Warm Up

1. A dog catches 8 out of 14 flying disks thrown. What is the experimental probability that it will catch the next one?

$\frac{4}{7}$

2. If Ted popped 8 balloons out of 12 tries, what is the experimental probability that he will pop the next balloon?

$\frac{2}{3}$

11-3 Make a List to Find Sample Spaces

Intro Video

Essential ?

How can you describe the likelihood of an event?

Standard

MCC7.SP.6

Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.

Vocabulary

sample space

Fundamental Counting Principle

11-3 Make a List to Find Sample Spaces

Because you can roll the numbers 1, 2, 3, 4, 5, and 6 on a number cube, there are 6 possible outcomes. Together, all the possible outcomes of an experiment make up the sample space.

You can make an organized list to show all possi outcomes of an experiment.

Additional Example 1: Problem Solving Application

One bag has a red tile, a blue tile, and a green tile. A second bag has a red tile and a blue tile. Vincent draws one tile from each bag. What are all the possible outcomes? How large is the sample space?

Additional Example 1 Continued

1 **Understand the Problem**

Rewrite the question as a statement.

- **Find all the possible outcomes of drawing one tile from each bag, and determine the size of the sample space.**

List the important information:

- **There are two bags.**
- **One bag has a red tile, a blue tile, and a green tile.**
- **The other bag has a red tile and a blue til**

Additional Example 1 Continued

2 Make a Plan

You can make an organized list to show all possible outcomes.

Additional Example 1 Continued

3 Solve

Bag 1	Bag 2
R	R
R	B
B	R
B	B
G	R
G	B

Let R = red tile, B = blue tile, and G = green tile.

Record each possible outcon

The possible outcomes are RR, RB, BR, BB, GR, and GB. There are six possible outcomes in the sample space.

Additional Example 1 Continued

Look Back

Each possible outcome that is recorded in the list is different.

11-3 Make a List to Find Sample Spaces

Warm Up:

Darren has two bags of marbles. One has a green marble and a red marble. The second bag has a blue and a red marble. Darren draws one marble from each bag. What are all the possible outcomes? How large is the sample space?

Hint: you can create a tree diagram (like yesterday)

Check It Out: Example 1 Continued

1 **Understand the Problem**

Rewrite the question as a statement.

- **Find all the possible outcomes of drawing on marble from each bag, and determine the si of the sample space.**

List the important information.

- **There are two bags.**
- **One bag has a green marble and a red marble.**
- **The other bag has a blue and a red marble.**

Check It Out: Example 1 Continued

2 **Make a Plan**

You can make an organized list to show all possible outcomes.

Check It Out: Example 1 Continued

3 Solve

Bag 1	Bag 2
G	B
G	R
R	B
R	R

Let R = red marble,
B = blue marble, and
G = green marble.

Record each possible outcome.

The four possible outcomes are GB, GR, RB, and RR. There are four possible outcomes in the sample space.

Check It Out: Example 1 Continued

Look Back

Each possible outcome that is recorded in the list is different.

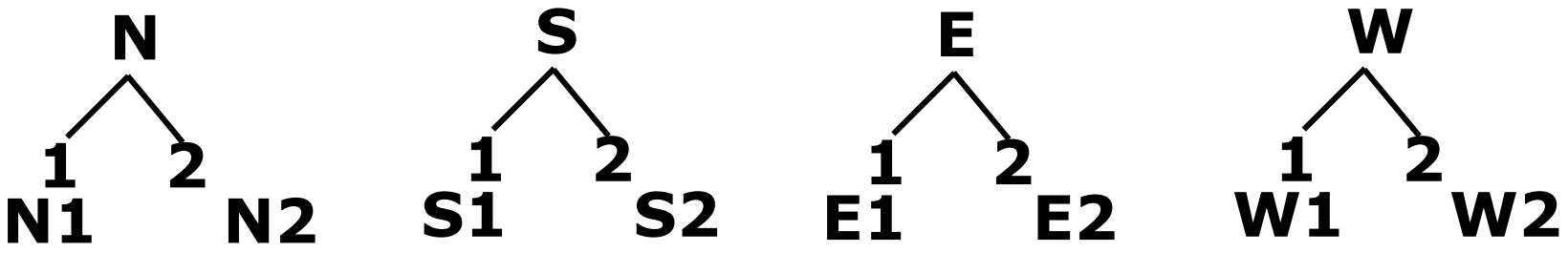
Additional Example 2: Using a Tree Diagram to Find a Sample Space

There are 4 cards and 2 tiles in a board game. The cards are labeled N, S, E, and W. The tiles are numbered 1 and 2. A player randomly selects one card and one tile. What are all the possible outcomes? How many outcomes are in the sample space?

Make a tree diagram to show the sample space.

Additional Example 2 Continued

List each letter of the cards. Then list each numbe
of the tiles.



