Egg Drop

You live in a 100 story building. You have 2 identical eggs. You are asked to find the maximum number of stories the eggs can be dropped before they break. You have only 14 attempts to drop the eggs. If both break before the 14th and final test you lose. If you need more that 14 drops to find the solution you lose

You could just drop an egg from the first floor and see if it breaks, and the test an egg from the 2nd floor and see it it breaks and then drop an egg from the 3rd floor and see it it breaks and so on but if the breaking point is the 90th floor this technique will not work. There is a strategy that will guarantee you find the maximum number of stories no mater what story that is.

Find a strategy that allows you to find the maximum floor the eggs will break from using only 2 eggs and using 14 or less tests.

Solution:

Drop 1 egg from the 14th floor. If it breaks you have 1 egg left and 13 tests left. The egg cannot be dropped from the 14th floor and survive so you know the maximum height is the 14th floor **or lower**. Start testing at the 1st floor and work your way up to the 13th floor. The first floor the second eggs breaks on is 1 story above the the maximum number of stories an egg and survive being dropped.

Drop 1.   Drop from floor 14. If it breaks use the remaining 13 drops to test floors 1 to 13.   If not-->
Drop 2.   Drop from floor 27. If it breaks use the remaining 12 drops to test floors 15 to 26. If not-->
Drop 3.   Drop from floor 39. If it breaks use the remaining 11 drops to test floors 28 to 38. If not-->
Drop 4.   Drop from floor 50. If it breaks use the remaining 10 drops to test floors 40 to 49. If not-->
Drop 5.   Drop from floor 60. If it breaks use the remaining 9 drops to test floors 51 to 59.   If not-->
Drop 6.   Drop from floor 69. If it breaks use the remaining 8 drops to test floors 61 to 68.   If not-->
Drop 7.   Drop from floor 77. If it breaks use the remaining 7 drops to test floors 70 to 76.   If not-->
Drop 8.   Drop from floor 84. If it breaks use the remaining 6 drops to test floors 78 to 83.   If not-->
Drop 9.   Drop from floor 90. If it breaks use the remaining 5 drops to test floors 85 to 89.   If not-->
Drop 10.   Drop from floor 95. If it breaks use the remaining 4 drops to test floors 91 to 94.   If not-->
Drop 11.   Drop from floor 99. If it breaks use the remaining 3 drops to test floors 96 to 98.   If not-->
Drop 12.   Drop from floor 100

This will work best with students if you pick a floor for the breaking point. Then have then choose a floor number to drop an egg and tell them if it breaks or not. Hold up 1 finger for the first guess. Have then choose a 2nd floor to drop an egg from and tell them if it breaks or not. Hold up 2 fingers for the 2nd guess. Continue until they have broken both eggs or used up 14 guesses or have found the correct floor.

If they get lucky and find the floor but use a strategy that will not always work have them explain their strategy and then have them use it again but pick a different floor so they can see their strategy will not always work.