What is a Company?

Lesson Summary

What is a Company? compares prominent corporations to help students learn about the many facets of public and private companies.

Lesson Objectives

- Identify and describe the terms: company, partnership, and corporation.
- Explain the characteristics, advantages, and disadvantages of various types of companies.
- Explain how companies are formed.
- Describe the benefits of forming a business to manufacture and sell a product.

NCTM Standards

9C - Recognize and apply mathematics in contexts outside of mathematics.

Mathematical Strands

	Thinking Algebraically	Students use information from a chart to evaluate investment decisions. Students will explain their thinking.	
	Interpreting Statistics	Students evaluate profits and profit trends presented in a table to make decisions about potential investments. Students should use their reasoning skills to make arguments both for and against each company presented.	
	Communicating Quantitative Information	Students synthesize large amounts of information organized within charts into a coherent, persuasive presentation.	
	Tackling Complex Problems	Students work through problems involving interest rates. Students reason about what decision is the right one for a company to make and use their skills to gain fluency in working with simple and compound interest.	

Some years are better than others for companies to go public. It depends on how much money they think they will generate by going public and how much it would cost them to borrow that money from a bank, versus selling shares of their company. This is a mock list of interest rates from the past seven years.

2000	2001	2002	2003	2004	2005	2006
8.5%	9.5%	4.75%	4.25%	4.00%	5.25%	7.25%

Is it better to have a higher interest rate when a company borrows money or to have a lower interest rate? Why?

In which three years would it have cost companies the most to borrow money? In which three years would it have cost the least? How do you know?

Write a formula that expresses the interest, i, that a company will pay on a one-year loan, l, at a specified interest rate, r.

If a company needed to borrow $14,500,000, how much more would it pay in one year of simple interest if it borrowed the money in 2001 as opposed to 2002? Make sure you show your calculations.

If a company needed to borrow $155,000,000, how much more money would it cost in one year of simple interest if it borrowed the money in 2003 versus 2004? Make sure you show your calculations.

INTERPRETING STATISTICS

Below are the profiles of three companies that are thinking of going public. Each company sells high-end fashion accessories. Based on the information provided, give reasons why a venture capitalist might invest in the company.

	Company A	Company B	Company C
Profits 2002	$635,000	-	$1,199,000
Profits 2003	$654,000	-	$1,103,000
Profits 2004	$719,000	-	$1,048,000
Profits 2005	$848,000	-	$1,017,000
Profits 2006	$992,000	$2,881,000	$1,220,000
Company founded in:	Dec. 2000	Nov. 2005	May 1988
Average units sold per day	460	320	830
Average units on hand	670	2,960	870

Write a summary about profit trends you see above.

Generally, companies do not want to have too much inventory on hand. For each company, express the number of units sold per day as a percentage of the number of units on hand.

Given the information you've extracted from the chart above, what company would you invest in as a venture capitalist?

Universal Power Group Corporation, based in Texas, was trying to decide whether to go public in 2006. Pretend you were a junior sales analyst at the company and are invited to give your opinion about what the company should do.

In order to make your recommendations, make notes next to each chart, and state what information is presented and how this information might inform your boss of the decision he needs to make.

Identify the most important piece of information in your opinion, and make a graphical representation of that information to present to your boss.

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Universal Power Group Company Profile

Company Overview: Universal Power Group (UPG) gives customers a charge. The company primarily distributes batteries and electrical parts to manufacturers and retailers in the U.S. Its products include lithium and nickel-cadmium batteries for such applications as cell phones, camcorders, and motorcycles. UPG also supplies electronic components and other hardware used in security systems. Products include alarm kits, sirens, and intercoms. Its Mobility division sells electric scooters. UPG's top customer is Brink's Home Security (56% of sales); other clients include Bass Pro Shops and The SCOOTER Store. Zunicom owns 40% of UPG. *(Hoover's.* February 2008 <http://hoovers.com/universal-power-group/--ID__153621--/free-co-profile.xhtml>*)*

Basic Information

2005 Sales (million)	$81.3
1-Year Sales Growth	21.0%
2005 Net Income (million)	$1.1
1-Year Net Income Growth	184.9%
2005 Employees	65

Annual Income (in millions)

Year	*Revenue*	*Gross Profit*	*Operating Income*	*Total Net Income*
Dec 05	$81.3	$10.3	$2.4	$1.1
Dec 04	$67.2	$8.8	$1.2	$0.4
Dec 03	$58.7	$9.1	$1.9	$0.9

Comparison to the Industry and the Market

	Universal Power Group	*Industry*	*Market*
Price/Sales Ratio	0.38	0.56	2.24
Price/Earnings Ratio	16.11	15.83	19.23
Price/Book Ratio	7.19	2.15	2.18
Price/Cash Flow Ratio	77.51	13.53	13.68

Universal Power Group's Top Competitors

	Universal Power Group	**Arrow Electronics**	**Avnet**	**Interstate Battery**
Annual Sales(millions)	$81.3	$11,164.2	$14,253.6	$754.9
Employees	65	11,400	--	1,251
Market Cap (millions)	$0.0	$4,243.8	$4,091.9	$0.0

Hoover's. January 2007 <http://www.hoovers.com/universal-power-group/--ID__153621,ticker__--/free-co-fin-factsheet.xhtml>

Working with Interest

A promising, young company decided that it wanted to expand. Instead of going public, it decided to borrow the $4,600,000 needed to expand its business. It took out a seven-year loan in 2007, with an interest rate of 5%.

For each formula presented below, I is the value of the money the company needs to repay at the end of the t year loan, with an interest rate of r, if it initially borrowed P dollars.

Assume the company could make one lump payment at the end of the loan's term. If interest were compounded annually, how much money would it owe the bank? Use the formula:

$I = P(1+r)^t$

Assume the company could make one lump payment at the end of the loan's term. If the interest were compounded quarterly, how much money would it owe the bank?

$I = P(1+\frac{r}{4})^{4t}$

Assume the company could make one lump payment at the end of the loan's term. If the interest were compounded continuously, how much money would it owe the bank?

$I = Pe^{r \bullet t}$

For each of the above scenarios, calculate how much additional money (interest) the company will have to pay back to the bank.

In which of the above scenarios does the company pay back the least amount of money?

What is a Stock?

Lesson Summary

What is a Stock? demonstrates to students how they can own parts of public companies by purchasing shares of their stock.

Lesson Objectives

- Define and give examples of: common stock, investor, risk, public corporation, private company, preferred stock, earnings, and dividends.
- Explain why there is risk involved in stock ownership.
- Make decisions as a group on the benefits of investing in stocks verses costs and/or loss of use of capital.
- Calculate gain and loss from sample stock sales.
- Explain the differences between common stock and preferred stock.
- Explain how a company will "go public" by issuing an IPO.

NCTM Standards

1A - Understand numbers, ways of representing numbers, relationships among numbers, and number systems.
1B - Understand meanings of operations and how they relate to one another.
1C - Compute fluently and make reasonable estimates.
5C - Develop and evaluate inferences and predictions that are based on data.
6C - Apply and adapt a variety of appropriate strategies to solve problems.
8A - Organize and consolidate mathematical thinking through communication.
8B - Communicate mathematical thinking coherently and clearly to peers, teachers, and others.
9A - Recognize and use connections among mathematical ideas.

Mathematical Strands

	Thinking Algebraically	Students will practice writing algebraic expressions to represent buying and selling stocks.	
	Interpreting Statistics	Students calculate the value of an investment in stock using the formula: Value of Investment = (Number of Shares) (Price per Share)	
	Communicating Quantitative Information	Students graph the value of a portfolio over time.	
	Tackling Complex Problems	Students adjust their portfolios based on the performance of their stocks. In two evaluations, students calculate, reason, and chart the progress of a portfolio.	

Write equations (=) or inequalities (<, >, ≤, ≥) that represent the problems below. You may use words or symbols, but please be sure you define your variables. Ignore broker's fees in the first three problems.

1. Write an equation to represent the following: You have a total of $5,460 to spend, and you want to use it all to buy a number (*x*) of shares that cost $35.40 per share.

2. Write an inequality to represent the following: You don't want to spend more than $6,820, and you want to buy *y* shares of stock that costs $28.21 per share.

3. Write an inequality to represent the following: You are very interested in a stock whose price per share is $76.05. You want to invest at least $2,000, but no more than $4,500.

In the following problems, write the equations or inequalities to represent each scenario including a broker's fee of 2% on each transaction.

4. You bought 95 shares of a stock at a price of $Y for a total cost of $11,821.80.

5. You bought n shares for $33.12 a share, which cost you $8,445.60.

6. You sold 480 shares of stock worth $X per share. As a result, $26,483.52 in cash came back to your portfolio.

7. You bought n shares worth $48.24 each. You sold the shares at $49.82, for a loss of $246.72.

8. Refer to problem number 7. Why did you have a net loss when the stock price increased?

1. If you know the number of shares you purchased and the price per share, how would you calculate the total value of your investment?

2. If you bought 3850 shares of DreamWorks Animation SKG, Inc. (DWA), in March for $26.45 per share, how much did you invest initially?

This is a table of closing prices from March to April for DWA stock.

Month	Price
March	$26.45
April	$27.10
May	$25.95
June	$22.90
July	$20.94
August	$21.19
September	$24.91
October	$26.45
November	$29.23
December	$29.49
January	$28.18
February	$26.85
March	$30.58
April	$29.58

3. Make a table that shows how much your investment is worth during each of the months listed in the table. Your table should also include the change in the value of your investment. (There should be a column that shows the profit or loss you would have from selling all the stock on that date.) Ignore any commission (broker's fees).

Choose an appropriate scale, and graph the value of the portfolio shown below. Mark important dates on the graph as appropriate.

