

Name: _____

Experiments in Probability

----a game of "dice" ---

Part 1 – The Duel.

A. "Friends, Mustangs, Countrymen. Look carefully at your dice and answer the following questions."

1) What color is your dice? _____

2) What are on the faces of your dice? _____

B. "Look carefully at your partner's dice and answer the next questions."

1) What color is it? _____

2) What are the faces on your partner's dice? _____

C. If you and your partner each rolled your own dice, ...

1) who do you expect would get the higher number? _____

Try it.....

2) Were you right? _____ Who won? _____

D. Evaluate your experiment.

1) How confident are you that this method gives you the correct answer?

(circle one) Not very confident Kinda' confident Super-confident

2) How could you improve your method?

E. Use your new method and record your results

F. Make a conclusion.

_____ < _____

Part 2 – The re-Duel

A. "The Blue team are honorable playes and offer the Yellow team a re-match, The Yellow team change their strategy, they trade the yellow dice for a new dice.

- 1) What color is the new dice? _____
- 2) What are on the faces of the new dice? _____

B. Hypothesis

- 1) Who do you think will win now? _____

1) Experiment! Pink vs. Blue

2) Record your results.

3) Make a conclusion.

_____ < _____ < _____

Part 3 – The re-re-Duel

A. "The Pink team are also honorable players and now offer the Blue team a re-match. The Blue team also decides to changes strategy and they give up the blue dice.....however, the yellow dice is the only one left to pick.

B. Experiment! Yellow vs. Pink

C. Record your results.

D. Make a conclusion

Part 4 – Area Models

- A. An area model can tell us the exact probability that either blue or yellow will win. Here's the logic...
- Each row in the model represents one outcome of the blue dice. Notice that there are six rows labeled {2, 2, 2, 5, 5, 5}.
 - For each outcome on the blue dice, there are six possible outcomes of the yellow dice. These are illustrated by the columns in the area model. Notice that six columns are labeled {1, 4, 4, 4, 4, 4}.
 - How many total possible outcomes are there when two dice are rolled?
(How many different combinations of faces from two dice? _____)
- B. Each little square in the area model represents one of the 36 possible outcomes. The letter in each square tells which dice won each outcome. For example:
- The "B" in the first row / first column shows that the blue dice rolled a "2" and the yellow dice rolled a "1". Therefore blue wins.
 - The "Y" in the first row / second column shows that the blue dice rolled a "2" and the yellow dice rolled a "4". Therefore yellow wins.
- C. Complete the area model for the yellow and blue dice

		Yellow					
		1	4	4	4	4	4
Blue	2	B	Y				
	2						
	2						
	5						
	5						
	5						

$$P(\text{"Y"}) = \underline{\hspace{2cm}}$$

$$P(\text{"B"}) = \underline{\hspace{2cm}}$$

Part 5 – More on Area Models

A. Make an area model for the blue and pink dice.

		Blue					
Pink							

$$P(“B”) = \underline{\hspace{2cm}}$$

$$P(“P”) = \underline{\hspace{2cm}}$$

B. How was that?.....easy?....tedious? Let's use some shortcuts for the next one.

- 1) Notice that the results come in blocks, and that the number of boxes in each block can be calculated by finding the area of each block.

C. Complete the area model for the pink and yellow dice using the short-cut

		Yellow					
		1	4	4	4	4	4
Pink	3						
	3						
	3						
	3						
	3						
	6						

$$P(“P”) = \underline{\hspace{2cm}}$$

$$P(“Y”) = \underline{\hspace{2cm}}$$

D. Do your area models confirm the results from your experiments? _____

Part 6 – Playing with two dice

- A. Let's change the rules for a minute, and roll two dice instead of one. The winner will be the player with the biggest sum showing from both dice. We are going to use area models to predict the outcome of the games before playing them.
- B. Drawing the "full" area model requires all the possible combinations of faces for your pair of yellow dice listed in the rows of the model. How many rows would the new area model have? _____
- C. The full model would require all the possible combinations of faces of your partners' pair of pink listed in the columns of the model. How many columns would the new area model have? _____
- D. How many tiny boxes would be in the interior? _____
- E. Let's use the short-cut found in part 5 so we don't have to draw so many rows and columns. We will begin with area models for the sum of two yellow dice to find what would be listed in the rows of the giant area model.

		1 st Yellow Dice					
		1	4	4	4	4	4
2 nd Yellow Dice	1	"2"	"5"				
	4						
	4						
	4						
	4						
	4						

$$P(" 2 ") = 1 / 36$$

$$P(" 5 ") = \quad / 36$$

$$P(" \quad ") = \quad / 36$$

- F. Complete the area model for the outcome of two blue dice to find what will be listed on the columns of the giant area model.

		2 nd Pink Dice					
		3	3	3	3	3	6
1 st Pink Dice	3						
	3						
	3						
	3						
	3						
	6						

$$P(\text{“ ”}) =$$

$$P(\text{“ ”}) =$$

$$P(\text{“ ”}) =$$

Part 7 – Area Models for two dice

		Two Pink Dice		
		6 (25 columns)	9 (10 columns)	12 (1 col)
Two Yellow Dice	2 (1 row)			
	7 (10 rows)			
	10 (25 rows)			

$$P(\text{“ Y ”}) =$$

$$P(\text{“ P ”}) =$$

Part 8 – Wrapping up the Experiment

Complete the area models below to find the predicted results for the remaining games.

		Two Blue Dice
Two Pink Dice		

$P(\text{“ P ”}) =$

$P(\text{“ B ”}) =$

		Two Yellow Dice
Two Blue Dice		

$P(\text{“ B ”}) =$

$P(\text{“ Y ”}) =$

