


Standard 12: The student will explain and evaluate the financial impact and consequences of gambling.

Risky Business

Priority Academic Student Skills

Personal Financial Literacy

Objective 12.1: Analyze the probabilities involved in winning at games of chance.

Objective 12.2: Evaluate costs and benefits of gambling to individuals and society (e.g., family budget; addictive behaviors; and the local and state economy). 



Lesson Objectives

- ⇒ Recognize gambling as a form of risk.
- ⇒ Calculate the probabilities of winning in games of chance.
- ⇒ Explore the potential benefits of gambling for society.
- ⇒ Explore the potential costs of gambling for society.
- ⇒ Evaluate the personal costs and benefits of gambling.

Simone, Paula, and Randy meet in the library every afternoon to work on their homework.

Here is what is going on. Ryan is flipping a coin, and he is not cheating. He has just flipped seven heads in a row.

Is Ryan's next flip more likely to be:

Heads;

Tails; or

Heads and tails are equally likely.

Paula says heads because the first seven were heads, so the next one will probably be heads too.

Randy says tails. The first seven were heads, so the next one must be tails.

Simone says that it could be either heads or tails because both are equally likely. Who is correct?

Personal Financial Literacy Vocabulary

Dependent event: The outcome of one event affects the outcome of another, changing the probability of the second event.

Gambling: Taking risks with personal finances or personal assets.

Independent event: The outcome of one event has no affect on the outcome of another; both events have the same probability.

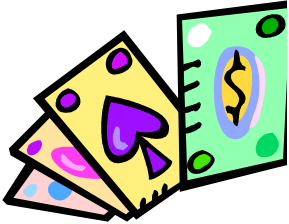
Predictability: Telling or forecasting about something in advance of its occurrence by means of special knowledge or inference.

Probability: The chance or likelihood that something will happen.

TEACHING TIP

This lesson is based on risk. You might want to review the content in 11.1 on risk with your students before proceeding.

Introduction



Gambling can be exciting, challenging and stimulating! Some people get a “rush” out of taking a chance, while others find it much too upsetting or risky. Gambling in the United States has just exploded in recent years, with almost every state legalizing some form of gaming activity. While gambling is a form of entertainment, it is also a risk. Like any other risky behavior, it can create financial losses for individuals and their families.

Lesson

When you hear the word *gamble*, what comes to mind? For most people, it is games of chance such as lotteries, bingo, slot machines, poker and other casino-type activities. People gamble for a variety of reasons. Many consider it just another fun form of entertainment. Playing a game of chance is an opportunity to test their skills and enjoy the challenge of selecting winners and losers. In some cases, it is the thrill of winning; in others, it is the financial gain. Whatever the reason, people who enjoy gaming activities budget for gambling expenditures just as they would budget for any other form of recreation. When the money is spent, they simply walk away—just as they would walk away from a concert or baseball game.

However, that is not true for everyone. A small minority (about 3%) of those who

gamble become highly addicted and wreck their personal finances. It may start out as fun and entertainment, but becomes a problem they cannot control. Recent studies show that at least 20% of all compulsive gamblers file bankruptcy after maxing out their credit cards and exhausting other credit options. Approximately one-third of them will also lose their jobs because of their gambling problems. In 1999, a National Gambling Impact Study Commission estimated that more than 5 million Americans are pathological or problem gamblers, with an additional 15 million at risk.

Even teenagers can be compulsive or problem gamblers. Some estimates show that somewhere between 4% and 8% of all adolescents have a serious gambling problem, with another ten percent at risk of developing serious problems. Male teens are more likely to have gambling problems than female teens, but the number of young women with gambling problems is rapidly increasing.

When gambling, you are taking a chance with your with your personal finances; you are risking your money or something else of value on an activity with an uncertain outcome. Whether buying lottery or scratch tickets, betting on sports or horses, playing cards or slot machines, you risk losing your money because you have no control over what happens. If placing a bet or buying a lottery ticket is anything more than just fun for you, and if you are using money you cannot afford to lose, then you should walk away and not play.

How to Spot a Problem Gambler

- Always thinking about gambling or having an urge to gamble that they cannot stop.
- Having to bet more money more often to keep up the thrill of gambling.
- Being really cranky when trying to cut back.
- Lying to hide gambling.
- Making bets through illegal activity.
- Trying to win the money they lost by gambling more.
- Using gambling as an escape.
- Making people they love unhappy.
- Relying on others to help them when they lose all their money.
- Not able to control or stop their gambling.