There are eight possible outcomes in the sample sp

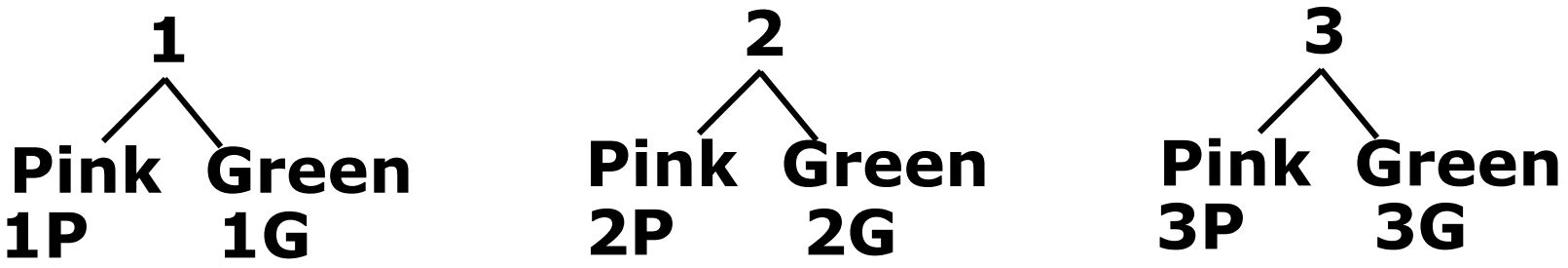
Check It Out: Example 2

There are 2 marbles and 3 cubes in a board game. The marbles are pink and green. The cubes are numbered 1, 2, and 3. A player randomly selects one marble and one cube. What are all the possible outcomes? How outcomes are in the sample space?

Make a tree diagram to show the sample space.

Check It Out: Example 2 Continued

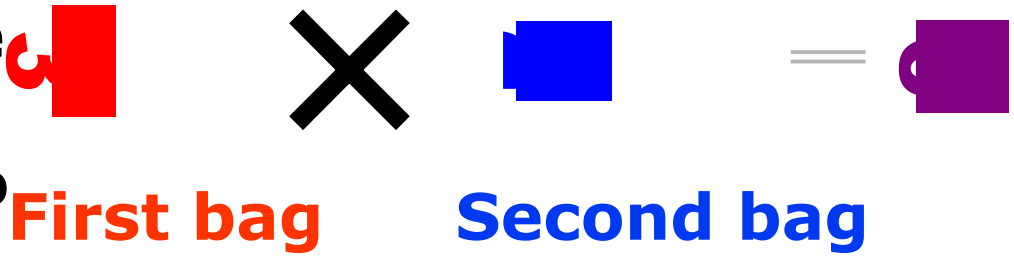
List each number of the cubes. Then list each colo
of the marbles.



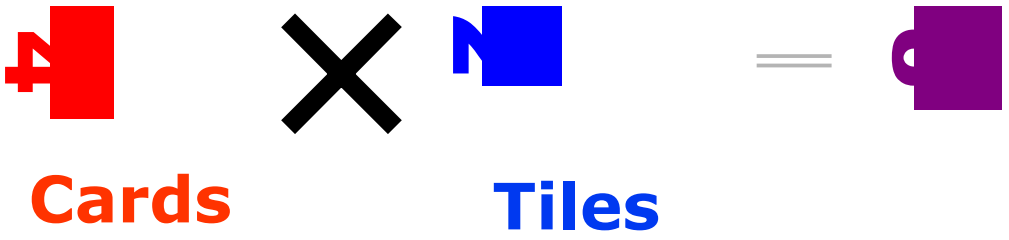
There are six possible outcomes in the sample spa

11-3 Make a List to Find Sample Spaces

In Additional Example 1, there are three outcomes for the first bag and two outcomes for the second bag.



In Additional Example 2, there are four outcomes for the cards and two outcomes for the tiles.



11-3 Make a List to Find Sample Spaces

The Fundamental Counting Principle states that you can find the total number of outcomes for two or more experiments by multiplying the number of outcomes for each separate experiment.

Additional Example 3: *Application*

Carrie rolls two 1–6 number cubes. How many outcomes are possible?

List the number of outcomes for each separate experiment.

The first number cube has 6 outcomes.

The second number cube has 6 outcomes

$6 \cdot 6 = 36$ ***Use the Fundamental Counting Princi***

There are 36 possible outcomes when Carrie rolls two 1–6 number cubes.

Check It Out: Example 3

Sammy picks three 1-5 number cubes from a bag. After she picks a number cube, she puts in back in the bag. How many outcomes are possible ?

List the number of outcomes for each separate experiment.