Group A	
Date	**Value**
4/10/2007	$100,000
4/11/2007	$103,500
4/12/2007	$102,970
4/13/2007	$100,340
4/14/2007	$99,730
4/17/2007	$98,980
4/18/2007	$99,102
4/19/2007	$104,250
4/20/2007	$103,590
4/21/2007	$102,111
4/24/2007	$101,553
4/25/2007	$103,211
4/26/2007	$104,006

Jennifer bought 800 shares of Wild Oats Market Inc. (OATS), at $16.65 per share on September 21, 2006. On September 28, 2006, she sold 400 shares after its price had dropped to $16.52. She bought 300 more shares on October 3, 2006, when the price had fallen to $16.01. She sold all her OATS stock at $17.09 on October 12, 2006.

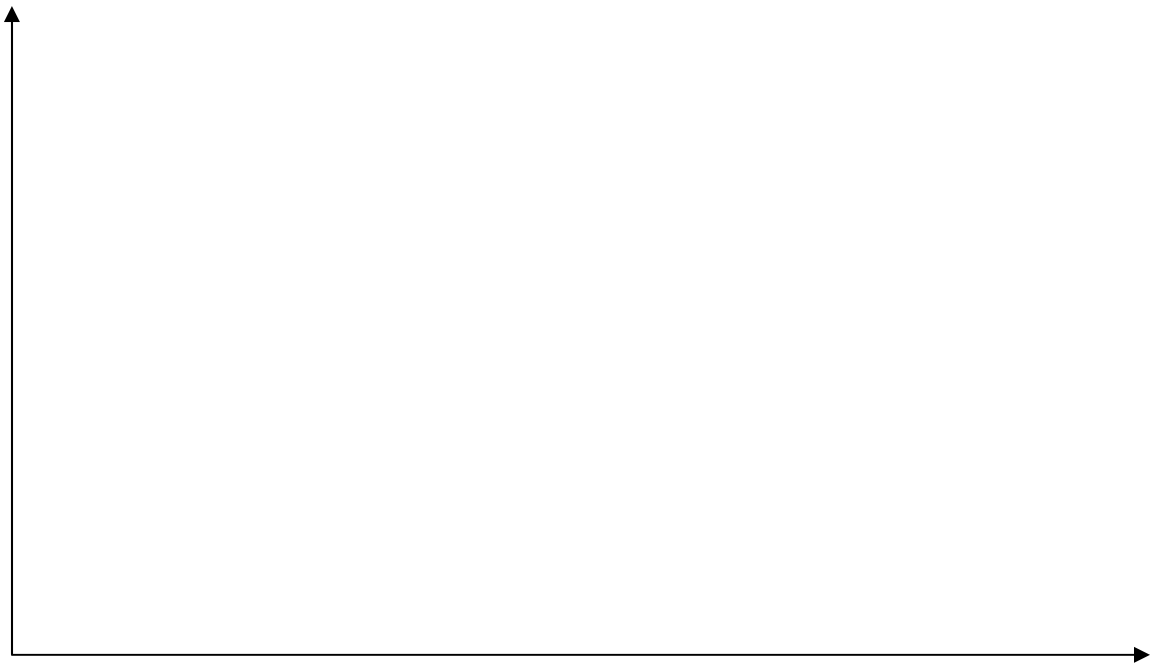
1. How much money did Jennifer invest initially in the OATS stock?

2. Immediately after September 28, how many OATS shares did Jennifer still own? What was the value of those shares?

3. How many shares did she own immediately after her purchase on October 3? What was the value of those shares?

4. How many shares did she sell on October 12? How much money were those shares worth?

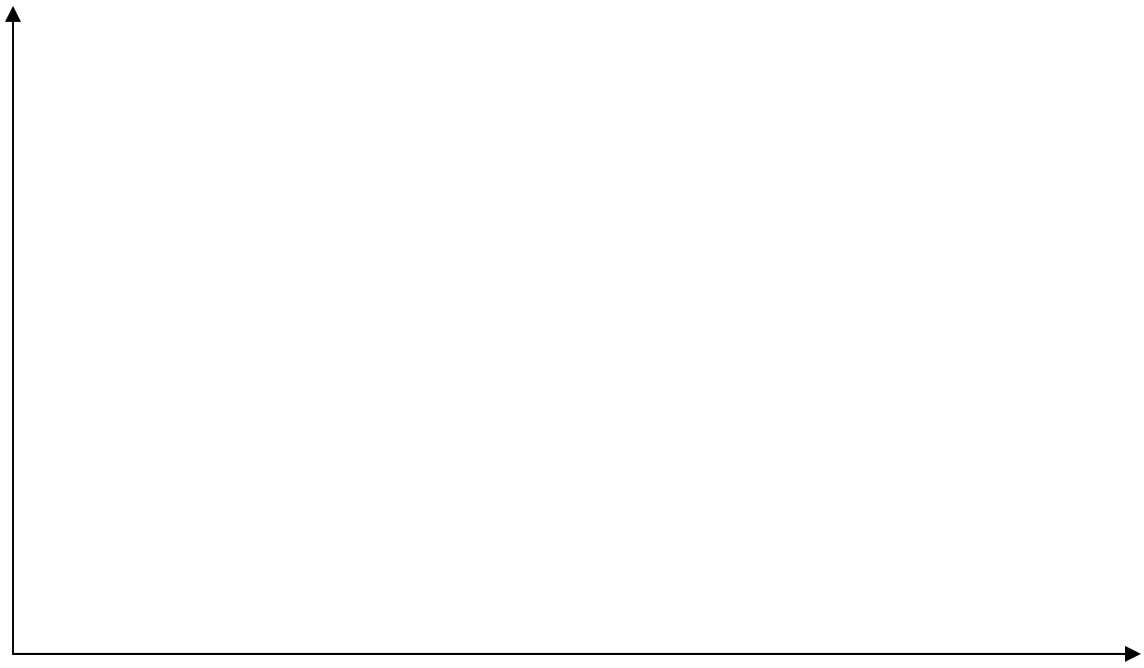
5. Chart the amount of money Jennifer had invested in Wild Oats Marker Inc. from September 21 to October 12.



6. How much of a profit/loss did Jennifer make over the course of the investment?

Jacie's SMG group decided to buy 230 shares of EI DuPont de Nemours & Co. (also known as DuPont, symbol: DD), on December 21, 2006 for $48.98 per share. They sold half their stock on December 27, 2006, when the price had risen to $49.19. They bought back 200 shares when the price dropped to $48.05 on January 5, 2007, and then sold all their shares on January 17, 2007 for $50.72 per share.

1. Ignoring the broker's fees the group paid each time they made a trade, chart the amount of money Jacie's group had invested in DuPont stock from December 21 to January 17. (You might find it helpful to make a table to keep track of the transactions first.)



2. How much of a profit/loss did the group make from their investment?

Identifying Ticker Symbols and Interpreting Stock Quotes

Lesson Summary

Identifying Ticker Symbols and Interpreting Stock Quotes teaches students how to use stock ticker symbols to locate companies. Students will also learn how to read a stock quote.

Lesson Objectives

- Identify stocks by both newspaper and ticker symbol.
- Determine how to look up a ticker symbol.
- Enter purchase orders and/or make a trade on The Stock Market Game website.
- Demonstrate the ability to use each of the following terms: share or stock, dividend, P/E ratio, volume or sales, change.

NCTM Standards

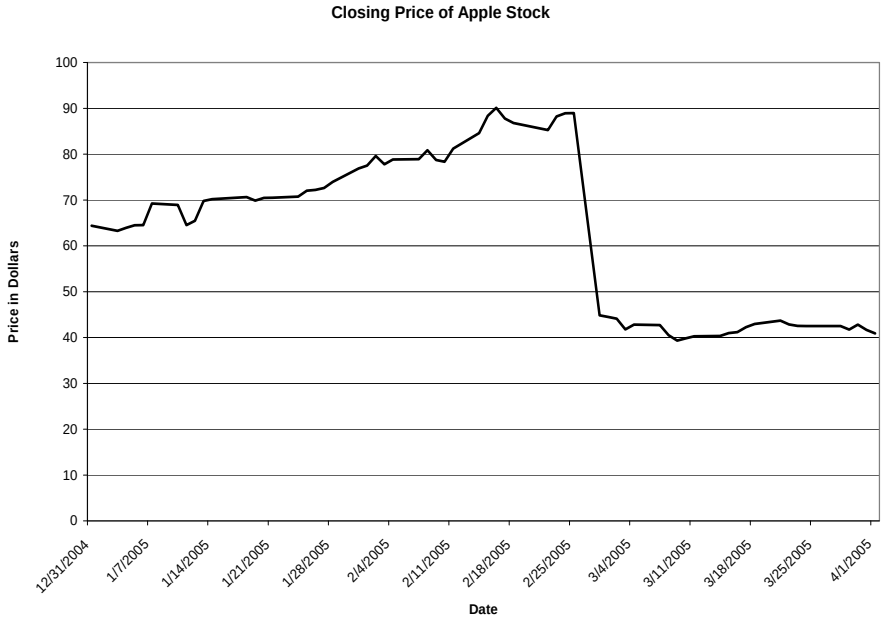
1A - Understand numbers, ways of representing numbers, relationships among numbers, and number systems.
5A - Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.
5B - Select and use appropriate statistical methods to analyze data.
5C - Develop and evaluate inferences and predictions that are based on data.
5D - Understand and apply basic concepts of probability.
6B - Solve problems that arise in mathematics and in other contexts.
6C - Apply and adapt a variety of appropriate strategies to solve problems.
8A - Organize and consolidate mathematical thinking through communication.
8B - Communicate mathematical thinking coherently and clearly to peers, teachers, and others.
9C - Recognize and apply mathematics in contexts outside of mathematics.
10A - Create and use representations to organize, record, and communicate mathematical ideas.

