divided by its horizontal change.

V. Essential Questions:

What units can distance be measured in? What units can time be measured in? What is the definition of speed? What units is it measured in?

VI. Materials: Meter Stick, Stopwatch, Graph Paper

VII. Differentiating Instruction: This activity involves a combination of visual, verbal, and experiential modalities for facilitating student comprehension.

VIII. Rationale: This activity is designed for students to appreciate how a simple act such as walking at a constant speed has a graphical interpretation.

IX. Activity Procedure: Volunteer walks a given distance, slowly. Another volunteer records the time with a stopwatch. Repeat, now with a quicker walk. Students work in pairs to repeat what was done with the first group. Instructor calls up two pairs at a time. The timekeeper records the measurements in the data book.

Students draw two axes for position vs. time, including the units. Next they plot the point for the slow walk and for the fast walk. They draw two lines with a ruler between the origin and each of the points they've plotted, (using two different colors if possible).

X. Evaluation and Assessment: Ask what's different about the two lines and how you can tell which one represents faster speed [higher slope represents faster speed]?

Have the students find the average speed by finding the slope of the graph.

Have the students interpolate by finding how long it takes to go half the distance covered at those two speeds.
Have the students extrapolate by finding how long it takes to go twice the distance covered at those two speeds.