

Name: Mendi White

Grade Level/Subject: Algebra

Topic: Let's Walk

Objectives (P.A.S.S.): Algebra I Standard 3

Introduction: In this project, students will calculate their walking rate and the length of their strides across a pre-measured distance. They will then use basic statistics to approximate a given distance like a school parking lot or gymnasium or hallway (the mystery distance). They will convert their rates from feet per second to miles per hour, and approximate the time it will take to walk a considerably longer distance. Finally, the students will graph their data on a coordinate plane and compare it with that of the other graphs. They will find the line of regression for their data.

Instructional process: Begin by giving the student worksheets and data tables. Hand out the required materials and explaining the instructions. Have a place already measured for students to do their trial walks.

Part 1: Each student in the group will walk a pre-measured distance, preferably 100 feet, three times. For each of the three trial walks, the students' steps are counted by their partner. The time is found by using a stopwatch. The time in seconds and the number of steps are recorded for each trial on the appropriate data table. All group members are responsible for recording the data of the other members on the worksheet. Students should write the names of the group members next to the corresponding walker number. Once this is completed, the group has one student make two trial walks of the "mystery" distance, timing the walk and counting the steps as with the 100 foot distance and recording the data on the second table. Record all data.

Part 2: The students calculate the mean, median, mode, and range for times and steps and record them in the third table on the worksheet. Encourage students to do all computations individually, and compare answers, rather than divide the labor and copy answers. Next, have students calculate the average rate in feet per second by dividing the average time by the distance 100 feet. They then convert to miles per hour in order to see their rates in a recognizable form. Lastly, have the students calculate the length of their strides by dividing the average number of steps by the distance and recording their answers to the nearest hundredth of a foot. Then have students convert their answers from decimal feet into feet and inches.

Part 3: On graph paper, students draw a quadrant I graph of the coordinate plane and label the domain and range. Students then graph each group member's average time and average steps as an ordered pair. Then students accurately predict the number of steps they would walk in ten seconds, then again for forty seconds. The two new points for each student are plotted. If done correctly, the three points for any given student should be collinear. The students draw lines through each set of three data points and answer the questions. "According to the graph, which member of your group takes the most steps in one second? What Characteristics of the graphs brings you to that conclusion?" Discuss why the data is linear and find the equation for the line of best fit or line of regression.

Closure: Discuss the concepts used in this project such as finding the mean (average) and the other statistical measures. Also discuss why the data is linear and how to use the results to calculate other distances. For example, "How long would it take you to walk home from school?" or "How fast does the average high school student walk in miles per hour?"

Assessment: Assessment could be the accuracy of computations on the graph or students could be given a set of data from another student and could calculate and graph that student's data.

Modifications/Accommodations: This project could be used early in the year to explore new topics or later on in the year for reinforcement or enrichment. The data from this experiment could be used later on in the year for other averages. If you have the technology, this project is great for plotting and graphing on the calculator. It could also be used to teach students how to create a spreadsheet and input formulas.

Reflection: The students need to be as accurate as possible when timing the "walk". They also need to be sure to accurately count the number of steps. Also be sure they have their graph appropriately labeled before beginning to graph the data.

DON'T BREAK MY STRIDE

Student Handout

You and each member of the group are to make three trial walks. Count your steps and time your walk for each trial.

	Time (sec)	Number of Steps
Trial (100 ft)		

Choose ONE person from your group to walk the “mystery” distance designated by the teacher. Record both the steps and times for two trials.

	Length
Location: _____	
Time _____	
Walker: _____	
Steps _____	

Calculate the mean, median, mode, and range of both times for all members. Then use the average time to calculate the rate in feet per second. Also use the average number of steps to calculate the average stride length.

Statistics for TIME

	MEAN	MEDIAN	MODE	RANGE
1.				
2.				
3.				
4.				

Average Rate

ft/sec	mph

Statistics for STEPS

	MEAN	MEDIAN	MODE	RANGE
1.				
2.				
3.				
4.				

Stride Length

Feet	Inches

It is _____ miles to _____.

It would take approximately _____ hours/min/seconds to walk there.