



SMALL GROUP COLLABORATION (SGC)

INDEPENDENTLY, READ THIS PAGE WHILE YOU'RE WAITING FOR YOUR GROUP.

INTRODUCTION

SKILL 166

PRACTICE STANDARD: Look for structure

SKILL OVERVIEW

This skill is about listing possible outcomes for compound events.

LEARNING GOAL

Your goal is to show all of the possible outcomes and decide which total is most commonly rolled.

WHY IS THIS LEARNING GOAL IMPORTANT?

This learning goal is important because compound events frequently occur in real-life. Knowing how to identify all possible outcomes will allow you to make more informed decisions.



MATERIALS: 6-, 8- AND 10-SIDED DICE

DO NOW: PRACTICE QUESTION

JENNIFER has each letter from her name on an individual piece of paper in a bag. If she choose one letter at random, what is the probability she will choose an N?

VOCAB

What mathematical vocabulary is important for this activity?

Simple Event

A simple event is a single thing that can happen that can have a probability assigned to it. Some examples are flipping a coin and getting tails, rolling a 5 with a 6-sided die, choosing your favorite candy from a bag, or your favorite player getting a hit in a baseball game.

Compound Event

A combination of two or more simple events.

Outcome

One of the possible events in a probability experiment (for example, when tossing a fair coin there are two possible outcomes, heads or tails).

QUICK CHECK: Is everyone ready to go? – turn the page and get started!



What are the Chances?

INDEPENDENTLY, READ THE INFORMATION BELOW OR ONE PERSON CAN READ ALOUD.

INFORMATION

When you roll one six-sided die, there are six possible outcomes: 1, 2, 3, 4, 5, 6. If you are rolling two six-sided dice, you could get 1 through 6 on each of them. For example, you might get a 3 on one die and a 5 on one die for a total of 8.

The possible outcomes are shown in the **TABLE** below the vertical 1-6 represent the first roll, and the horizontal represent the second.

	1	2	3	4	5	6
1	11	12	13	14	15	16
2	21	22	23	24	25	26
3	31	32	33	34	35	36
4	41	42	43	44	45	46
5	51	52	53	54	55	56
6	61	62	63	64	65	66

There are **36** possible outcomes when rolling two six-sided dice.

Although typically we roll 6-sided die, there are all sorts of different sided dice.

You can look at the 8- and 10- sided dice your teacher provided, or use the pictures to imagine what it would be like to roll them.



8-sided



10-sided



<5 min



REMEMBER

Use a graphic organizer to show all of the possible outcomes: a tree diagram, an organized list, or an area model.



WHOLE GROUP

TALK ABOUT IT: What are the lowest and highest totals you could roll with a pair of six-sided dice?

QUICK CHECK: I have read the information on this page with my group.



Modeling Outcomes

INDEPENDENTLY, READ THE INFORMATION BELOW OR ONE PERSON CAN READ ALOUD.

CHALLENGE GOAL

GROUP CHALLENGE GOAL

Identify patterns in the outcomes when two different dice are rolled:

- two 8-sided dice, and
- two 10- sided dice.

What totals are most likely to be rolled in each situation?

IN YOUR OWN WORDS: What will you be **comparing and contrasting** at the end of this activity?



SMALL TEAM

SMALL TEAM BREAK-OUT: Break into two **smaller thinking teams** to complete this activity. The whole group will reconvene for page six.

Who will be on the team thinking about **two 8-sided dice**?
Write their names below.

Who will be on the team thinking about **two 10-sided dice**?
Write their names below.



<5 min

QUICK CHECK

I understand what I need to do for the challenge!



REMEMBER

For the work on pages 4 & 5, you'll be in small teams.

VOCAB

Reconvene
get together again

QUICK CHECK: We've divided up into small thinking teams.



SMALL TEAM

Modeling Outcomes

SOLVE THIS PART WITH YOUR SMALL TEAM OR INDEPENDENTLY.

