



## CEMC at Home

Grade 7/8 - Monday, March 30, 2020

### Sum the Dice

#### You Will Need:

- At least two players
- Two dice
- Paper and a pencil for keeping score



#### How to Play:

1. Players alternate turns rolling the two dice at once.
2. On your turn, you start by rolling the dice once. Here is how the score for this turn is decided:
  - If you rolled a 1 on either die, then your turn is over and you score 0 on this turn.
  - If you did not roll a 1 on either die, then you add up the two numbers rolled and record this number.
  - You now decide if you would like to roll again, or take the this recorded number as your final score for this turn.
  - If you decide to roll again, then you keep adding the sum of the two dice on each roll to your running total, until you either decide to stop or you roll a 1 on either die.
  - If you decide to stop on your own, then you take the total you have accumulated as your score for this turn, but if you roll a 1 at any time, then your turn is over and you score a 0 on this turn.
3. The first player whose total score (on all of their turns) reaches 100 wins the game!

**Play the game a number of times.** Can you come up with a good strategy for this game?

**Follow-up Questions** (*You can use the aids on the next page to help you answer these questions.*)

1. Let's say you decide in advance that you will stop after one roll no matter what you see on the dice. In this case, there are 10 different possible scores that you could achieve on this turn. We will call these scores the *possible outcomes*. Fill in the boxes below with the possible outcomes.

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2. Explain why the 10 possible outcomes in 1. are not all *equally likely* to occur.
3. Write the outcomes in 1. in order from *most likely* to *least likely* to occur. Explain your thinking.

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**most likely** —————→ **least likely**

4. Does this exploration lead you to believe that you should change your strategy for this game?

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#### More Info:

Check out the CEMC at Home webpage on Tuesday, March 31 for a solution to Sum the Dice.



**Aids for the follow-up questions:**

Each cell in the table below represents a possible result when two dice are rolled. Notice that the row and column with a 1 have already been filled in. This is because if you roll a 1 on either die, then your score for the turn is zero.

Fill in the rest of the table with the score for each possible roll and then use it to answer the follow-up questions.

		Die #1 Roll					
		1	2	3	4	5	6
Die #2 Roll	1	0	0	0	0	0	0
	2	0					
	3	0					
	4	0					
	5	0					
	6	0					

An *outcome* is the result of a probability experiment, such as rolling a die.  
Outcomes are considered *equally likely* if they have the same chance of happening.

If you want more practice exploring outcomes in a game or an experiment, then check out [this lesson](#) in the CEMC Courseware.