

Teacher Notes-Exactly How Many

Materials per group: rice (dry/uncooked; about 300 grams. I paid \$9 for 15 pounds); have other measuring-type lab equipment on hand (balances, beakers, cups, bowls, rulers, calculators, ...)

Procedure:

1. Have each student set up their own paper as shown on the ppt
2. Assign groups. I tried this in 2's and 3's; the 3's worked better for me
3. Explain the problem to be solved: in 20 minutes, determine exactly how many grains of rice there are. (Announce the problem ONLY after they've got their paper set up and groups are assigned, otherwise they won't listen to anything else.)
4. Quickly go through what they will do (steps 1-5, shown to the right on the ppt)
5. Let them get to work. During this time, do not go and sit at your desk, or things will get out of control. And do not walk among them too much, or they'll ask questions; this is *their* problem to solve. Stay close, but not too close.
6. When my students completed step 2 (circled which method to use) I let them get whatever equipment they needed that they could find
7. By the end of 20 minutes, students need to write the number of grains of rice on the board
8. Possible discussion:
 - Read off each number on the board, so everyone is aware what's there
 - If groups were careful, most numbers will be within about 5,000 of each other
 - Locate the highest and lowest number (outliers). Ask these groups what their specific method was. One group with a very high number in my room switched from ounces to grams without converting; otherwise had excellent technique. The very low number tried to measure their rice by volume, but failed to take into account pockets of air in between grains of rice; otherwise, again, very good technique.
 - Use the length of your chalkboard to create a (very) long line graph showing the placement of each group's number. Number the x-axis from, say, 0 to 50,000 (or higher if needed), and dot each group's number. You'll see most dots clustered in the middle, within about 5,000 of each other, with a few further out. Students can copy this onto the back side of their paper.
 - Apply to your current topic- why did we do this? (precision/accuracy; estimating impossibly large numbers like stars or cells in the human body)