PART A: SMALL TEAM

Use a graphic organizer to show all the possible outcomes for rolling the two dice. There's an example of how to use a table on page 2, but you may use another, like a tree diagram or an organized list, if you want.

What is the total between both dice for each outcome?



10 min



HINT

Think: if I roll 1 on the first die, then I could roll 1, 2, 3, etc. on the second. Find the totals.

HINT

If you roll 2 on the first die, and 4 on the second die, that is a **DIFFERENT** outcome than rolling 4 and then 2, even though you get the same total.

HINT

If you don't have actual dice, use the pictures on page 2.

QUICK CHECK: We developed a system to make sure no outcomes were missed.



SMALL TEAM

Modeling Outcomes

SOLVE THIS PART WITH YOUR SMALL TEAM OR INDEPENDENTLY.

PART B: SMALL TEAM



10 min

What is the total that occurs most often? Is there more than one total which shows up the most times? Explain.



SMALL TEAM

TALK ABOUT IT: Each person should be prepared to share something with the whole group.

One thing I plan to say is _____

One question I might want to ask another team about their work is:

- QUICK CHECK: Our small team is ready to share with the whole group.
- Other teams are ready to reconvene



Discuss and Decide

AS A WHOLE GROUP, DISCUSS AND ANSWER THE CHALLENGE GOAL QUESTION.

PART C: WHOLE GROUP

SHARE-OUT PROCEDURE



10 min

- **30 seconds:** One person talks – everyone else respectfully listens.
Does anyone have questions about what they just heard?
30 more seconds to answer questions if needed.
- **Repeat** until everyone has shared.
- **5 minutes:** Anyone can ask questions or speak about the topic.
Discuss & answer the Group Challenge question below.

CHALLENGE GOAL: Compare and Contrast

What is the total that comes up most often in each situation?

Type of dice	Two 6-sided dice	Two 8-sided dice	Two 10-sided dice
Most common total(s)			

What patterns do you see in these numbers? _____

Using the pattern, decide as a group what you predict the most common total(s) would be for two 12-sided dice. Justify your prediction. _____

- QUICK CHECK: *Everyone* in the group had a chance to speak.
- Everyone* in the group helped complete the Group Challenge.



Reflection

INDEPENDENTLY, COMPLETE THE REFLECTION

REFLECTION

Lucy is rolling a 6-sided die and flipping a coin. How many possible outcomes are there for her situation?

CIRCLE ONE: **6** **8** **12**

Show how you made your choice: _____

How did the teams in your group analyze the data from the different data sets?

CIRCLE ONE: **Area Model** **Organized List** **Tree Diagram**

Explain how you did it: _____

MATH PRACTICE STANDARD: LOOK FOR AND MAKE USE OF STRUCTURE.

Brendan says that he doesn't need a graphic organizer like a tree diagram, area model, or organized list, he found a shortcut that will give you the number of possible outcomes of any situation. Do you see his pattern? If you don't, look for it and explain what you see! _____



5 min

SKILL CHECK

On a scale of 1-5, how well do you understand finding volume and surface area of prisms?

1 = low
5 = high

QUICK CHECK: I've answered these questions thoughtfully.



Ending Problem

INDEPENDENTLY, SOLVE THE PROBLEM

ENDING PROBLEM

A restaurant offers the following options:

Main dishes	Fried Chicken, Broiled Steak, Baked Salmon, Grilled Vegetables
Side dishes	Mac and Cheese, Rice, Salad, Broccoli, Pasta

How many different combinations can you make?

- a) 9
- b) 40
- c) 24
- d) 20

Show all your work below or explain how you know your answer is correct.



<5 min



HINT

This question is similar to the types of questions you'll see on your skill assessment.

REFERENCES:

Picture references: First graphic from Microsoft Word Clip Art, http://commons.wikimedia.org/wiki/File:Dice_rpg.png, http://commons.wikimedia.org/wiki/File:Ten_sided_dice.png

QUICK CHECK: I've cleaned up my working space and put all materials away.