Strategy to determine how many golfballs will fit inside a school bus.

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The first thing we look at is the size of the bus. Online, the dimensions of a school bus are described as “About 9.5 to 11 ft for its height, around 8 ft for its width, and a length ranging between the measurements of about 12 ft to 40 ft.” We will consider the largest estimate, which is 11 x 8 x 40 ft, so that we have an area much larger than the perimeter, as will be important. We will also assume the bus is rectangular shaped rather than having a curved roof; the curved roof will simply have a few more than a rectangular-shaped one would.

Next to discuss how the golf balls will be stored, ignoring obstacles for now. This can be done in one of two ways – by either stacking them on top of one another directly or by having one row of golf balls rest between four golf balls below it. The trade-off of the latter is that four golf balls are needed for each ball above it (though this is not a 4-1 mapping, since a ball would be holding up other ones around it), thus the second row of balls would not be able to fully reach the walls of the bus (unless they were cut, but we will assume not). However, given a careful placement, the row above that can have the same number of balls as the first row by balancing the balls between the outer perimeter of balls below it and the wall of the bus. As such, this strategy sacrifices a number of balls equal to the perimeter of the bus when viewed from above every second row. The trade-off is that each row is now in the range of ¼ to ½ of the golf ball's diameter lower than it would be in the former strategy (which is the equivalent of storing the balls in boxes that fit exactly). Because this gives us the benefit of adding on a few rows of balls equal to the area of the area of the bus when viewed from above, outweighing the loss discussed before since our area is bigger, and thus we will choose to rest the golf balls between the ones below it.

The major obstacles in the bus are, of course, the seats. We will need to measure around the seats to determine how many balls will be lost we reach those rows, especially when the row reaches the height of the actual seat. Most likely, this will be equal to about 2 or 3 rows of golf balls (but if odd, this means we run into the problem of colliding with the wall discussed above). The next set of rows will need to be concerned about the backs of the seats, as well as the driver's seat and the bars holding up the passenger seats.

As a few remaining tidbits, we observe the following few things. First, the back row will sometimes have a full bench rather than two seats, which is equivalent to having one more seat. If the windows are open, those areas can ignore the problem of a golf ball running into a wall. School buses don't have bathrooms, so this is a non-issue. Opening the roof top fire escape can store a few more. There is also storage space in the stairs to get on the bus.

We should avoid doing this experiment while children are on the bus. They may alter the results, in which case we need to measure the loss of golf balls on a case-by-case basis, especially if the school serves particularly greasy foods in the cafeteria.