MAKE A CALCULATOR

INTRODUCTION

Students need opportunities to practice proportional reasoning and experience the interrelationship between math and science. This activity reviews conversion of units and basic principles of science and engineering practice.

Students will use data to make their own slide rule, comparing one range of data to another. There is a lot of room for extension here. You could bring in slide rules or use a slide rule simulator or app. As an extension you could also have students graph their stride length against height and see that the data should form a line with a slope of about 0.41. You could have them calculate the proportional relationship between the two lines in their slide rule.

STANDARDS

NGSS 3 PS2-2
Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

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Students are expected to meet this performance standard in third grade, and in fifth grade and middle school extend it to the concept of gravity, mathematical predictions of motion, and the balance between forces. This activity helps students move towards that quantitative modeling of forces and motion. It also provides practice with Science and Engineering Practices—Developing and Using Models, and Using Mathematics and Computational Thinking in particular. The Crosscutting Concepts of Patterns, and Scale Proportion and Quantity are involved. It also addresses the CCSS Math Practices, Math Practice 1, and the developing concept of the relationship between variables that students are expected to have in upper elementary and middle school.

NAME: DATE:

PART 1: FIND YOUR PACE

1. Measure out a distance of 200 cm. Get a partner to observe and help you count out how many normal strides it takes you to cross that distance. Make sure that you are walking normally and not at all trying to change your stride.

2. Divide the number of strides by the distance to find your stride length.

3. _____ / 200 cm = _____ stride length

4. Switch and repeat with your partner.

5. Measure your height in cm, and record it here:

6. _____ height

Wounded Marines helped by Navy Medical Corps on Iwo Jima, February 1945.
(The National WWII Museum, 2011.102.538)

PART 2: MAKE YOUR CALCULATOR

**1. On graph paper, make two lines of 24 cm.
Make them parallel to each other and about 2 cm away from each other.**

2. Put tick marks on each line every 2 cm.

**3. On the top line number the tick marks starting with 32, and increasing by 4 for each (32, 36, 40, 44...).
Label this line "Stride in cm."**

**4. On the bottom line number the tick marks starting with 80, and increasing by 10 for each (80, 90, 100...).
Label this line "Height in cm."**

**5. Find your stride length on the top line. Using a ruler, find the same spot on the bottom line.
It should be the same as your height. Is it? Does it work for your partners?**

PART 3: ANSWER QUESTIONS

**Soldiers are tracking some footprints in the woods. The prints have a stride length of 36 cm.
Is the person who made the footprints an adult?**

A scientist enters her lab and finds footprints of mud on the floor. She suspects that the prints might have been made by her colleague, who is very tall (195 cm). If it was her friend, how long would the stride be?