Compulsive gambling or gambling addiction is generally a gradual change in behavior. In most people, it begins slowly and then progresses to a point where it becomes impossible to control. If you think someone might have a gambling problem, you may want to discuss it with your school counselor or call the Oklahoma Problem Gambling Help-Line at 1-800-522-4700. It is toll-free call and someone is available 24/7 to take your call. While compulsive gamblers may promise to control the problem, most people need professional help to stop.

Social Costs and Benefits of Gambling

Based on current gambling trends, the gaming industry earnings have jumped to about \$100 billion a year after paying out winnings. That is about the same amount the United States is spending on the war in Iraq in 2008. Online gambling is one of the fastest growing segments of the industry and accounts for just over 10% of its earnings. Those earnings provide jobs for many people who work for casinos, race tracks, and other related businesses.

In Oklahoma, the gaming industry earns about \$2 billion annually which is about \$600 per capita. The state has 97 casinos, with 45,289 machines at the end of 2006, which is 5.5 percent of all gaming machines in the country. The casinos employ thousands of people and provide revenue for local communities, various Indian nations, and state government.

On the other hand, the growth of the gambling industry is not all good social or economic news. Casinos tend to take revenue from other businesses in the area and may even discourage other businesses from locating there. Why? Because of opportunity costs. If you work for a casino, you cannot work for another business in the area; and if you spend your money at a casino, you cannot spend that money with other local businesses.

Lotteries tend to have the same impact as regressive taxes, meaning that people with lower levels of income use a larger percentage of their income to buy lottery and scratch tickets than people with middle to upper incomes. Because the proceeds actually go the state, buying lottery tickets is a voluntary tax on those who choose to buy the tickets. Money spent on lotteries tends to reduce income levels by about five percent, leaving families with less money to purchase food, pay rent and utilities, or contribute to their savings accounts.

FAST FACTS

About one half of American adults have bought a lottery ticket in the past 12 months.

Lottery and scratch ticket buyers spend an average of \$500 a year.

About one-third of all adults in the U.S. visit a casino at least once a year.

10% of the population provides about 80% of all casino revenues.










Calculating the Odds

When participating in any gambling activity, you and the sponsor are both “playing the odds.” The sponsor, whether the state or a casino, hopes it wins and you, of course, hope you win. Because gambling is a significant source of income for the sponsor, you can “bet” the odds will favor the sponsor—not you. Almost all games—slot machines, blackjack, poker, roulette wheels, lotteries, scratch tickets, etc.—are set up to ensure the sponsor wins. It is by design and not by accident.

Suppose you have a friend who likes to play the roulette wheel at a casino. If he spends day after day playing, he will consistently lose over time. Of course, he may also go home one night with a stash of cash because each time he plays the outcome is less predictable. So, while he may beat the odds, he may also lose a bundle of money in the process. The casino set it up that way to guarantee it consistently makes a profit. Without making a profit, there is no incentive for the casino to remain open.

Lotteries like Powerball or Pick 3 are much the same. Even though you may hear about someone winning a big amount, you do not hear how many people purchased tickets and lost their money to make it happen.

Why do you continue playing when you know the odds are against you? The answer is the same as with other decisions you make. You believe the potential benefits will outweigh the potential costs. In other words, you think you can beat the odds. You will be the “one in a million” who wins the jackpot. The table below is from the Powerball Web site. It shows the odds of winning in the Powerball game.

Match	Prize	Odds
	Grand Prize	1 in 146,107,962.00
	\$200,000	1 in 3,563,608.83
	\$10,000	1 in 584,431.85
	\$100	1 in 14,254.44
	\$100	1 in 11,927.18
	\$7	1 in 290.91
	\$7	1 in 745.45
	\$4	1 in 126.88
	\$3	1 in 68.96
The overall odds of winning a prize are 1 in 36.61. The odds presented here are based on a \$1 play (rounded to two decimal places).		

<http://www.powerball.com>

Powerball is a random game. It does not know who purchases a ticket or where they buy it. It only knows that a number was selected by someone, somewhere. The only way to improve your odds of winning is to buy more tickets. If you purchased ten percent of all tickets sold, your winnings would average ten percent of the payout over a period of time. You would improve your odds of winning the small prizes but not necessarily the grand prize because there are more winners of small prizes than winners of large prizes.