Number of ways the first cube can be picked: 5

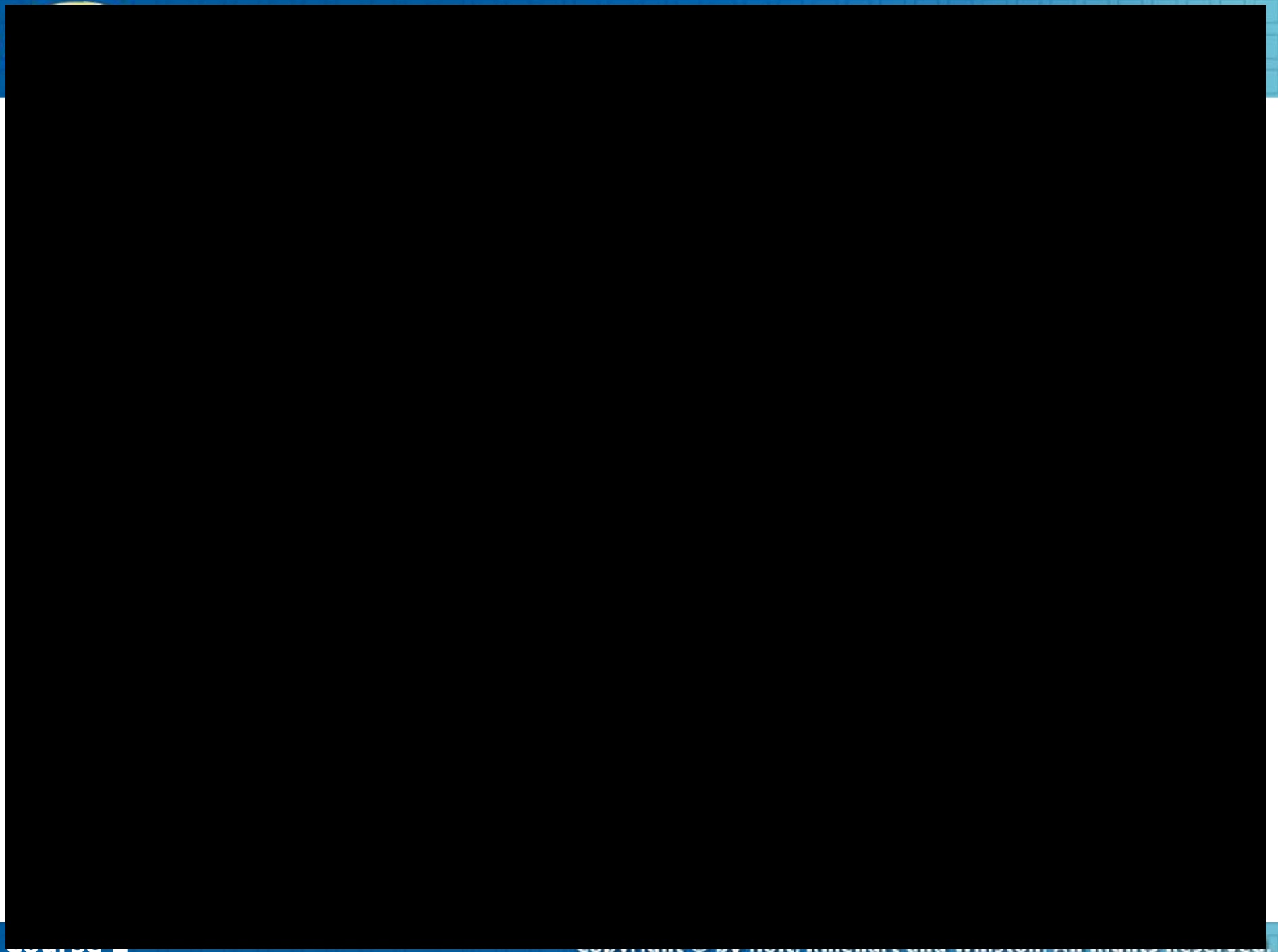
Number of ways the second cube can be picked: 5

Number of ways the third cube can be picked: 5

$5 \cdot 5 \cdot 5 = 125$

Use the Fundamental Counting Principle.

There are 125 possible outcomes when Sammy rolls 3 1-5 number cubes.



Lesson Quiz

What are all the possible outcomes? How many outcomes are in the sample space?

1. a three question true-false test

8 possible outcomes: TTT, TTF, TFT, TFF, FTT, FTF, FFT, FFF

2. tossing four coins

16 possible outcomes: HHHH, HHHT, HHTH, HTHH, THHH, HHTT, HTHT, HTTH, THHT, THTH, TTHH, HTTT, THTT, TTHT, TTTH, TTTT

3. choosing a pair of co-captains from the following athletes: Anna, Ben, Carol, Dan, Ed, Fran

15 possible outcomes: AB, AC, AD, AE, AF, BC, BD, BE, BF, CD, CE, CF, DE, DF, EF