Central Limit Theorem Activity

The purpose of this exercise is to verify the Central Limit Theorem. Remember that this Theorem tells us that the mean of a large sample is:

- Approximately bell-shaped
- Has mean equal to the mean of the population
- Has standard deviation equal to the population standard deviation/ sqrt(n)

Please follow these instructions to verify that the Central Limit Theorem holds.

(a) Divide into pairs. Each pair should have 1 die.

(b) Take turns rolling the die, 25 times each, so you will have 50 rolls. Keep track of the number that lands face up each time.

(c) Draw a histogram of the results. The die faces are equally likely, so the histogram should have a "uniform" shape. Verify that it does.

(d) Find the mean and standard deviation for the 50 rolls.

(e) The mean and standard deviation for rolling a single die are 3.5 and 1.708, respectively. Is the mean for your 50 rolls close to 3.5? Is the standard deviation close to 1.708?

(f) Come together as a class. Draw the theoretical curve that the *mean* of 50 rolls should have. Remember that it's bell-shaped, and has a mean equal to the population mean, so that's 3.5 in this case, and the standard deviation in this case should be 1.708/sqrt(50) = .24.

(g) Have each pair mark their mean for the 50 rolls on the curve. Notice whether or not they seem reasonable, given what is expected using the Central Limit Theorem.