Mathematical Strands

	Thinking Algebraically	Students practice calculating the value of stocks before and after splits.	
	Interpreting Statistics	Students interpret graphs and make decisions based on the information presented. They are also asked to make choices about what types of investors might be more or less interested in certain graphs of the same information.	
	Communicating Quantitative Information	Students graph and choose scales, then make informed decisions based on trends and on their knowledge of the market.	
	Tackling Complex Problems	Students evaluate the portfolio decisions of fictional Stock Market Game teams. They explore the pros and cons of investing in a few shares of a high-priced stock versus many shares of a low-priced stock.	

Calculating Share Price After Splits

Below is a chart showing the closing price of Apple, Inc. (AAPL) stock between January 2005 and April 2005.



Although it may look like Apple's stock dropped dramatically in value in February 2005 (from about $90 per share to $45 per share), this is not the case. Apple Inc. split its stock, meaning that it doubled the number of outstanding shares on the market while cutting the price per share in half.

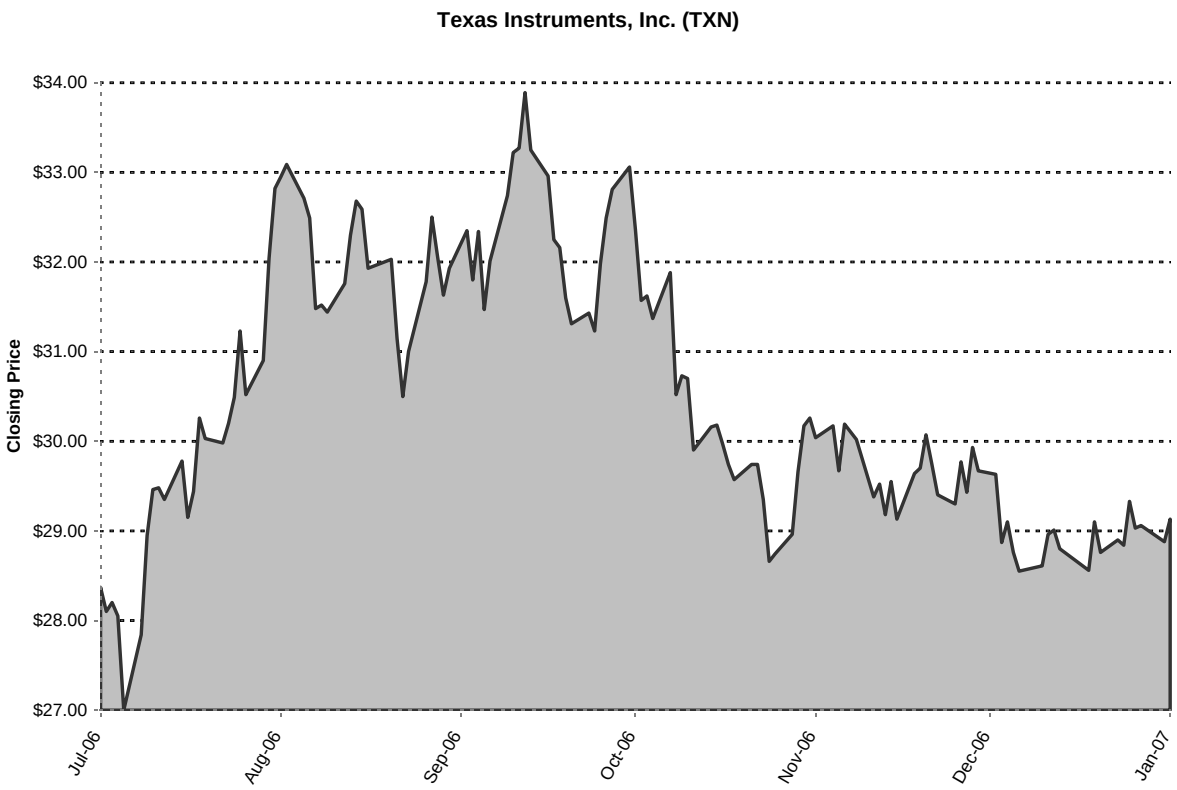
Calculate the value of the stock holdings after they undergo a split. Complete the table with the appropriate information.

	Before the Split			After the Split		
Type of Split	*Price Per Share*	*# of Shares*	*Value of Stock*	*Price Per Share*	*# of Shares*	*Value of Stock*
2 for 1	$110	475				
	$388	6,378				
		590	$46,267.80			
	$52.48		$24,928.00			
			$47,579.40	$17.82		
				$32.16	7,222	
		1559				$82,564.64
3 for 2	$48	200				
	$60	300				
	$120.48	800				
	$64.41		$21,083.33			

A Brief Algebraic Proof

Using an algebraic expression, prove that the value of the stock before the split is equal to the value of the stock after the split. Use P to represent the price of the stock before the split, and N to represent the number of shares held before the split. Use whatever split ratio you like.

This is a six-month graph of closing prices of Texas Instruments Corporation stock.



1. If an investor bought the stock in the beginning of August, about how much did she pay?
2. If she sold the stock in the beginning of December, about much did she sell it for?
3. How much profit/loss was incurred between August and December?
4. If she had held onto the stock until the beginning of January, how much would she have sold the stock for?
5. How much profit/loss was incurred?
6. Over which one-month period did the stock experience the biggest loss?
7. Over which one-month period did the stock experience the biggest gain?
8. About when should you have purchased the stock if you had to hold onto it for ten weeks?

Below are five-day and five-year graphs of closing prices for Pfizer. *(Reuters. January 2007* <http://stocks.us.reuters.com/stocks/overview.asp?country=US&ticker=PFE.N&symbol=PFE.N>)

Five-Day

Five-Year

1. If you were considering buying Pfizer stock, would you buy the stock based on the five-day graph?

2. Would you buy the stock based on the five-year graph?

3. Using the information in both graphs, would you recommend buying the stock?

Displaying Closing Prices

This is a list of closing prices from Sealy Corporation (ZZ) from October 25, 2006 to November 24, 2006.

Date	Close
24-Nov-06	$15.33
22-Nov-06	$15.15
21-Nov-06	$15.24
20-Nov-06	$14.87
17-Nov-06	$14.74
16-Nov-06	$14.48
15-Nov-06	$14.46
14-Nov-06	$14.16
13-Nov-06	$13.95
10-Nov-06	$13.98
9-Nov-06	$14.01
8-Nov-06	$14.07
7-Nov-06	$13.96
6-Nov-06	$14.02
3-Nov-06	$14.00
2-Nov-06	$14.12
1-Nov-06	$14.10
31-Oct-06	$14.07
30-Oct-06	$14.00
27-Oct-06	$13.95
26-Oct-06	$14.00
25-Oct-06	$13.68

1. Make a graph that displays the one-month trend of the stock's closing price.

2. The 52-week high was $18.20 and the low was $11.64. Note this on the graph.

3. Once you have graphed the closing prices, make an argument about whether or not your team should buy the stock on November 25. Use the trend you notice in your graph to support your argument mathematically, and use your knowledge of the stock market to justify whether this stock will gain in price or continue to go down.

Interpreting Stock Quotes and Ticker Symbols

1. Suzanne's group decided to buy 9 shares of First National Bank Alaska (FNBA) for $2070 per share. Angel's group decided to buy 2025 shares of South Street Financial Corporation (SSFC) for $9.20 per share.

a. How much money did each group spend on their investment? Be sure to include a 2% broker's fee.

b. SSFC's stock had increased to $9.32 per share when Angel's group decided to sell it. How much did the group gain? Be sure to include a 2% broker's fee.

c. How much would First National Bank Alaska's stock have to increase in the same period for Suzanne's group to make the same amount of money?

2. In the spring 2007 Stock Market Game, two groups of students disagreed about whether they should invest $20,000 by purchasing shares of FNBA ($2,070.00) or invest the same amount of money by purchasing shares of SSFC ($9.20).

a. Would they be able to buy more shares of the first stock or the second? Using mathematics, explain your answer.

b. Without looking at any stock quotes, explain what reasons there may be to invest the money in a few shares of a high-priced stock.

c. Explain what reasons there may be to invest the money in a few shares of a low-priced stock.

What is Risk?

Lesson Summary

What is Risk? helps students to understand that an informed investor must recognize the risks involved with every investment.

Lesson Objectives

- Define and illustrate the three major kinds of risk.
- Examine companies and determine the risk involved in investing in these companies.
- Research two companies and decide the level of risk their Stock Market Game team would take if they invest in these companies.
- Write a persuasive letter motivating or discouraging an investor from purchasing stocks in a company they researched.
- Solve decimal multiplication problems.

NCTM Standards

1A - Understand numbers, ways of representing numbers, relationships among numbers, and number systems.
1B - Understand meanings of operations and how they relate to one another.
1C - Compute fluently and make reasonable estimates.
2A - Understand patterns, relations, and functions.
2B - Represent and analyze mathematical situations and structures using algebraic symbols.
2C - Use mathematical models to represent and understand quantitative relationships.
5A - Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.
5B - Select and use appropriate statistical methods to analyze data.
5C - Develop and evaluate inferences and predictions that are based on data.
5D - Understand and apply basic concepts of probability.
6B - Solve problems that arise in mathematics and in other contexts.
8A - Organize and consolidate mathematical thinking through communication.
8B - Communicate mathematical thinking coherently and clearly to peers, teachers, and others.
9C - Recognize and apply mathematics in contexts outside of mathematics.
10A - Create and use representations to organize, record, and communicate mathematical ideas.
10B - Select, apply, and translate among mathematical representations to solve problems.
10C - Use representations to model and interpret physical, social, and mathematical phenomena.