Suppose you hear there is a “seven to one” odds on a particular horse in a horse race. You think it sounds good, so you bet \$20 the horse will win. Basically, you have agreed to pay the track \$20 if you lose and it will pay you \$140 if you win. With 7:1 odds, you have about a 15% chance of winning ($100/7=14.28$). The odds of winning depend on how many horses are in the race. If there were only one horse, go for it! That would be “one to one” odds, or a sure thing. As more horses are added, the odds of winning change and are against you winning.

The Odds of Winning

The odds of winning in most games of chance are pretty low, regardless of the commercials and headlines. As a general rule, the higher the odds, the higher the potential payout. That rule is based on incentives: if the odds are high, the risk of playing is high. If you want people to take high risk, you need potentially high rewards.

Probability looks at how likely it is for something to happen. For example, if you pull one card out of a deck of cards, what is the probability you will draw an ace? The answer is 4 out of 52. There are 52 cards in a deck and 4 aces. Another way to put it: you have a 1 in 13 chance because $52/4=13$. If you have a 1 in 13 chance of drawing an ace, then you have a 12/13 chance of NOT drawing an ace. The probability of drawing an ace is relatively low.

If you decide to play a Pick 3 lottery game where you have to guess the exact three numbers, your probability of winning is 1 in 1000. You can figure this out by noting that the probability of getting the first number right is 1/10. The probability of getting all three right is then $1/10 \times 1/10 \times 1/10 = 1/1000$.

The table below is from the Oklahoma Lottery Commission's Web site and shows the odds for winning different combinations in the Pick 3 Lottery drawing.

PLAYS	EXAMPLE	IF LOTTERY DRAWS	YOU WIN	ODDS
Straight	7 2 4	7 2 4 Only Exact Match Wins	\$500	1 in 1,000
Box 3-Way	1 1 3	1 1 3 1 3 1 3 1 1	\$160	3 in 1,000
Box 6-Way	7 2 4	7 2 4 2 4 7 4 2 7 7 4 2 2 7 4 4 7 2	\$80	6 in 1,000
Front Pair	7 2 ★	7 2 ★ 72 + Any Number	\$50	1 in 100
Back Pair	★ 2 4	★ 2 4 Any Number + 24	\$50	1 in 100

Source: <http://www.lottery.ok.gov/>

In the box below, compute the odds for a Pick 5 lottery drawing where you have to guess the exact five numbers. Be sure to show your equation.

Which game provides the best odds: the Pick 3 or Pick 5?

Which game would you expect to have the highest potential payout amounts? Why?

Independent Versus Dependent Events



Flipping a coin is an example of an independent event. The probability of getting a head does not change no matter how many times you flip the coin. When the coin is flipped and the first seven flips are heads, the eighth flip still has the probability of $1/2$. However, many people seem to think the first several flips somehow influence additional flips, but they do not. The probability is still the same, as if the first seven flips did not happen. Each flip of a coin is independent.

Most card games are different. When playing Poker or Blackjack, each successive hand is dependent on the previous. For example, you have a $4/52$ chance of getting an ace at the beginning of the game. If the dealer gives you an ace on the first card dealt, the next person has a $3/51$ chance of getting an ace as the next card dealt. There are only four aces, and if you have received one, the next person cannot receive it again.

The best hand in Poker with the highest payout is a royal flush, consisting of a 10, jack, queen, king, and ace in the same suit. The reason it is the best hand is because you have the lowest probability of getting one. You can calculate your odds by following these steps.

- You need five spades, hearts, diamonds or clubs. The probability of getting the first card you need is $5/52$.
- To get the second card you need in the same suit, the probability is $4/51$. Getting the third card is a probability is $3/50$; the fourth card is $2/49$ and the last card is $1/48$.
- The probability of being dealt a royal flush is rather small. In fact, it is:

$$\frac{5}{52} \times \frac{4}{51} \times \frac{3}{50} \times \frac{2}{49} \times \frac{1}{48} = \frac{1}{2,598,960}$$

If you said Simone is correct, you are right!

Why?

Paula is assuming that the pattern will continue, because Ryan is on a roll. But there is no guarantee that will happen.

Randy is certain that Ryan's luck will change. He cannot continue getting heads. Again, there is no guarantee that will happen.

Simone knows the odds are 50/50. The coin only has two sides. Every time it is flipped, each side has an equal potential of landing face up. The coin has no memory and no way to know how it landed with previous flips, even though it is on a streak.

The same is true for games of chance. There is no guarantee that you will win every time. You may have a winning streak, but nothing says it will last.



COMPLETE: GAMBLING ON A ROLL – Activity 12.1.1
Review student answers before continuing with this lesson.

