



Topic C:

Using Probability to Make Decisions

S-MD.B.5, S-MD.B.6, S-MD.B.7

Focus Standards:	S-MD.B.5	(+) Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values. <ol style="list-style-type: none"> Find the expected payoff for a game of chance. <i>For example, find the expected winnings from a state lottery ticket or a game at a fast-food restaurant.</i> Evaluate and compare strategies on the basis of expected values. <i>For example, compare a high-deductible versus a low-deductible automobile insurance policy using various, but reasonable, chances of having a minor or a major accident.</i>
	S-MD.B.6	(+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).
	S-MD.B.7	(+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).
Instructional Days:	7	
Lessons 13–14:	Games of Chance and Expected Value (P,P) ¹	
Lesson 15:	Using Expected Values to Compare Strategies (P)	
Lesson 16:	Making Fair Decisions (E)	
Lesson 17:	Fair Games (P)	
Lessons 18–19:	Analyzing Decisions and Strategies Using Probability (P,P)	

Topic C is a capstone topic for this module, where students use what they have learned about probability and expected value to analyze strategies and make decisions in a variety of contexts. They begin by analyzing simple games of chance and relate this to their work in previous lessons on expected value by calculating expected payoff (**S-MD.B.5**).

Students explore the notion of “fairness,” both in the context of fair games and in the context of fair decisions (**S-MD.B.6**). In Lesson 16, students are given a scenario in which three basketball players must choose a fair way to determine which of the players keeps a new pair of shoes. Students are presented with three options

¹ Lesson Structure Key: **P**-Problem Set Lesson, **M**-Modeling Cycle Lesson, **E**-Exploration Lesson, **S**-Socratic Lesson

for making the decision. They compare and contrast the methods and come to the conclusion that a decision is fair when one outcome is not favored over another. In Lesson 17, the notion of a fair game is developed as students explore the meaning in the context of a game in which a fee is paid to play. Students come to the conclusion that a game is fair if the fee paid to play is equal to the expected winnings.

In the final lessons of this topic, students are asked to use what they have learned about probability and expected value to make decisions in a variety of contexts (**S-MD.B.7**). Contexts include games of chance, medical testing, life insurance, and product testing. This provides students with a culminating experience that allows them to demonstrate their understanding of probability.