Mathematical Strands

	Thinking Algebraically	Students use differences in the percentage change in the market compared to the percentage change of a stock to explore what beta numbers mean.	
	Interpreting Statistics	Students will calculate beta numbers, and then match those stocks to the profiles of different investors.	
	Communicating Quantitative Information	Students investigate the connection between volatility (as represented on a graph) and betas.	
	Tackling Complex Problems	N/A	

What Does Beta Tell Us?
A stock's beta number is a measure of how volatile its price is compared to the market. Market analysts use sophisticated statistical tools to calculate the beta numbers for each stock, but you can get an idea of what beta measures by comparing the change in the market to the change in price of a stock.

Calculate the monthly percentage change in each stock and in the S&P 500 in each table, using the following formula.

Percentage change from month a to month b =

$$\frac{(price\_in\_month\_b)-(price\_in\_month\_a)}{price\_in\_month\_a}\cdot 100\%$$

Example:

Percentage change from November to December for Expedia = $\frac{20.98-18.16}{18.16}\cdot 100\% = 15.53\%$

Expedia, Inc. (EXPE)

	Expedia, Inc.		S & P 500	
	Price	% change	Value	% Change
November 2006	$18.16		$1,400.63	
December 2006	$20.98	15.53%	$1,418.30	
January 2007	$21.45		$1,438.24	
February 2007	$21.26		$1,406.82	
March 2007	$23.18		$1,420.86	

Avery Denison Corporation (AVY)

	Avery Denison Corporation		S & P 500	
	Price	% Change	Value	% Change
November 2006	$67.47		$1,400.63	
December 2006	$67.93		$1,418.30	
January 2007	$68.36		$1,438.24	
February 2007	$66.43		$1,406.82	
March 2007	$64.26		$1,420.86	

Edison International (EIX)

	Edison International		S & P 500	
	Price	% Change	Value	% Change
November 2006	$45.98		$1,400.63	
December 2006	$45.48		$1,418.30	
January 2007	$44.98		$1,438.24	
February 2007	$47.00		$1,406.82	
March 2007	$49.13		$1,420.86	

Eastman Kodak Company (EK)

	Eastman Kodak Company		S & P 500	
	Price	% Change	Value	% Change
November 2006	$26.02		$1,400.63	
December 2006	$25.80		$1,418.30	
January 2007	$25.86		$1,438.24	
February 2007	$23.87		$1,406.82	
March 2007	$22.56		$1,420.86	

1. Which of the stocks above had percentage changes that were very different from the market?

2. What do you think this means about their beta numbers?

3. Which of the stocks above had percentage changes that were fairly similar to the changes in the market?

4. What do you think this implies about its beta number?

5. Predict next to each company whether its beta number would be high or low.

Interpreting Beta Numbers

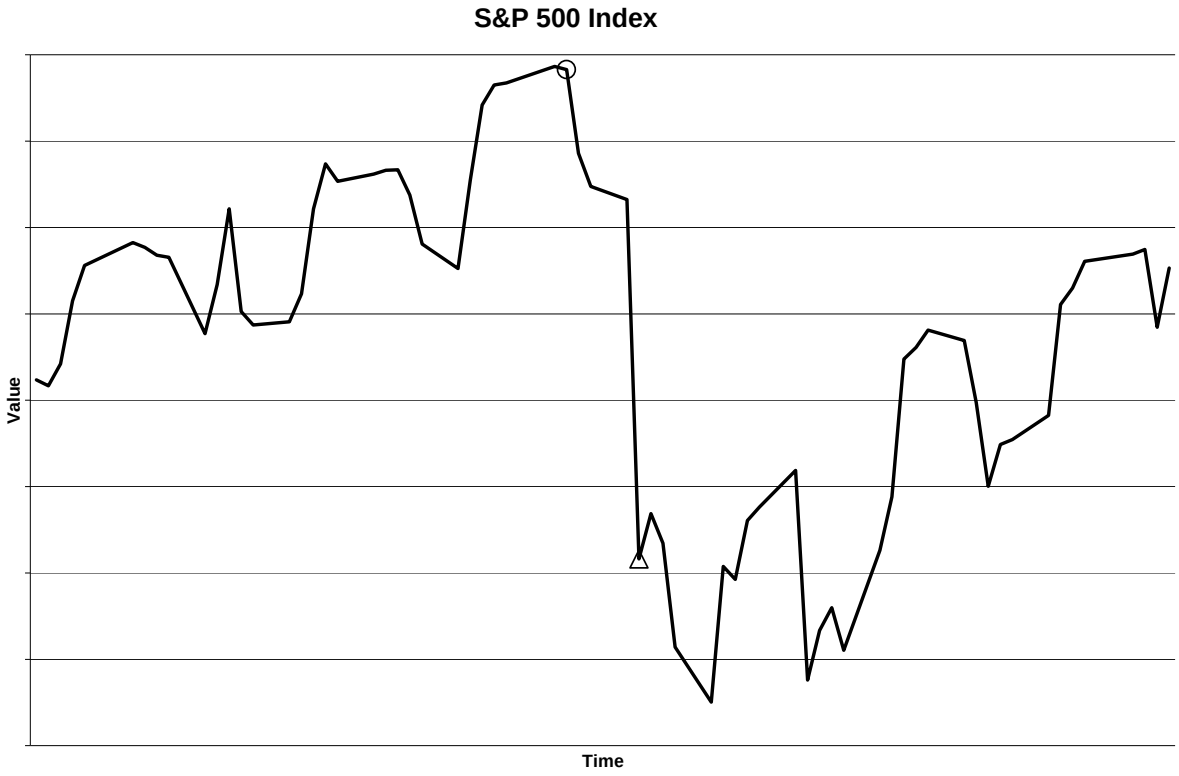
If you were a financial advisor, you would need to understand your clients' tolerance for risk and then use your knowledge of beta numbers to help inform your clients about how risky investments can be.

In a meeting, your client who has low risk tolerance, says he does not want to invest in a certain stock because over a 52-week period the stock's price changed between a high of $120.47 and a low of $75.42. The client describes this change as "wild," and says that he does not want to invest in such a risky stock. You know that this stock has a Beta number of 1.01.

1. What is the overall percentage change of the stock's high and low prices?

2. As a percentage change, how big is this change in stock price?

Assume the chart below is a graph of the S&P 500 Index over the same period.



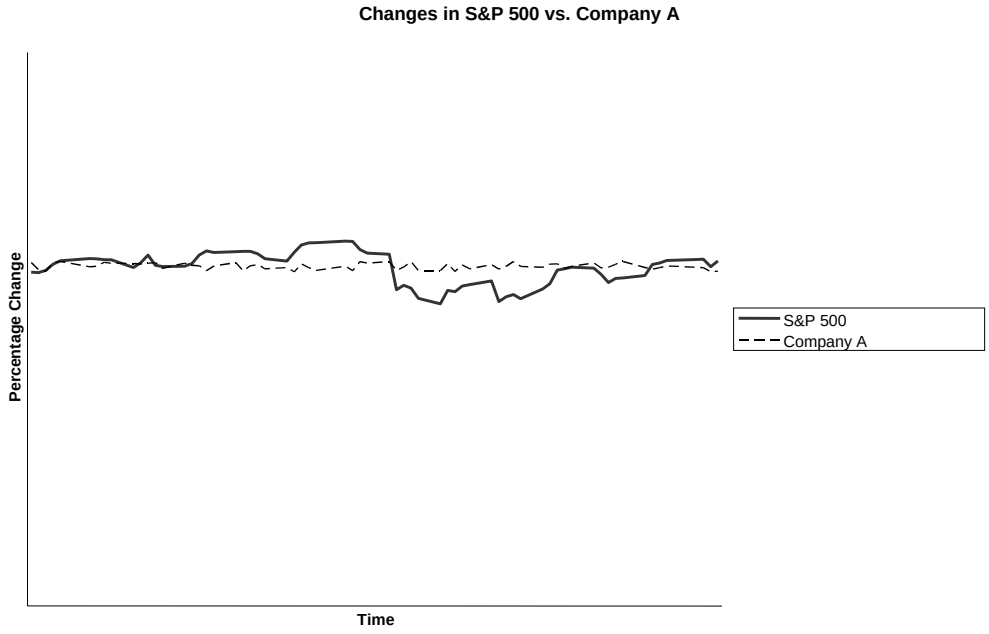
3. How does the chart above help explain why the dramatic change occurred, yet the stock has a beta of 1.01?

4. If the point circled on the graph represents a value $12,783, calculate the value of the point with the triangle on it if the percentage change in the S&P 500 is the same as the percentage change you calculated in #2.

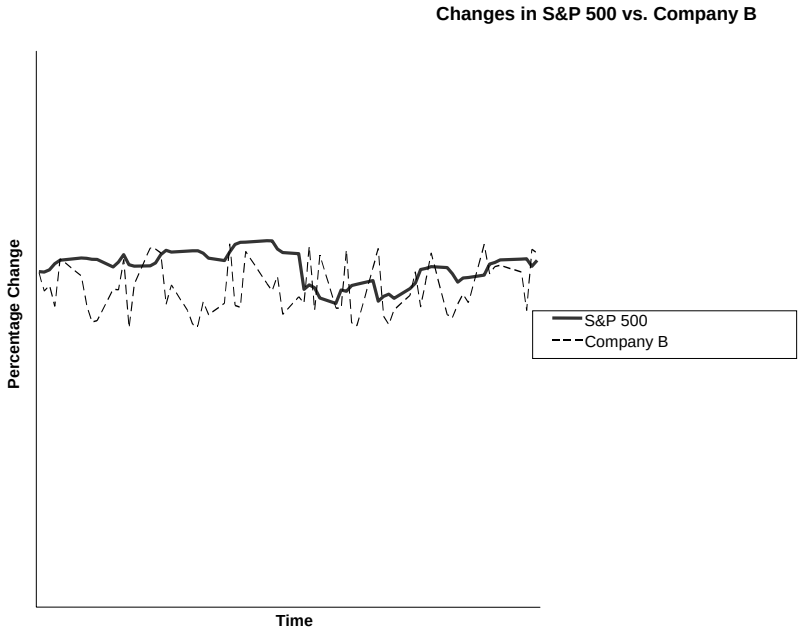
5. Use your knowledge of beta to explain to your client what may have been going on in the stock market during this same time, and why this fluctuation may not be that "wild" after all.

