

**Acting Like a Hog**

There is a simple game called Hog that is played using a group of dice.

**Materials:** 10 dice, paper and pencil

**Rules:** Each player will play in turn. On any one turn the player decides how many dice to use, and then tosses them all at once. If a “one” appears on any of the tossed dice, the player scores zero points for that turn. If not, the player score for that turn is the sum of the numbers rolled. The game ends after each player has had ten turns. The players with the highest total score wins.

**Examples:**

Player 1 decides to use four dice and tosses 4, 6, 2, 3. The score for that turn is 15.

Player 2 decides to use three dice and tosses 1, 2, 5. The score for that turn is 0.

Player 3 decides to use six dice and tosses 2, 3, 4, 1, 2, 1. The score for that turn is 0.

1. Try out the game in a small group, and record your scores for ten turns each.

turn #	Player 1	Player 2	Player 3
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

2. What strategies seem to work well?

3. What is the best number of dice to use?
  
4. It is likely that different people will have different ideas about the best number of dice to use. Pick a **specific number** of dice to use, and repeat the tossing 10 times so that you can determine the average number of points gained per turn using that number of dice. Have people in the class try different numbers of dice and pool results for those using the same number of dice.

Circle the number of dice used: 2 3 4 5 6 7 8 9 10

turn #	score for turn
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
sum	
average per turn	

5. You can simulate the tossing of the dice by letting the calculator randomly choose the outcomes. For this you use `dice(N)` where N represents the number of dice thrown. To access this command press `[math]`, arrow over to **PRB**, scroll to `[7]` and press `[ENTER]`. Then enter the number that represents the number of dice that you are using. For example, you could simulate tossing 7 dice by entering `dice(7)`. The output will be seven numbers that represent the seven tosses of the dice. If no “ones” appear in the output, your score is the sum of all of the numbers. If any “ones” appear, record a zero for that turn.
  
6. Repeat the simulation ten times using the same number of dice that you used when you actually threw the dice. Use the results to find your average score per turn.

turn #	score for turn
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
sum	
average per turn	

7. Pool your data with others who chose the same number of dice to investigate.  
 # of dice used: \_\_\_\_\_  
 average score per turn: \_\_\_\_\_

8. Do the results look similar to the results from actually tossing the dice?

Why do you think that is so?

9. Pool the data from the whole class to determine the average number of points per turn when various numbers of dice are used.

# of dice used	1	2	3	4	5	6	7	8	9	10
Average pts per turn										

10. Has your idea of an ideal strategy changed because of the information that you gathered by simulating the playing of the game?

11. What seems to be the best strategy?

**Some questions for future teachers:**

12. If you played this game with students, what misconceptions do you think that the students might have?

13. What could you do to make yourself more confident about the best strategy for the game?

14. How could this activity be extended to deepen the students' understanding?