

# PFL Academy

Teacher Guide: Chapter 12.1 — Understanding the Risks of Gambling

## OVERVIEW

TIME	MATERIALS	PREREQUISITES
45-50 Minutes	Student Activity Packet, Calculator	Basic Probability Concepts

## LESSON FLOW

### 5 min THE CHALLENGE

- Read Marcus's poker night scenario aloud.
- Ask: "What does it mean when someone says gambling is entertainment, not investment?"
- Brainstorm: What types of gambling have students heard about or encountered?

### 10 min CORE CONCEPTS

- Review probability basics: outcomes, events, and calculations.
- Explain independent vs. dependent events with concrete examples (coin flips vs. card draws).
- Introduce house edge concept—the mathematical guarantee of operator profit.
- Quick check: Have students calculate simple probabilities verbally.

### 25 min APPLY IT

- **Part A (8 min):** Probability calculations. Work through table together, then students complete independently.
- **Part B (10 min):** Expected value analysis. Walk through roulette calculation on board step-by-step.
- **Part C (7 min):** House edge comparison. Discuss why lottery has highest edge despite popularity.

### 10 min CHECK YOUR UNDERSTANDING

- Complete in class or assign as homework.
- Review Q2 (roulette probability)—emphasize it doesn't change regardless of history.
- Discuss Q5 reflection on gambling as entertainment—no single right answer.

## DIFFERENTIATION

### Support

- Create visual probability diagrams (pie charts showing outcomes).
- Provide a step-by-step expected value calculation template.
- Work through Part B calculation as a class on the board.
- Use manipulatives (dice, coins, cards) for hands-on probability exploration.

### Extension

- Calculate breakeven point: How often would you need to win to overcome house edge?
- Compare cost-per-hour of gambling vs. other entertainment (movies, bowling).
- Research historical gambling scandals related to probability manipulation.
- Analyze psychological factors that casinos use to encourage continued play.

## ANSWER KEY

### Part A: Probability Calculations

Probability Table Answers:

Rolling a 6:  $1/6 = 0.167 = 16.7\%$

Drawing an ace:  $4/52 = 0.077 = 7.7\%$

Landing on red:  $18/38 = 0.474 = 47.4\%$

Flipping heads twice:  $1/4 = 0.25 = 25\%$

Q1: Independent events don't affect each other's probability (each roulette spin is fresh). Dependent events change probability after each occurrence (drawing cards changes deck composition). Confusing these leads to the gambler's fallacy.

### Part B: Expected Value Analysis

Roulette Bet on Red (\$10 bet):

$$EV = (18/38 \times \$10) - (20/38 \times \$10)$$

$$EV = \$4.74 - \$5.26 = -\$0.52$$

Q2 (100 bets of \$10):

$$\text{Expected loss} = 100 \times \$0.52 = \$52$$

House Edge Comparison (Expected Loss per \$100):

$$\text{Blackjack: } \$100 \times 0.5\% = \$0.50$$

$$\text{American Roulette: } \$100 \times 5.26\% = \$5.26$$

$$\text{Slot Machines: } \$100 \times 8\% = \$8.00$$

$$\text{State Lottery: } \$100 \times 50\% = \$50.00$$

Q3 (\$500/month on slots):

$$\text{Monthly loss: } \$500 \times 8\% = \$40$$

$$\text{Annual loss: } \$40 \times 12 = \$480$$

### Check Your Understanding

**CYU 1:** B (Believing that past independent events affect future outcomes)

**CYU 2:**  $18/38 = 47.4\%$  (same as always—previous spins don't affect future outcomes)

**CYU 3:**  $EV = (1/10,000,000 \times \$5,000,000) - (9,999,999/10,000,000 \times \$2) = \$0.50 - \$2.00 = -\$1.50$

**CYU 4:** Negative expected value means each bet loses money on average. Over many bets, these small losses accumulate. Individual players may win short-term, but the operator collects from all players, guaranteeing profit.

**CYU 5:** Accept thoughtful responses about setting budgets, expecting to lose, not chasing losses, and comparing gambling costs to other entertainment options.

## COMMON MISCONCEPTIONS

Misconception	Clarification
"I'm due for a win after losing several times."	This is the gambler's fallacy. Independent events like roulette spins have no memory—each spin has the same probability regardless of past results.

"Skilled players can consistently beat the house."	While skill helps in some games (poker, blackjack), the house edge ensures long-term operator profit. Even skilled players face negative expected value on most games.
"A small house edge means the game is fair."	Even a 1% house edge means significant losses over time. Playing \$100/hour with 1% edge costs \$1/hour. Over hundreds of hours, this adds up substantially.