The following graphs illustrate how the relative performance of stocks with different beta numbers would perform against the market as a whole.

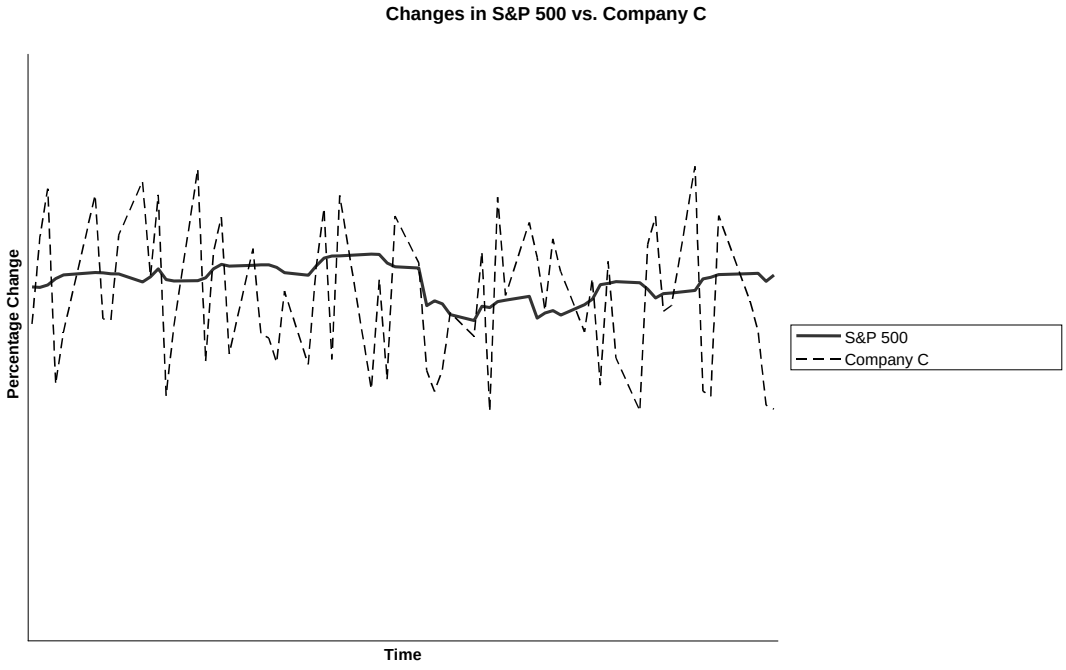
Company A has a beta of 1.02.



Company B has a beta of 2.3



Company C has a beta of 5.8

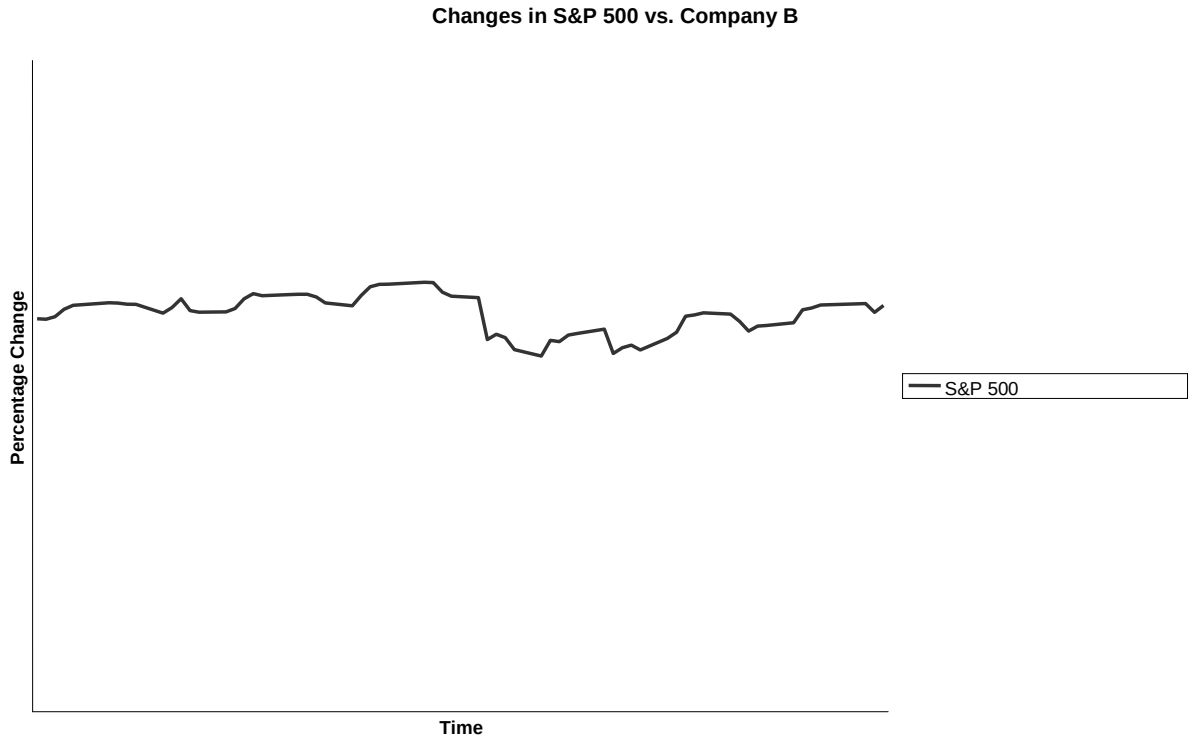


1. Which of the graphs shows a stock whose performance most closely resembles the trend of the S&P 500 Index?

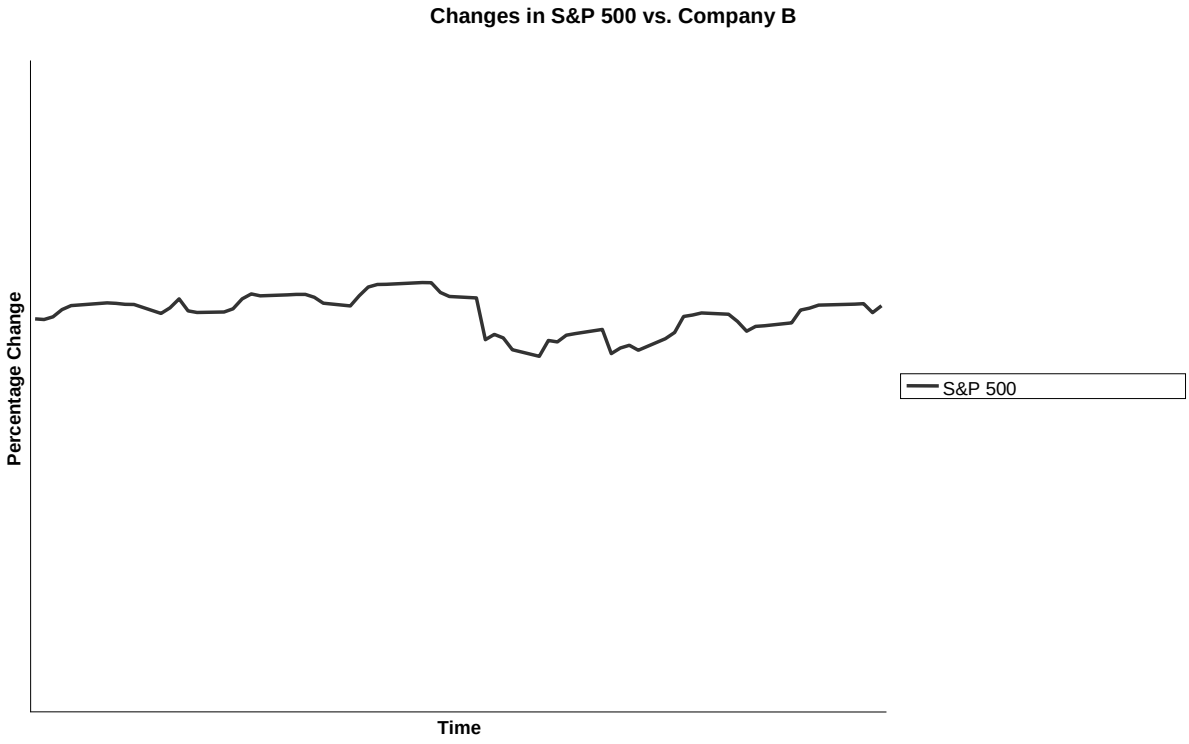
2. Which of the graphs shows a stock whose performance showed more dramatic changes than the S&P 500 Index?

3. What is different about the graph of a stock's relative performance when it has a beta close to 1 compared to when it has a beta close to 5?

4. Describe what the graph of a stock's relative performance would look like compared to that of the S&P 500 Index if the stock has a beta of 3. Use the graph below to draw a graph of the stock's performance.



5. Describe what the graph of a stock's relative performance would look like compared to that of the S&P 500 if the stock had a beta of 8.9. Use the graph below to draw a graph of the stock's performance.



How Does Money Grow Over Time?

Lesson Summary

How Does Money Grow Over Time? will teach students about types of interest and various savings venues.

Lesson Objectives

- Define compound interest and explain the effect of compounding interest on a daily, monthly, quarterly, or annual basis.
- Investigate various investment and saving opportunities.
- Define and demonstrate comprehension of the following terms: saving, investing, Rule of 72, compound interest, and diversification.

