Data Analysis and Numerical Occurrence

Directions

This game is for two players. Each player receives twelve counters to be placed on the game board. The arrangement of the counters is completely up to the player.

The players take turns rolling two dice. On each roll the sum of the two upturned numbers is determined. If the player has a counter or counters in that position, he/she may remove one counter from the game board. Play continues until one-player removers all twelve counters from the board.

The Problem

The players are to use mathematical experimentation and data analysis to find the best arrangement for the counters. This arrangement is found by analyzing the data from each game.

Supplies

1. Paper
2. Four Functions Calculator
3. Pencil
4. Game Board
5. Information Packet

Questions for Day 1 - 5

Part One: Data Analysis of the Experimental Data

1. Compare the Counter Placements from game one through game five.
   A. Did your placement of counters change through out the gaming process?
   B. If so, why did you make the changes? Support your statement with information from your experimental data.

2. Using your experimental data. What did you find to be the best placements of counters in the River Crossing Game? (Note: You must support your statements with information from your experimental data.)

3. Using your conclusion for the best placement of counters, Why do these numbers occur more often?

Part Two: Experimental Percentages Vs Theoretical Percentages

1. Using the River Crossing Game Total Tally Sheet, find the individual experimental percentage for each number.

2. Using the River Crossing Game Total Tally Sheet, find the class experimental percentage for each number.

3. Complete the Area Model for Possible Sums from Two Cubical Dice (theoretical data sheet).

4. Complete the Probability Comparison Chart.

5. Using the Theoretical Data, What is the best placement for counters? Why?

Counter Placement Chart

Game 1 – 5

Write How Many Counters You Place on Each Number.

Number	2	3	4	5	6	7	8	9	10	11	12
Game 1											
Number	2	3	4	5	6	7	8	9	10	11	12
Game 2											
Number	2	3	4	5	6	7	8	9	10	11	12
Game 3											
Number	2	3	4	5	6	7	8	9	10	11	12
Game 4											
Number	2	3	4	5	6	7	8	9	10	11	12
Game 5											
Number	2	3	4	5	6	7	8	9	10	11	12
Totals											

The purpose of this game is to find the best placement of counter by using experimental data. After every game, you need to compare your placement of counters with the Sum of Two Dice Tally Sheet. YOU CAN USE STRATEGY TO INCREASE YOUR CHANCES OF WINNING THE GAME.

Sum of Two Dice Tally Sheet

Game 1 – 5

Put a tally mark under the sum of the numbers every time you roll that sum!

Number	2	3	4	5	6	7	8	9	10	11	12
Game 1											
Total											
Number	2	3	4	5	6	7	8	9	10	11	12
Game 2											
Total											
Number	2	3	4	5	6	7	8	9	10	11	12
Game 3											
Total											
Number	2	3	4	5	6	7	8	9	10	11	12
Game 4											
Total											
Number	2	3	4	5	6	7	8	9	10	11	12
Game 5											
Total											
Number	2	3	4	5	6	7	8	9	10	11	12
Totals											

Sum Totals Distribution Line Plot

This chart is to be used for your personal **Total Rolls** of each number

2	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**

Experimental Probability

Find the Experimental Probability of Rolling each Number

Individual Experimental Data

Number	2	3	4	5	6	7	8	9	10	11	12
Total											
Total Rolls											

Individual Experimental Probability

	Percentage			Percentage
Prob(2)			Prob(8)	
Prob(3)			Prob(9)	
Prob(4)			Prob(10)	
Prob(5)			Prob(11)	
Prob(6)			Prob(12)	
Prob(7)				

Class Experimental Probability

Number	2	3	4	5	6	7	8	9	10	11	12
Total											
Total Rolls											

Class Experimental Probability

	Percentage			Percentage
Prob(2)			Prob(8)	
Prob(3)			Prob(9)	
Prob(4)			Prob(10)	
Prob(5)			Prob(11)	
Prob(6)			Prob(12)	
Prob(7)				

Area Model For Possible Sums From Two Cubical Dice

This chart gives the theoretical probabilities of rolling the number.

Theoretical Probability

2nd Die

1st Die

(+)	1	2	3	4	5	6
1						
2						
3						
4						
5						
6						

Theoretical Probabilities

	Probability	Percent
Prob(2)		
Prob(3)		
Prob(4)		
Prob(5)		
Prob(6)		
Prob(7)		
Prob(8)		
Prob(9)		
Prob(10)		
Prob(11)		
Prob(12)		

Example

Prob(2) = 1/36 =0.02777777=2.7%

Steps

1. Divide 1 by 36 to get a decimal.
2. Multiply the decimal by 100 to get a percent.
3. Cut off the decimal at the tenths place. DO NOT ROUND.

Note

Probability is a Fraction and Percentage is a Decimal

Probability Comparison Chart

Use this chart to compare the Individual Probability and the Class Probability to the Theoretical Probability. Keep in mind that you must keep a clear mind and only respond to the data.

Percentage of Probability Comparison Chart

Probability	Individual	Class	Theoretical
Prob(2)			
Prob(3)			
Prob(4)			
Prob(5)			
Prob(6)			
Prob(7)			
Prob(8)			
Prob(9)			
Prob(10)			
Prob(11)			
Prob(12)			

Discussion Questions

1. Compare the individual probability with the class probability. In what ways are the probabilities similar and in what ways are they different? Do you notice and over all similarity?
2. Compare the individual probability with the theoretical probability. In what ways are the probabilities similar and in what ways are they different? Do you notice and over all similarity?
3. Compare the Class probability with the theoretical probability. In what ways are the probabilities similar and in what ways are they different? Do you notice and over all similarity?
4. Which probability, individual or class, has the greatest similarity to the theoretical probability? Why?

Game Total Tally Sheet

Place the information from your tally sheets on this chart

NUMBER	1	2	3	4	5	6	7	8	9	10	11	12
Game 1												
Game 2												
Game 3												
Game 4												
Game 5												
Total Rolls												

CLASS TOTALS

NUMBER	1	2	3	4	5	6	7	8	9	10	11	12
Group 1												
Group 2												
Group 3												
Group 4												
Group 5												
Group 6												
Group 7												
Group 8												
Group 9												
Group 10												
Group 11												
Group 12												
Group 13												
Group 14												
Class Total												