Marietta City Schools

2025–2026 District Unit Planner

Advanced Mathematical Decision Making (AMDM)

Unit title	Unit 2: Using Probability to Make Decisions	**Unit duration (hours)**	*18.75 hours*

Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit): ***What will students learn?***

GA DoE Standards

Standards

AMDM.PR.5 Analyze the chances for success or failure in order to make decisions.
AMDM.PR.5.1 Determine conditional probabilities and probabilities of compound events to make decisions in problem situations.
AMDM.PR.5.2 Use probabilities to make and justify decisions about risks in everyday life.
AMDM.PR.6 Model strategic interaction among rational decision-makers.
AMDM.PR.6.1 Calculate expected value to analyze mathematical fairness, payoff, and risk.
AMDM.PR.6.2 Analyze real-life situations involving strategic interactions using the mathematics of zero-sum games.
AMDM.PR.6.3 Construct a mathematical model of probabilistic situations to make mathematical assumptions.
AMDM.MM.1 Apply mathematics to real-life situations; model real-life phenomena using mathematics.
AMDM.MM.1.1 Explain contextual, mathematical problems using a mathematical model.
AMDM.MM.1.2 Create mathematical models to explain phenomena that exist in the natural sciences, social sciences, liberal arts, fine and performing arts, and/or humanities contexts.
AMDM.MM.1.3 Using abstract and quantitative reasoning, make decisions about information and data from a contextual situation.
AMDM.MM.1.4 Use various mathematical representations and structures with this information to represent and solve real-life problems.

Concepts/Skills to support mastery of standards

- Determining probability
- Everyday decisions based on probability
- Expected value
- Zero-sum games
- Modeling

Vocabulary

binomial probability	chance	combinations	compound event	conditional probability	decimal
dependent event	equally likely	event	expected value	experimental probability	fair game
fraction	Fundamental Counting Principle	independent event	inventory cost	lottery	odds
outcome	Pascal's Triangle	payoff	percentage	probability	projected profit
risk	sample space	simulation	success	theoretical probability	triangular array
triangular array	Venn diagram	weighted average	weighted event	zero-sum	

Notation

$P(E) = \frac{Favorable\ outcomes}{Total\ outcomes}$

$EV = (\#)(probability) + (\#)(probability) + \ldots$

Essential Questions

- What are the steps to calculate probability?
- What is the difference between theoretical and experimental probability?
- How is the expected value calculated?
- When are Venn diagrams used to solve problems?
- How are probability and expected value used to determine risk?

Assessment Tasks

List of common formative and summative assessments.

Formative Assessment(s):

- Unit Quiz (CFA) - probabilities using tree diagrams, Venn diagrams, and area models

Summative Assessment(s):

- Unit 2 Test - all topics from this unit
- Carnival Project

Learning Experiences

Add additional rows below as needed.

Objective or Content	Learning Experiences	Personalized Learning and Differentiation
AMDM.PR.5 Analyze the chances for success or failure in order to make decisions. ● AMDM.PR.5.1 Determine conditional probabilities and probabilities of compound events to make decisions in problem situations. ● AMDM.PR.5.2 Use probabilities to make and justify decisions about risks in everyday life. **AMDM.PR.6 Model strategic interaction among rational decision-makers.** ● AMDM.PR.6.1 Calculate expected value to analyze mathematical fairness, payoff, and risk. ● AMDM.PR.6.2 Analyze real-life situations involving strategic interactions using the mathematics of zero-sum games. ● AMDM.PR.6.3 Construct a mathematical model of probabilistic situations to make mathematical assumptions.	**Is This Game Fair? (Explore, Apply, and Test and Reflect)** In this learning plan, students will build on prior knowledge of probability to determine if there is a chance to win at a carnival game. **Learning Goals:** 1. I can calculate the probability of winning certain prizes from the "Pick Up Ducks" game. 2. I can analyze if the prize payoff is worth the amount spent to play the game.	Students will be able to work at their own pace in collaborative groups where additional scaffolding is available.
AMDM.PR.5 Analyze the chances for success or failure in order to make decisions. ● AMDM.PR.5.1 Determine conditional probabilities and probabilities of compound events to make decisions in problem situations. ● AMDM.PR.5.2 Use probabilities to make and justify	**Pascal's Triangle and Carnival Games (Diagnostic Assessment, Engage, and Explore)** In this learning plan, students will understand how to apply Pascal's Triangle to calculate the probability of hitting a target and also estimate the expenses associated with supplying the	Students will be able to work at their own pace in collaborative groups where additional scaffolding is available.

decisions about risks in everyday life. **AMDM.PR.6 Model strategic interaction among rational decision-makers.** ● AMDM.PR.6.1 Calculate expected value to analyze mathematical fairness, payoff, and risk. ● AMDM.PR.6.2 Analyze real-life situations involving strategic interactions using the mathematics of zero-sum games. ● AMDM.PR.6.3 Construct a mathematical model of probabilistic situations to make mathematical assumptions.	game with prizes. **Learning Goals:** 1. I can determine the probability of a binomial event using Pascal's Triangle. 2. I can transform any row of the triangle into the correct probabilities appropriate for a stated binomial event. 3. I can apply the probabilities calculated from Pascal's Triangle to make business decisions and gauge other real-world events.	
Content Resources		