NCTM Standards

1A - Understand numbers, ways of representing numbers, relationships among numbers, and number systems.
1B - Understand meanings of operations and how they relate to one another.
1C - Compute fluently and make reasonable estimates.
2A - Understand patterns, relations, and functions.
5A - Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.
5B - Select and use appropriate statistical methods to analyze data.
5C - Develop and evaluate inferences and predictions that are based on data.
5D - Understand and apply basic concepts of probability.
6B - Solve problems that arise in mathematics and in other contexts.
6D - Monitor and reflect on the process of mathematical problem solving.
8A - Organize and consolidate mathematical thinking through communication.
8B - Communicate mathematical thinking coherently and clearly to peers, teachers, and others.
9C - Recognize and apply mathematics in contexts outside of mathematics.

Mathematical Strands

	Thinking Algebraically	Students will use the formula $FV = P(1+r)^t$ to calculate the value of future investments.	
	Interpreting Statistics	Students will calculate the percentage returns from investments in the stock market and then compare those rates of return to the interest rates money could have been earning in a bank. Students will calculate the rate of return of the Dow Jones Industrial Average.	
	Communicating Quantitative Information	Students will practice their skills with compound interest, calculate investment growth, and graph exponential growth.	
	Tackling Complex Problems	Students will calculate compound interest over a long period of time to witness the dramatic growth produced by compounded interest. You may choose to tell them the formula: Future Value = Principal·(1+interest rate)^{time} or $FV=P(1+r)^t$. This is also an opportunity to teach students to use formulas in a spreadsheet application (such as Microsoft Excel or Lotus 1-2-3).	

Calculating the Value of Future Investments
Use the formula presented to find the value of the missing information.

$FV = P(1+r)^t$, where FV is the future value of an investment
P is the principal or initial investment
r is the interest rate, expressed as a decimal
t is the time, expressed in years.

	Principal	Interest Rate	Years	Future Value
1.	$3,000	8%	10	
2.	$1,500	10%	5	
3.	$7,000,000	2%	2	
4.	$20	3%	60	
5.	$804	1%	15	
6.	$382	11%	20	
7.	$4,560	4%	7	
8.	$0.01	5%	500	
9.	$30,000,000	5%	2	
10.		6%	10	$24,000
11.		4%	100	$5,000,000
12.		3%	2	$34,290

Below is a table listing yearly close data of the Dow Jones Industrial Average from 1997 to 2006.
(*Dow Jones Indexes.* January 2007 <http://www.djindexes.com/mdsidx/downloads/xlspages/DJIA_Hist_Perf.xls>)

Calculate the rate of return for each one-year period. Use the following formula:

$$\text{Rate of return} = \frac{(year's\_close) - (prior\_year's\_close)}{prior\_year's\_close}$$

Trade	Year's Close	Rate of Return
December 1997	7,908.25	---------
December 1998	9,181.43	16.10%
December 1999	11,497.12	25.22%
December 2000	10,787.99	-6.17%
December 2001	10,021.57	-7.10%
December 2002	8,341.63	-16.76%
December 2003	10,453.92	25.32%
December 2004	10,783.01	3.15%
December 2005	10,717.50	-0.61%
December 2006	12,463.15	16.29%

1. For which year was the rate of return from the Dow Jones the greatest?

2. For which year was the rate of return from Dow Jones the smallest?

3. Some of the rates of return from the Dow Jones Industrial Average are small and some are large. What would your advice be to someone who saw these rates of return and decided to invest *all* of their savings in stocks? Is this the best investment idea? Why or why not?

This is a table of the federal interest rate for the same years.
Board of Governors of the Federal Reserve System. January 2007 <www.federalreserve.gov>

Year	Interest Rate
1997	8.44%
1998	8.35%
1999	8.00%
2000	9.23%
2001	6.91%
2002	4.67%
2003	4.12%
2004	4.34%
2005	6.19%
2006	7.96%

Based on the DJIA table and the interest rate table to the left, in which years would it have been better to invest some money in the stock market rather than all the money in the bank? Why?

Investment and Compounded Interest

Becca and David are trying to put money aside for their children's education. Their first child will be attending college in 10 years and they have about $11,500 saved so far. They plan on saving another $2,000 a year to put into this account each January.

Assume that Becca and David's investment account has an annually compounded interest rate of 6%. They want to know how much money they will have when their first child starts college.

1. Complete the table below by calculating the total value of their investment account for years 6-10.

Year	Value of Investment	Value after Additional Deposit	Interest	New Amount of Investment
	$11,500.00	$11,500.00	$690.00	$12,190.00
1	$ 12,190.00	$14,190.00	$851.40	$15,041.40
2	$ 15,041.40	$17,041.40	$1,022.48	$18,063.88
3	$18,063.88	$20,063.88	$ 1,203.83	$21,267.71
4	$21,267.71	$23,267.71	$1,396.06	$24,663.77
5	$24,663.77	$26,663.77	$1,599.83	$28,263.60

2. You are their financial planner and you will be meeting with the couple to show them how this college fund will grow. For your meeting you will need to give a brief talk (2-4 minutes). Prepare a graph or table to explain to Becca and David their investment's projected growth.

The Importance of Time in Investing

If Peter invests $100 at the beginning of each year, starting at age 15 and ending at age 65, in a simple savings account that has an annually compounded interest rate of 4%, how much money will be in the account when he is 65?

A table showing the value of Peter's investment has been started for you below.

Year	New Value of Investment	Value of Investment After Deposit	Interest Earned
15	$0.00	$100.00	$4.00
16	$104.00	$204.00	$8.16
17	$212.16	$312.16	$12.49
18	$324.65	$424.65	$16.99
19	$441.63	$541.63	$21.67
. . .			
52	$8,497.03	$8,597.03	$343.88
53	$8,940.91	$9,040.91	$361.64
54	$9,402.55	$9,502.55	$380.10
55	$9,882.65	$9,982.65	$399.31
56	$10,381.96	$10,481.96	$419.28
57	$10,901.24	$11,001.24	$440.05
58			
59			
60			
61			
62			
63			
64			
65			

1. Explain how the *Value of the Investment After Deposit* was calculated in year 2.

2. Explain how the *Interest Earned* was calculated in year 2.

3. Explain how the *New Value of Investment* was calculated in Year 3.

4. Using your knowledge of the table, complete the last eight rows.

5. If Rachel, Peter's friend, decides at age 30 that she would like to start a savings account that would have as much money in it as Peter's does when they are both 65, how much money would she need to invest all at once at age 30?

Use the formula: $I = P(1+r)^t$, where I is the value of the initial investment (*P)*, after being invested for *t* years at an rate of return of *r*.

Dividends and Earnings

Lesson Summary

Dividends and Earnings will teach students how an investor receives a return on a stock purchase.

Lesson Objectives

- Draw conclusions as to how to examine a company before making investments.
- Describe the factors that influence investment decisions.
- Calculate dividends paid out to stockholders.
- Calculate net gain/loss for an investor.
- Explain the difference between earnings and dividends.

NCTM Standards

1A - Understand numbers, ways of representing numbers, relationships among numbers, and number systems.
1B - Understand meanings of operations and how they relate to one another.
1C - Compute fluently and make reasonable estimates.
2A - Understand patterns, relations, and functions.
5A - Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.
5B - Select and use appropriate statistical methods to analyze data.
5C - Develop and evaluate inferences and predictions that are based on data.
5D - Understand and apply basic concepts of probability.
6A - Build new mathematical knowledge through problem solving.
6B - Solve problems that arise in mathematics and in other contexts.
6C - Apply and adapt a variety of appropriate strategies to solve problems.
6D - Monitor and reflect on the process of mathematical problem solving.
7C - Develop and evaluate mathematical arguments and proofs.
8A - Organize and consolidate mathematical thinking through communication.
8B - Communicate mathematical thinking coherently and clearly to peers, teachers, and others.
9B - Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.
9C - Recognize and apply mathematics in contexts outside of mathematics.
10A - Create and use representations to organize, record, and communicate mathematical ideas.
10B - Select, apply, and translate among mathematical representations to solve problems.

Mathematical Strands

	Thinking Algebraically	Students use a simple formula for calculating dividend payments to investors.	
	Interpreting Statistics	Students use information presented in a chart to answer questions	
	Communicating Quantitative Information	Students make recommendations for selling stocks, based on when dividends will be awarded.	
	Tackling Complex Problems	Students compute the value of investments over time by applying their knowledge of dividends, reinvestment of dividends, and broker's fees.	

Use the formula below to determine the answer to each question.

Dividend Payment = (Dividend per Share)·(Number of Shares)

1. Carol has 7,400 shares of a stock that is paying a dividend of $0.40 per share. What will her dividend payment be?

2. Lilliana owns 1,560 shares of a stock which pays a dividend of $0.28 per share. How much is her dividend payment?

3. Jon's stock pays dividends of $0.78 per share, and he owns 7,980 shares of the stock. How much money will he receive in dividends?

4. Hanna has 980 shares of a stock which will pay dividends of $0.354 per share. What will her dividend payment be? How much will she be paid over the course of three dividend payments?

5. Irene is getting a dividend payment of $1,418.75 from her 6,250 shares of stock. How much was the dividend payment per share?

