TOPIC 11

LESSON 11.1b
# Events of Odds?

7.SP.6 7.SP.7b
7.SP.8a 7.SP.8b

Objective: Using Arrays to Organize Outcomes

## Warm-Up

Solve each proportion for the unknown value.

1. $\frac{x}{120} = \frac{1}{12}$

2. $\frac{12}{x} = \frac{1}{48}$

3. $\frac{1}{8} = \frac{x}{200}$

4. $\frac{x}{64} = \frac{1}{4}$

EXPLORE 2

## Theoretical Probability of Sums

Recall the game Joel and Hiram are playing with 2 six-sided number cubes. Now, you will calculate the theoretical probability of each sum.

By playing the game in the experiment, you can see that this game has a non-uniform probability model. However, calculating the theoretical probabilities of each outcome is difficult without knowing them all. One method to determine the probabilities of the outcomes is to make a list of all the possible outcomes.

1. How many different possibilities are there when rolling 2 six-sided number cubes?

When there are a large number of possible outcomes, an array like the one you used before is useful in organizing the outcomes. The entries in the array should be related to the experiment.

2. The array shown has two numbers filled in: 2 and 7.

| | | Number Cube 1 | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 |
| Number Cube 2 | 1 | 2 | | | | | |
| | 2 | | | | | | |
| | 3 | | | | | | |
| | 4 | | | 7 | | | |
| | 5 | | | | | | |
| | 6 | | | | | | |

a. What does the 2 represent in the array?

b. What does the 7 represent in the array?

3. Complete the array.

4. How many different possibilities are in the number array?

5. Does it appear that the list of all the possibilities when rolling 2 number cubes has the same number of possibilities as the number array?

6. Using the array, determine the number of times each sum appears and the theoretical probability, in fraction form, of each sum. Record your answers in the table.

7. Is there an equally likely chance for each outcome to occur from rolling 2 number cubes according to the theoretical probabilities?

8. According to the theoretical probabilities, who should win the game? Explain your reasoning.

| Outcome | Number of Times | Probability |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

9. Did the experimental probability of your experiment in the previous activity match the theoretical probability of the game? If not, why do you think the results of the experimental and theoretical probabilities were different?

10. Calculate the percent error between the experimental and theoretical probabilities of Hiram winning the game.

11. Calculate each probability when rolling 2 number cubes and summing the resulting numbers. Explain your calculations.

a. P(prime number)

b. P(greater than 7)

c. P(1)

12. If the number cubes are tossed 180 times, how many times do you predict the following sums would occur?

a. 1

b. 4

c. 9

d. 10

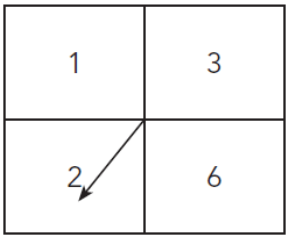
e. 12

f. prime number

13. Kelsey claims that the probability of getting a sum of 4 when rolling two number cubes should be 1 out of 11 since there are 11 possible outcomes. Is Kelsey correct? If not, how could you convince Kelsey that her thinking is incorrect?

EXPLORE 3

# Probabilities of Products




The square spinner shown is spun twice, and the results of the two spins are multiplied together to produce a product that is recorded.

1. Determine all the possibilities for obtaining the products using a list.

2. Copy and complete the array to determine the possible products.

| | | Spin 1 | | | |
|---|---|---|---|---|---|
| | | | | | |
| Spin 2 | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

3. List the sample space.

4. Are all outcomes equally likely? Explain your calculations.

5. Calculate the probability of each product. Record your answers in the table.

| Outcome | Probability |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

6. Did you calculate the experimental or theoretical probability? Explain how you know.

7. Calculate each probability shown for the experiment with the square spinner.

a. P(even product)

b. P(odd product)

c. P(spin results in a multiple of 3)

d. P(perfect square)

e. P(less than 50)

8. If this experiment is conducted 200 times, how many times do you predict you would get each product?

a. 2

b. 3

c. 6

d. 36

e. an even product

f. an odd product

Name: _____ Date: _____ Class: _____

Homework HW

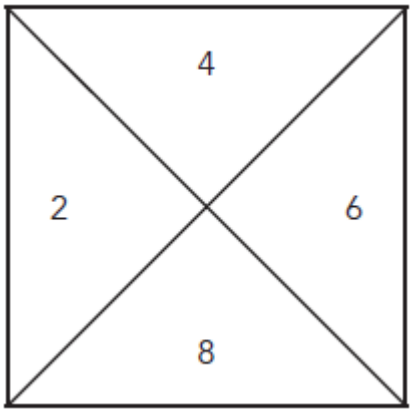
## LESSON 11.1b
# Events of Odds?

Objective

**Using Arrays to Organize Outcomes**

Practice

1. Brett received a dart board for his birthday. The rule book says that two darts are to be thrown and that an individual's score is the sum of the two numbers.




a. Complete an array to determine all the possibilities for obtaining the sums.

b. List the sample space for the sum of the numbers.

c. Are all outcomes equally likely? Explain your reasoning.

d. How many possibilities are in the array?

e. Use the array to help create a probability model listing the theoretical probabilities for each sum.

f. Calculate each probability of an even sum, a sum greater than 8, and an odd sum.

g. If two darts are thrown 80 times, how many times do you predict each of the following sums would occur? 8? 10? 14?