

Ping Pong Problem

Methods of solving:

Volume of a sphere divided into area (upper bound)

Treat sphere as a cube (next upper bound)

Use a model—say a one-foot-cube. Note: It takes a lot of balls. You need to provide them if you want it to go this way. A smaller cube

Do you stack or just fill the car (like dumping a buck of balls into the car)?

Why did this problem flounder in class?

Diversity of math expertise. Math experts became “bullies” and novices felt left out.

Those who wanted the empirical approach didn’t have enough balls.

What types of answers did it provoke?

XX Student worker type from slide XX

How do you explain the wide range?

Decimal point precision? Too many still thought they were in a math class—looking for the “right” answer. They got angry that there was not a right answer and “if I knew you only wanted an approximation, I wouldn’t have done all this work”.

Suggestions for saving:

Make clear what we are after. This is not a math problem. It is a thinking problem. If this isn’t made clear up front, they feel a bait and switch on the grading. The Role of “math whiz” may have provoked this. A “secretary” role may have provoked the kind of response that was desired.

While “applied,” this prompt isn’t terribly “real”. Alternative prompts grounded more in active citizenship may have promoted less “mathy” answers.

Maybe you should even get rid of the information on the size of the Hummer.

JOHN BEAN'S PING PONG ASSIGNMENT

The Situation: Polly Pong (affectionately known by her friends as Ping) owns a Hummer dealership. Besides being an experienced car dealer, Ms. Pong is an avid table tennis player who enjoys watching professional table tennis tournaments. She is delighted to learn that an international table tennis team is making an exhibition tour through the United States and has scheduled an event in a high school gymnasium near her dealership. She wants to expand American interest in table tennis by promoting the tour; at the same time she wants to advertise her Hummer dealership. She has hit upon a plan. She will fold down the rear seats of a big H2 Hummer and fill the interior completely full of ping pong balls. She'll park the Hummer on a sidewalk in front of the dealership and invite townsfolk to guess how many ping pong balls are in the Hummer. The winning guesser will get free tickets to the tournament along with a professional ping pong table for his or her home.

However, before she begins her advertising campaign, she needs an estimate on how much it will cost her to fill the Hummer with ping pong balls. She has hired you—a local math whiz—to determine how many ping pong balls it will take to fill a Hummer and to give her a pretty close estimate of the costs. She has given you the following data:

- o The cargo area of an H2 Hummer with rear seats folded down is 86.6 cubic feet. Ms. Pong estimates that the front seat area would be an additional 20 cubic feet for a total of 106.6 cubic feet
- o She can buy a gross (144 count) of ping pong balls for \$50.

Her request: She has asked you to provide a estimate of the total cost of the ping pong balls to fill the Hummer. She also wants you to explain how you modeled the problem and did the calculations.

Your Task: Write a one- or two-page memorandum to Ms. Pong providing your best estimate of the costs along with an explanation of your reasoning. Attach diagrams or figures if you think these will help.