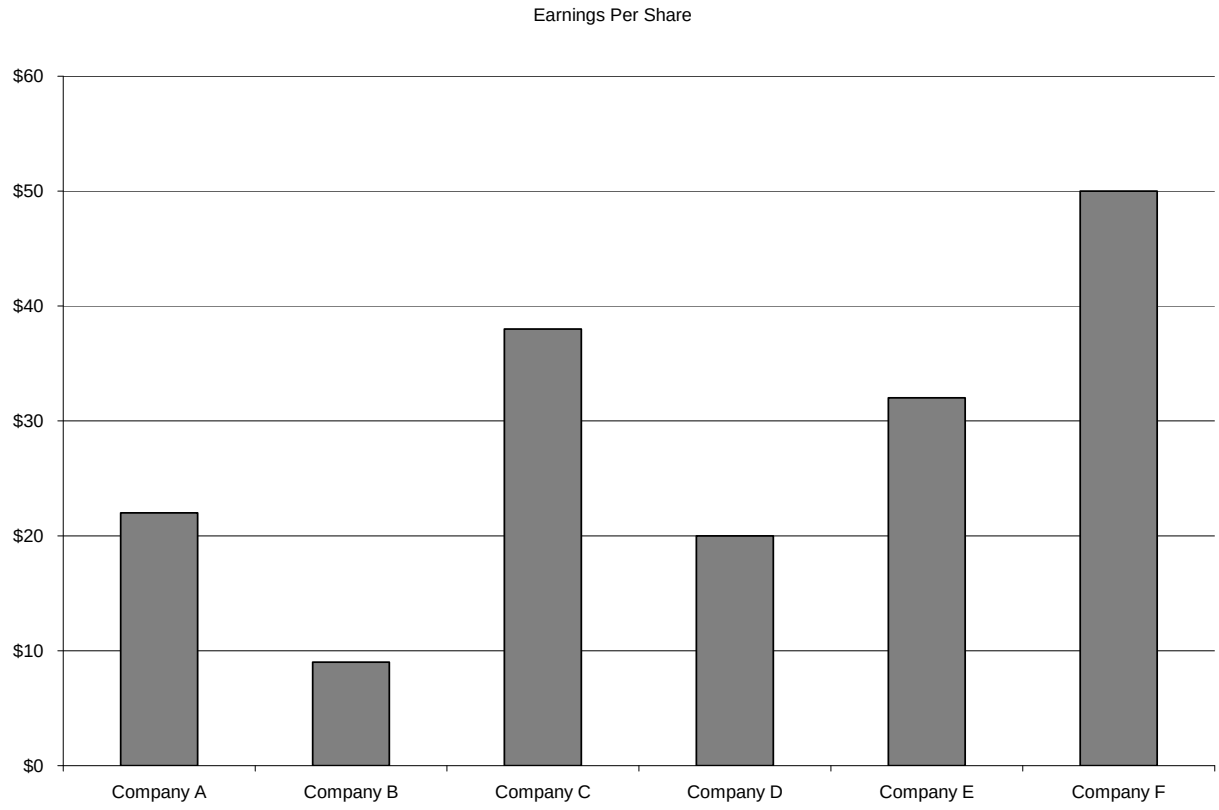
6. Darryl is getting a dividend payment of $72.75 from a dividend of $0.15 per share. How many shares does he own?

Number of shares = dividend payment ÷ dividend amount per share
= $72.75 ÷ $0.15 = 485

7. Leigh is receiving dividends of $2,016.70 for her 6,020 shares of stock. How much did the company pay in dividends for each share?

8. Robert owns 680 shares of stock which gave him a total dividend payment of $155.04. How much was the dividend per share?

Below is a chart that shows the earnings per share for three different companies. Use the information provided in the chart to answer the questions below.



1. Which company shows the greatest earnings per share?

2. Which company shows the least earnings per share?

3. What is the difference in earnings per share between the company with the greatest earnings per share and the least earnings per share?

4. Which companies have greater earnings per share than Company A?

5. Which companies have earnings per share that are less than $25?

Pretend that you are a financial advisor and one of your clients has come to you looking for advice. She wants to sell some investments in order to pay a $5,000 tuition bill.

Here is a list of her stocks.

Stock	Current Price	Number of Shares	Price 1 Year Ago	Dividend*
A	$40	200	$31	-
B	$102	125	$100	$2.50 / quarter
C	$36	150	$32	-
D	$68	250	$63	$1.50/quarter
E	$52	100	$54	-

*Dividends have been paid four times over the course of the investment and will be paid again in two weeks.

1. Calculate the gain per share (or loss per share) for each stock.
   gain per share = (current price) – (price one year ago)

2. Calculate the overall gain or loss for each stock, not including dividends.
   overall gain = (gain per share) (number of shares)

3. The client wants to sell the stock that showed the smallest growth over the past year. Which stock would that be?

4. Now calculate the gain or loss for each stock, but include profit from dividends.
   quarterly dividend payment over 1 year = (dividend) (number of shares) (4).

5. Which stock now has the smallest profit?

6. Which stock would you advise your client to sell? Why?

1. On April 3, 2006, Sarah bought 4,900 shares of American International Group, Inc. (AIG), stock for $65.67 per share. AIG paid a dividend of $0.15 on May 31, 2006. She sold 1,000 shares of the stock on August 2, 2006 for $60.28 each, but the remaining stock earned a dividend of $0.165 on August 30, 2006. On November 29, 2006, her stocks paid another $0.165 dividend, and on February 2, 2007, Sarah sold all her remaining AIG stock for $69.07.

Assuming that Sarah paid a 2% broker's fee for every transaction, how much money did Sarah earn or lose on her investment from April 3, 2006 to February 2, 2007?

2. On November 7, 2006, Emilio bought 23,500 shares of AT&T Incorporated (T) stock for $34.30 a share. On January 8, 2007, he received a $0.355 dividend, which he reinvested in more shares of AT&T, which were then valued at $33.81.

Assuming there are no broker's fees, how many new shares of AT&T did Emilio buy?

How many shares does he now have?

He wants to sell enough shares to make back the amount of money he used to buy the original batch of AT&T stock. How many shares should he sell if they are currently valued at $38.84 on April 14, 2007?

3. For a Valentine's Day present, Peter bought his new wife 5,000 shares of Honeywell International Inc. (HON) stock for $40.51 per share. The stock paid four dividends, each worth $0.227, and each time Peter took the money and bought more stock on behalf of his wife. The prices of the stock at the time he reinvested were $41.43, $42.00, $38.77, and $43.32. Two days before Valentine's Day the next year, he sold all the stock (to purchase a new house for his family) when each share was valued at $49.06. Use the following table to keep track of your calculations.

	Investment	Broker's Fee	Total Number of Shares at Time of Dividend	Dividend Paid	Total Amount Gained from Dividend	New Price per Share	Number of Shares Bought with Dividend Payments (whole units)
Initially			----	----	----	----	----
First Payment							
Second Payment							
Third Payment							
Fourth Payment							
Sale			----	----	----	----	----

Assuming that Peter paid the same 2% broker's fee for every transaction (excluding the receipt of the dividend), how much money did Peter gain or lose during the course of his investment?

Disclaimers: 1. Prices included in lesson are not representative of actual market data and are for instructional purposes only. 2. Discrepancies may occur between student responses and the answer keys as a result of how far calculations were taken past the decimal point. In most instances, numbers were rounded from the thousandth or ten thousandth place.

What is an Exchange/Market?

Lesson Summary

What Is an Exchange/Market? discusses the functions of stock exchanges, and the advantages or disadvantages of listing on one stock exchange over another.

Lesson Objectives

- Explain the role of exchanges in shaping the market place.
- Compare and contrast standard listing requirements for each exchange.
- Understand the advantages and disadvantages of listing with the NYSE, NASDAQ and AMEX.
- Describe the differences between a dealers market and an auction market.
- Draw conclusions as to whether the exchange on which a stock is listed should impact the choices made by SMG teams.
- Draw conclusions as to the role technology has played in changing the work and impact of the stock market.

NCTM Standards

1A - Understand numbers, ways of representing numbers, relationships among numbers, and number systems.
5A - Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.
5C - Develop and evaluate inferences and predictions that are based on data.
5D - Understand and apply basic concepts of probability.
9C - Recognize and apply mathematics in contexts outside of mathematics.
10A - Create and use representations to organize, record, and communicate mathematical ideas.
10B - Select, apply, and translate among mathematical representations to solve problems.

Mathematical Strands

	Thinking Algebraically	Students practice using currency conversion tables. When students achieve fluency, they may choose to use one of many online currency converters.	
	Interpreting Statistics	Students identify trends in the data from a table. Students will then look at more concrete examples to see how the buying power of the dollar changes in foreign markets.	
	Communicating Quantitative Information	Students create a brief analysis of where the most economical place to travel would be based on the information provided.	
	Tackling Complex Problems	Students follow the buying and selling of stocks by a foreign investor. Even though the stock's price rose over the time period given, the investor lost money because the exchange rate changed against his favor over the course of his investment. Students are asked to explain this phenomenon in a brief paragraph.	

Converting Currency Quickly

Currency	U.S. $	¥en	Euro	Can $	U.K. £	AU $	Swiss Franc
1 U.S. $ =	1.0000	121.8500	0.7688	1.1714	0.5036	1.2877	1.2475
1 ¥en =	0.008207	1.0000	0.006309	0.009613	0.004133	0.010568	0.010238
1 Euro =	1.3007	158.4962	1.0000	1.5237	0.6551	1.6750	1.6227
1 Can $ =	0.8537	104.0208	0.6563	1.0000	0.4299	1.0993	1.0650
1 U.K. £ =	1.9856	241.9488	1.5265	2.3260	1.0000	2.5570	2.4771
1 AU $ =	0.7765	94.6226	0.5970	0.9096	0.3911	1.0000	0.9687
1 Swiss Franc =	0.8016	97.6754	0.6163	0.9390	0.4037	1.0323	1.0000

Use the table above to covert the currency below into the appropriate denomination.

1. 30 U.S. dollars = Yen

2. 400 Euro = Canadian $

3. 1,000,000 £ = U.S. $

4. 4 ¥ = Australian dollars

5. 50 Canadian dollars = Australian dollars

6. $100,000 U.S. = Swiss Francs

7. 805,000 Yen = Euro

8. 500,000 Swiss Francs = U.S. $

9. 35,142 Canadian dollars = U.S. $

10. 5240.80 Euro = £

Exchange Rates

Below is a table of monthly averages of the value of the euro (€, the currency used in European Union nations) against the U.S. dollar (USD).