Probability Versus Predictability

While some games involve some type of strategy or plan, most gaming activities are based on sheer luck. Your outcome is based on the chance something will happen, or the probability. Basing your financial future on luck is not very reliable. It is similar to the idea of flipping a coin to see what happens; maybe you will win and maybe you will not.

You may sometimes hear people refer to investing in the stock market as gambling, but is it really? Informed investors are making financial decisions based upon their knowledge about what they need to meet their financial goals. While those decisions have a level of risk, they are not the same as flipping a coin with no control over the outcome. Decisions about saving and investing are based on **predictability**, not probability. Predictability means you have some knowledge about the choices you make. For example, if you know a mutual fund has a good history of increased value, you can make some predictions about the future value of the fund. It does not guarantee future earnings, but it does give you a basis for making the decision.

Weather forecasters rely on predictability. They know the chance something will happen based on current conditions. Even though they are not always right, they are making “educated” guesses about the future. Unfortunately, predicting the future offers no guarantees—with weather or with money. Even still, it is more reliable than flipping a coin.

Conclusion

Gambling with your future is high risk. While it may be fun and exciting to play the odds, the key word is “play.” Money used for gambling, betting or other games of chance should be money you can afford to set aside for fun—not money you need to pay your bills or feed your family. Gambling, like any other choice you make, has costs and benefits. Understanding the high cost of risk will help you decide if gambling is something you can afford to do.

CHECK OUT THESE RELATED WEB SITES

- http://www.sciencebuddies.org/science-fair-projects/project_ideas/Math_p017.shtml?from=noMenuRequest
Pick a Card, Any Card Lesson and Activity
- <http://www.learner.org/interactives/dailymath/playing.html>
Math in Daily Life activity on probability
- <http://mathcentral.uregina.ca/beyond/articles/Gambling/Odds.html>
Information on the odds of gambling
- <http://library.thinkquest.org/11506/intro.html>
An introduction to probability
- <http://www.lottery.ok.gov/>
Information on lottery games in Oklahoma, including odds
- <http://mathforum.org/dr.math/>
Math lessons on probability
- <http://www.powerball.com>
Powerball home page with information on odds

Name: _____ Class Period: _____

Risky Business

Review Lesson 12.1

Answer the following questions and give the completed lesson to your teacher to review.

1. Based on current trends in the gaming industry,
 - a. the number of people who gamble is decreasing.
 - b. people who gamble are beating the odds at the casinos.
 - c. Internet gambling is rapidly growing.
 - d. fewer people have gambling problems.

2. _____ is one sign that a person has a gambling problem.
 - a. Frequent visits to a casino
 - b. Buying lottery tickets regularly
 - c. Always thinking about gambling
 - d. Playing in poker tournaments

3. Which of the following is a potential social benefit of gambling?
 - a. Increased number of bankruptcies
 - b. Increased jobs in a local community
 - c. Increased number of lottery tickets sold
 - d. Decreased spending with local businesses

4. Probability is best defined as
 - a. how likely it is that something will happen.
 - b. making choices based on past events.
 - c. forecasting the future.
 - d. taking a chance.

5. An example of an independent event is
 - a. a game of blackjack.
 - b. a game of poker.
 - c. the lottery.
 - d. flipping a coin.

Name: _____ Class Period: _____

Gambling on a Flip – Activity 12.1.1

Directions: Complete the table below. You will need a coin with heads and tails for this activity.

1. You are testing your luck at a game of chance. In the first column of the chart below, determine if each flip of the coin will be a head or a tail before flipping your coin. Write H for head or T for tail in column 1.

Coin Flip	Your Prediction (H or T) Column 1	Did flip match prediction? YES or NO Column 2	+100 for correct prediction Column 3	-100 for incorrect prediction Column 4
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

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2. After making your predictions, flip your coin and record whether it is a head or a tail. In the second column, write YES if your flip matches your prediction and NO if your flip does not match your prediction.
3. In the next column, enter 100 points if your flip matched your prediction.
4. In the last column, enter 100 points if your flip did not match your prediction.
5. Total the number of points in Column 3 and enter your results below. Total the number of points in Column 4 and enter your results below. Subtract the total number of points in Column 4 from the total number of points in Column 2. If your answer is positive, you win! If your answer is negative, sorry. Did you win or lose? Explain your answer.

Column 3 Total	Column 4 Total	Balance

6. Put a dollar sign in front of your totals. You have just gambled with \$1,000. Did you win or lose? Explain your answer.