



NAME

Mastering Probability through Games

DESCRIPTION

The theory of probability was developed in the 17th century, primarily to answer questions posed by gamblers. Mathematicians of the time saw that strategies can be developed to optimize the chances of success, even in situations involving luck. Today, probability is used in a variety of applications, ranging from scientific research to making practical business decisions.

In this seminar, students will explore the world of probability by experiencing it first hand by playing games of chance and skill. Eventually, students will use the knowledge gained through these experiences to create their own game of chance!

DRIVING QUESTION

How can we, as mathematicians, use the concepts of probability to create and analyze fair and unfair games?

FINAL PROJECT OPTIONS *(Students can submit their own final project proposal.)*

Students create a game of chance that incorporates complex probability concepts (combining events, multiple ways to win, multiple trials, etc.) and creates a fair version of the game as well as an unfair version of the game. Create a written report that includes:

- A description of the game’s procedures
- How to win
- How to lose
- Whether or not there is a cost associate with playing

Students create a written report that analyzes two different, preexisting games of chance (e.g. the lottery) that includes the following information:

- A description of both game’s procedures
- How to win and lose at both games
- Explanation of whether or not the games are 100% chance or if there is some skill involved (choice on the part of participants)
- Expected value of all players in the game
- Cost to play

<ul style="list-style-type: none"> • The expected value of all players in the game • Calculated probabilities for all players in the game as well as explanations for how these probabilities were calculated <p>Student will then present the game as well as an outline of the written report detailed above</p>	<ul style="list-style-type: none"> • Calculated probabilities for all players in the game as well as explanations for how these probabilities were calculated • A recommendation on which game to play under certain circumstances, including whether one game always has better odds than another or if that is dependent on certain events <p>Students will then present the comparison of the two games in the written report as a general outline.</p>
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ACADEMIC MASTERY CREDIT PATHWAYS

Discrete Math, Statistics and Probability, Formal Written Expression, Future Readiness: Reflection and Refinement Mastery Credit

MILESTONES *(Subject to change, see myLC for assigned tasks in real time.)*

Week	Milestone
1	Students choose their final product
2	Pick a basic game of chance from class and write a report similar to the final product
3	Rough draft of game is complete
4	Students give and receive feedback on their games, revise their rough drafts
5	Final Draft of Game is complete
6	Final Product Written Report Completed
7	Presentation of Final Product to an audience