

Million Dollar Giveaway

(Measurement)

Objective

Students will apply measurement skills to determine, in dollar bills, the capacity of a suitcase.

Overview of the Lesson

The prize for winning a radio contest will provide the winner with up to \$1,000,000 in cash. The catch is that the winner is only allowed one suitcase in which to carry away as much money as it will hold. Will this amount be more or less than the \$1,000,000? Students devise plans to determine an appropriate estimate for the amount of money it will take to fill a given suitcase.

Materials

Each Group

- ① 4 Stacks of 25 fake one-dollar bills in play money or plain paper cut to size - 2 1/2 x 6" (Have additional stacks available.)
- ② Rulers
- ③ Calculator
- ④ Million Dollar Giveaway Student Activity Sheet

Per Class

- ⑤ Large suitcase

Procedure

Present the following scenario to the students:

The local radio station (identify one) sponsored a contest. It was quite easy -- just be the ninth caller and you could win up to one million dollars. Well, I was the ninth caller. My instructions for collecting the money were as follows: Bring a suitcase to the station -- one that could be carried, not rolled. All of the money that could fit in the suitcase would be mine. The money would be issued in one-dollar bills. Well, I need your help! This is the suitcase that I have selected to take to the radio station. (Hold up a suitcase.) How much money will I win if I use this suitcase?

Place students in small groups. Distribute the student worksheet and 4 stacks of \$25 in play money to each group. Inform them that their first task is to guess how many dollars they think will fit in the suitcase. Record these guesses as they share them with each other. Discuss such things as the range of guesses, those that are relatively close, etc.

Next have them reconvene in their small groups to discuss their plan for estimating how much money will fit in the suitcase. This process will include; first discussing and recording what they know, then discussing what they need to know and finally making decisions about their plan of action.

In every case, students will experiment to discover the relationship between the size of the suitcase and the size of the money. In some cases, they will use the ruler to measure the suitcase and the money and based on these measurements, calculate the approximate amount of money that will fit in the suitcase. The approximate size of a dollar bill is $2\frac{1}{2}$ inches x 6 inches. The height of a stack of one hundred - one dollar bills measures approximately $\frac{1}{2}$ inch. Other groups will actually use the money as the measuring unit. By laying out the bills on the bottom of the suitcase and stacking packs of bills to determine the number of stacks that it will take to fill the case, students simplify the tasks associated with finding a solution to merely counting and multiplying.

Depending on the method used, groups may arrive at different amounts of money which the suitcase can hold. However, the amounts should be relatively close to each other and the one pre-determined by you. Each group must therefore be able to justify its solution. Revisit the original guesses to see how they compare to the estimates. Also, discuss how much less than \$1,000,000 the suitcase will hold.

Note: The suitcase the teacher used had two sides. Thus, students could find the amount of money that fit on one side, and then multiply by two. Also, the suitcase had a “flap” in it. This prevented students from placing the dollar bills vertically. It helped narrow the number of answers. Also, students could fit the dollars in a flat position only. This will eliminate stuffing bills into any left over space. In reality, dollars would be crammed into the suitcase to get the maximum amount.

Extensions & Connections

Have students investigate the following:

In what denomination would the station have to issue the money to enable you to fill your suitcase with \$1,000,000?

How many suitcases, of the same size, would you have to fill to have \$1,000,000 one-dollar bills?

How much would \$1,000,000 one-dollar bills weigh? Would a person be able to lift \$1,000,000 one-dollar bills?

Determine how much the money used to fill the suitcase would weigh. Could this amount of weight be carried by the average human? (Twenty one-dollar bills weigh approximately .7 of an ounce.)

Have students engage in various research investigations on the dollar such as its history, how many 1's are on a one dollar bill, etc.

Resources

National Council of Teachers of Mathematics. Curriculum and Evaluation Standards for School Mathematics Addenda Series: *Number Sense*. (1991) Reston, Virginia.

Ideas for Online Discussion

(Some ideas may apply to more than one standard of the **NCTM Professional Standards for Teaching Mathematics**.)

Standard 2: Teacher's Role in Discourse

- ❶ The teacher's role in this lesson primarily consisted of presenting the problem and supplying the materials. The students therefore were in control of their own learning. How well will this open approach work with your students? Are there any special techniques which are an integral part of this type of lesson?"

Standard 3: Students' Role in Discourse

- ❷ The students had at their disposal, "a variety of tools to reason, make connections, solve problems and communicate." (p. 45) Comment on the dynamics of this lesson as it relates to this statement.

Standard 4: Tools for Enhancing Discourse

- ❸ The teacher directed this lesson by allowing only one student from each group to have the responsibility of collecting all of the data. What are your feelings about giving one student so much responsibility? How would your students accept this? Can you suggest an alternative approach to achieving the same goal with only one suitcase?

Standard 6: Analysis of Teaching and Learning

- ❹ What are the benefits of students using non-standard units of measure, while others are using standard units of measure?

Million Dollar Giveaway Student Worksheet

Name of People in your group

Estimate how much money your
group thinks will fit in the suitcase!!
\$

Suitcase and the million dollars!
What do you know?

What do you need to know?

What is your plan?

On the back of this paper, describe how your team solved the
problem. Use pictures, graphs, or charts as well as a written
explanation.

Good Luck!!

Million Dollar Giveaway

6"



2 1/2"

