



THE MATHEMATICS OF GAMES
Grand Haven High School
Mathematics Department



Instructor

Mr. Williams

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Course Description

Welcome to The Math of Games! In this course, students will utilize skills and concepts mastered in Algebra, Geometry, and Algebra 2 to investigate games and game theory. Students will engage in classroom investigations, hands-on activities, and written responses to the mathematics behind games. The class also involves a project-based component in which students will research, modify, and design games.

Course Objectives

- Discover Math Concepts within a different context.
- Use Game Theory involving Strategy, Algebra, Probability, Sports, Geometry, and Discrete Mathematics
- Use Project Based Learning to enhance Learning TARGETS

Student Expectations

Successful completion of Math of Games requires consistent attendance, active participation in class, work completion, and responsibly checking Google Classroom for missed assignments, and best effort on quizzes and projects. A positive attitude and good work ethic will bring positive results. All students and staff are expected to do their best in class daily. Respect for yourself, others, and the environment around you will also be expected from everyone in the classroom.

Communication

Students are expected to regularly monitor their progress through the StudentVue and Google Classroom. Parents and students are encouraged to contact teachers through email or phone with any questions or concerns. The Math Lab is available for additional help.

Grading Policy

- Homework/Classwork/Participation 35%
- Quizzes/Projects/Presentations 65%
- Unexcused absences will result in a 0% for assignments missed on those days.
- Excused Absences have 2 days to make up missed assignments

Building Behavioral Expectations

TEAM GH ... One Team, One Family, One Grand Haven. Be Kind. Always.

It is our expectation that ALL GHHS students, staff and parents will ... always give their best **EFFORT** in everything that they do, work hard to be **INCLUSIVE** of each other, show **RESPONSIBILITY** in class, the hallways, cafeteria and at events, and **WORK TOGETHER** at all times!

GO BUCS

Course Outline – Subject to Change

Unit 1: Algebra Applications:

Battleship
Polar Battle Ship
Sink the Battle Ship
Sum of 15 Game
Tower of Hanoi
Geometric Series in Historical Context
River Crossing Game
Coded Messages
Horse Racing

Unit 2: Geometry Applications:

Bridge and Pixel Problem
Euler's Problem (Networks, Konigsberg Bridges)
Face It - The Game of Vanishing Faces
Matchstick Manipulations
Round Robin Tournaments
Tree Game (topology)
Billiards/Putt-Putt

Unit 3: Logic Applications

Sudoku
Ken-Ken
Logic Puzzles
Kakuro
Mastermind

Unit 4 Group Project

1. Requirements for design and manufacture of project
2. Oral presentations of projects

Unit 5: Probability Applications

Blackjack
Keno
Sports Gambling
Craps
Roulette
Lotteries
Coin Tossing
Coin Triplets
In-Between
March Madness
Scrabble
Deal or No Deal
Coin Triplets
Backgammon

Unit 6: Strategy Games

Creating a Checkerboard Pattern
Hex
Intersection
Lines Through Dots
Magic Squares
Mastermind
TacTix
Othello
Mancala
Abalone
Nim
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Unit 7: Random Stuff

1. Montey Hall Problem
2. Discrete Applications
3. Math in the Movies

Unit 8: Final Project

- 1: Requirements for research of project
- 2: Oral and written presentations of projects