

Grandma Ruth

Concepts

- Measurement
- Problem Solving
- Experimental Design
- Data Collection and Analysis
- Number Sense
- Scientific Method
- Communication

Overview

Students will experience an Inquiry-based investigation based on the mind and methods of an elderly person.

Materials

- TI-84 Plus
- Tape measure
- TI-Navigator™ system (optional)

Launch

As I grew up, I had the pleasure and misfortune of having my grandparents live close by. I enjoyed their company, and their constant desire to spoil their grandchildren by buying us things throughout the year. The downside of these shopping trips occurred in late summer when they would take me shopping for school clothes.

Grandma Ruth would insist on buying me several new outfits for school. These outfits would include everything from shirts and pants to shoes and *underwear*. There was something about buying underwear with your grandmother as a 14 year-old male that made the trip uncomfortable.

To make matters worse, Grandma Ruth had this strange notion that you could determine if a sock would fit your feet by wrapping it around your fist. So there I stood in the department store, wrapping socks around my fist to see if they were going to fit my feet. Grandma Ruth is gone now, and mixed in my fond memories of her is still the question of whether she was a little crazy in her notion of trying on your socks by using your fist rather than your feet.

Plan

1. This is your question to answer so that my faith in my Grandma’s sanity can be settled. To settle this, you are to use all that you know about the scientific method. The question has been asked, “Does the diameter of your fist determine your foot size?”
2. Your team needs to develop your test, conduct the experiment, analyze the data, and reach a conclusion supported by the data.
3. Include the collection of Fist and Foot data.
4. Share your team’s plan with the class.
5. During the discussion, the class should determine the exact methodology of the investigation. All teams will then conduct the experiment the same way.

Execute

1. The teams will conduct the accepted experiment as prescribed and modified by the class. Data should be collected and placed in the TI-84 Plus.
2. Place the data for the diameter of the fist (FIST) as the independent variable, and the length of the foot (FOOT) into the list editor. Press **[STAT]** (Figure 1). Then select **[1]** to enter, and edit the lists (Figure 2).
3. Highlight the name of a list, and arrow over to the right or left until you get the first unnamed list (Figure 3).
4. Enter the names FIST and FOOT into the first and second columns (Figure 4). Now enter the data collected into your newly named lists.

Conclude

1. What did the data indicate? How were you sure? Did all of the variables you listed stay constant or controlled except for the FIST and FOOT?
2. What was your sample size? Was it large enough, how do you know?
3. How did your results compare with other team members?
4. What was the range of the data? Why might the range matter?

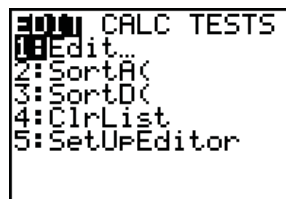


Figure 1

L1	L2	L3	1
1.399	.427	0.000	
.100	.430	0.000	
.200	.426	0.000	
.100	.423	0.000	
.200	.433	0.000	
.100	.430	0.000	
0.000	.466	0.000	

L1 = {1.399, .100, ...

Figure 2

L5	L6	NAME	?
-----	-----		

Name=

Figure 3

FIST	FOOT	-----	1
-----	-----		

FIST(1) =

Figure 4

5. How would you modify the experiment if repeated?
Why?
6. Where was the science? What mathematic concepts
were involved?
7. What questions come to your mind when you study
the data?

Teaching Notes

The goal of this investigation is to model Inquiry and experimental design in a guided lesson. It is important to set the tone with this investigation for the whole institute. Playing the mathematics and sciences issues as they exist and as they are perceived and emphasizing good data collection, measurement, and analysis is imperative.

Technology Pitfalls

Named lists can be overwhelming for some. Make sure the students understand the process, and help them know the value in naming lists.

TI-Navigator™ Use

Use the TI-Navigator™ to collect the individual measures in the Activity Center using forms, and send it back to the class (Fist, Foot). See *Aggregating Data and Lists TI-Navigator™ Tip Sheet*.