PROBABILITY POSSIBLE OUTCOMES
(likelihood) (coins, counters, #cubes, spinners)
Standard: 3.D.4.2

Predict the outcomes of simple experiments (e.g., coin tossing) and test the predictions using concrete objects (e.g., coins, counters, number cubes, spinners).

Concept Skill: Probability

A probability is the chance of an event occurring.

Probability of an Outcome

The probability of an outcome for a particular event is a number telling us how likely a particular outcome is to occur. This number is the ratio of the number of ways the outcome may occur to the number of total possible outcomes for the event. Probability is usually expressed as a fraction or decimal. Since the number of ways a certain outcome may occur is always smaller or equal to the total number of outcomes, the probability of an event is some number from 0 through 1.

Example:

Suppose there are 10 balls in a bucket numbered as follows: 1, 1, 2, 3, 4, 4, 4, 5, 6, and 6. A single ball is randomly chosen from the bucket. What is the probability of drawing a ball numbered 1? There are 2 ways to draw a 1, since there are two balls numbered 1. The total possible number of outcomes is 10, since there are 10 balls.

The probability of drawing a 1 is the ratio $2/10 = 1/5$. 
Suppose the letter cards below are face down and mixed up. Write the probability of picking the letter “E”.

Step 1: Find the number of total outcomes.
(There are a total of 9 letters in New Mexico). (The total is 9 possible outcomes).

Step 2: Find the number of “E’s” in the word.
(There are 2 letter “E’s” in the word New Mexico).

Step 3: What is the probability?
(The probability is there are 2 “E’s” out of 9 letters. The probability is 2 out of 9, or 2/9.)
Example 2:

Look at the spinner cut into 4 equal parts?

What is the probability of spinning a color green?

Step 1: What is the total number of outcomes?
(There are 4 different colors cut into equal parts).

Step 2: How many parts are shaded in green?
(There is in section shaded green).

Step 3: What is the probability?
(Since there is only one green section and 4 total parts, the possible outcome or probability is 1 out of 4 or $\frac{1}{4}$.)
Danny has a deck of cards with the following letters. If he were to put the cards in a bag and pull one out what is the ratio that he will pull out an “S”?

MISSISSIPPI

A. 4 out of 11
B. 4 out of 7
C. 7 out of 11
D. 2 out of 9

What is the ratio of Danny pulling out a consonant? Explain how you got your answer.
Jordan has a bag of marbles. He has 7 marbles that have stripes, 5 that are blue, 9 of them are clear and 3 are green.

What is the ratio of Jordan picking clear marbles from his bag?

A. 3 out of 9  
B. 9 out of 15  
C. 3 out of 24  
D. 9 out of 24

What is the ratio of pulling any marble but a striped one? Explain how you got your answer.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
What is the ratio of the spinner landing on red?

A. five out of five  
B. four out of five  
C. one out of four  
D. one out of five

If Chris were to spin the spinner 2 times, what is the ratio that it will land on blue?

________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
Danny has a deck of cards with the following letters. If he were to put the cards in a bag and pull one out what is the ratio that he will pull out an “S”?

MISSISSIPPI

* A. 4 out of 11
B. 4 out of 7
C. 7 out of 11
D. 2 out of 9

What is the ratio of Danny pulling out a consonant? Explain how you got your answer.

7 out of 11, Danny would first count all the cards to see how many there are all together. Then he would count how many of his cards are consonants.
Jordan has a bag of marbles. He has 7 marbles that have stripes, 5 that are blue, 9 of them are clear and 3 are green.

What is the ratio of Jordan picking clear marbles from his bag?

A. 3 out of 9  
B. 9 out of 15  
C. 3 out of 24  

*D. 9 out of 24

What is the ratio of pulling any marble but a striped one? Explain how you got your answer.

17 out of 24, first Jordan would count the total number of marbles in his bag all together, then he would count all the marbles except for the ones with stripes.
What is the ratio of the spinner landing on red?

A. five out of five  
B. four out of five  
C. one out of four

* D. one out of five

If Chris were to spin the spinner 2 times, what is the ratio that it will land on blue?

4 out of 10, there are 5 chances on the spinner for each time he spins it. If he spins it 2 times then there would be 10 chances total. There are 2 chances to land on blue each time it is spun, so $2 + 2 = 4$