Month	USD per 1 Euro
January 2006	1.21032 USD
February 2006	1.19393 USD
March 2006	1.20284 USD
April 2006	1.22733 USD
May 2006	1.27662 USD
June 2006	1.26606 USD
July 2006	1.26806 USD
August 2006	1.28105 USD
September 2006	1.27274 USD
October 2006	1.26164 USD
November 2006	1.28895 USD
December 2006	1.32013 USD

1. Describe the trend you see in the data above. Did the dollar get weaker against the Euro over 2006 or stronger? How can you tell?

2. How much was $1 million worth in Euros in October 2006?

3. How much was $1 million worth in Euros in November 2006?

4. If you had stock worth 120,540€ in November of 2006, how much was that worth in U.S. dollars?

5. If you had an investment valued at 30,250€ in March 2006, how much was that worth in USD?

6. If you had 250,250€ in April 2006, how much U.S. currency could you buy?

7. If you wanted to buy 200 shares of DaimlerChrysler (DCX.BE) on the Berlin stock exchange at 49.43 Euro each, how much would this cost you in July 2006 in U.S. dollars?

Below is a table of monthly averages of the value of the Japanese Yen (¥, the currency used in Japan) against the U.S. dollar (USD).

Month	USD per Yen
January 2006	0.00865239 USD
February 2006	0.00848665 USD
March 2006	0.00852716 USD
April 2006	0.00854353 USD
May 2006	0.00894797 USD
June 2006	0.00872543 USD
July 2006	0.00863886 USD
August 2006	0.00862683 USD
September 2006	0.00853158 USD
October 2006	0.00843055 USD
November 2006	0.00852645 USD
December 2006	0.00851937 USD

Describe the trend you see in the data above. Did the dollar get weaker against the Yen over 2006 or stronger? How can you tell?

Traveling Abroad

Below is a table that shows the currency conversions between major world currencies. For example, it tells us that on a certain day one U.S. dollar was worth 1.17 Canadian dollars.

Major Currency Cross Rates

Currency Last Trade	U.S. $	¥en	Euro	Can $	U.K. £	AU $	Swiss Franc
1 U.S. $ =	1	121.8500	0.7688	1.1714	0.5036	1.2877	1.2475
1 ¥en =	0.008207	1	0.006309	0.009613	0.004133	0.010568	0.010238
1 Euro =	1.3007	158.4962	1	1.5237	0.6551	1.6750	1.6227
1 Can $ =	0.8537	104.0208	0.6563	1	0.4299	1.0993	1.0650
1 U.K. £ =	1.9856	241.9488	1.5265	2.3260	1	2.5570	2.4771
1 AU $ =	0.7765	94.6226	0.5970	0.9096	0.3911	1	0.9687
1 Swiss Franc =	0.8016	97.6754	0.6163	0.9390	0.4037	1.0323	1

(Source: http://finance.yahoo.com/currency, February 11, 2007)

1. How many British Pounds (£) could be purchased with 1 Australian dollar?

2. How many British Pounds could be bought with 20 Australian dollars?

3. How many U.S. dollars could be exchanged for 400 Swiss Francs?

4. How many British Pounds could be exchanged for 200,000 Japanese Yen (¥)?

One of your U.S. relatives has decided to see more of the world and wants to travel to some foreign countries. Knowing that you have been studying stock markets and exchanges, the relative asks you what countries would provide the best exchange rates.

5. In which countries does the U.S. dollar have the most buying power?

6. In which countries does the U.S. dollar have the weakest buying power?

7. Given the exchange rates above, where would you advise your relative to travel? Why?

8. What other information would you want to know about buying power before you traveled?

Foreign Investors

A Chinese investor named Min bought 2,000 shares of Yahoo! Inc. (YHOO), at $25.54 per share.

- How much did he pay in U.S. dollars?

- Given the exchange rate below, how much did he pay in Chinese Yuan?

US Dollar	Chinese Yuan
1	7.8041

- About two months later, he decided to sell all his Yahoo! Inc. stock, when it was valued at $29.74 per share. How much was his investment worth in U.S. dollars when he sold it?

- In American dollars, did Min make a profit or a loss?

- Given the exchange shown below for the date on which he sold his Yahoo! Inc. stock, how much was Min's investment worth in Chinese Yuan?

US Dollar	Chinese Yuan
1	6.5533

- Was this a profit or a loss for Min in Chinese Yuan?

- Explain what happened to Min.

Foreign Investing

Over the two year period shown, in which of these stocks would a European investor have made money? In which would he have taken a loss?

January 3, 2005

Stock	Price
Sony Corp (SNE)	$38.71
Eastman Kodak Company (EK)	$32.48
Sprint Nextel Corp. (S)	$24.85
Staples, Inc (SPLS)	$32.85
Google, Inc. (GOOG)	$202.71

U.S. Dollar ($)	Euro (€)
1	0.74206

January 3, 2007

Stock	Price
Sony Corp (SNE)	$42.91
Eastman Kodak Company (EK)	$25.91
Sprint Nextel Corp. (S)	$19.04
Staples, Inc (SPLS)	$26.40
Google, Inc. (GOOG)	$467.59

U.S. Dollar ($)	Euro (€)
1	0.76894

What is Diversification?

Lesson Summary

What is Diversification? will teach students how diversification of investments can help reduce risk.

Lesson Objectives

- Create a diversified portfolio selecting stocks from at least six industries.
- Conduct Internet research on different investment options and write a summary of their findings and present to the class.
- Interpret company and industry charts to determine which investments to make with their SMG teams.
- Define diversification, risk tolerance, industry, and index.

NCTM Standards

1A - Understand numbers, ways of representing numbers, relationships among numbers, and number systems.
1B - Understand meanings of operations and how they relate to one another.
5A - Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.
5B - Select and use appropriate statistical methods to analyze data.
5C - Develop and evaluate inferences and predictions that are based on data.
5D - Understand and apply basic concepts of probability.
6C - Apply and adapt a variety of appropriate strategies to solve problems.
7B - Make and investigate mathematical conjectures.
8A - Organize and consolidate mathematical thinking through communication.
8B - Communicate mathematical thinking coherently and clearly to peers, teachers, and others.
8C - Analyze and evaluate the mathematical thinking and strategies of others.
8D - Use the language of mathematics to express mathematical ideas precisely.
9C - Recognize and apply mathematics in contexts outside of mathematics.

Mathematical Strands

	Thinking Algebraically	Students calculate percentages to determine sectors in a diverse portfolio.	
	Interpreting Statistics	Students are given profiles of investor portfolios, with investments disaggregated by industry sector. Students should be able to read the information presented to determine which sectors the investor is most and least invested in, and to identify which portfolios are diversified.	
	Communicating Quantitative Information	Students create bar charts, pie charts, or other graphical representations to present information on diversification.	
	Tackling Complex Problems	Students are given a sample SMG portfolio of stocks to analyze for diversification in terms of cap size.	

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Calculating Percentages
To calculate percentages, take the amount of money in a category (for example, all the money invested in small cap firms), divide it by the total amount of money in the portfolio, and multiply by 100%.

% of portfolio invested in small cap firms =

$$\frac{money\_invested\_in\_all\_small\_cap\_firms}{total\_value\_of\_investment} \cdot 100\%$$

Company	Size	Sector	Value
A	Mid	Industrial Materials	$36,000
B	Small	Consumer Goods	$7,000
C	Large	Media	$11,000
D	Mid	Utilities	$3,000
E	Mid	Consumer Goods	$7,000
F	Large	Consumer Goods	$21,000
G	Small	Telecommunications	$1,500
H	Large	Industrial Goods	$31,000
I	Small	Health	$15,500
J	Mid	Energy	$5,000
K	Large	Energy	$27,000
L	Mid	Utilities	$19,000

1. What is the total value of the investment above?

2. Using the portfolio above, calculate the percentage of the total investment in each sector.

3. Calculate the percentage of the investment in each size company.

4. Construct a bar chart to show how diversified this portfolio is in terms of sector.

5. Construct a pie chart to show how diversified this portfolio is in terms of cap size.

Below is the profile of a portfolio's holdings (displayed within industry sectors).

Sector	% Holdings
Utilities	25.50
Business Services	9.06
Financials	0.00
Telecommunications	0.00
Media	0.00
Consumer Goods	0.00
Energy	6.86
Hardware	6.10
Health	0.00
Software	0.00
Consumer Services	0.00
Industrial Materials	52.49

1. How much more is this portfolio invested in Industrial Materials than in Utilities?

2. How much more is this portfolio invested in Energy than Hardware?

3. Would you say that this portfolio is well-diversified portfolio or not well-diversified? Why?

Below is the profile of another portfolio's holdings (displayed within industry sectors).

Sector	% Holdings
Utilities	1.48
Business Services	10.46
Financials	4.02
Telecommunications	0.00
Media	8.54
Consumer Goods	20.72
Energy	3.91
Hardware	2.63
Health	2.15
Software	0.00
Consumer Services	25.32
Industrial Materials	20.77

4. What sector does the investor have the most money invested in?

5. What sector does the investor have the least money invested in?

6. Would you say that this is a well-diversified portfolio? Why?

Below is the profile of a third portfolio's holdings (displayed within industry sectors).

Sector	% Holdings
Utilities	0.00
Business Services	0.00
Financials	0.00
Telecommunications	98.86
Media	0.00
Consumer Goods	0.00
Energy	0.00
Hardware	0.00
Health	0.00
Software	0.00
Consumer Services	0.00
Industrial Materials	1.14

7. What sector does the investor have the most money invested in?

8. What sector does the investor have the least money invested in?

9. Would you say that this is a well-diversified portfolio? Why?

If one sector of the economy falls precipitously, which portfolio may be at the greatest risk? Which portfolio has the greatest protection from dramatic fluctuations in one sector of the portfolio? Why?

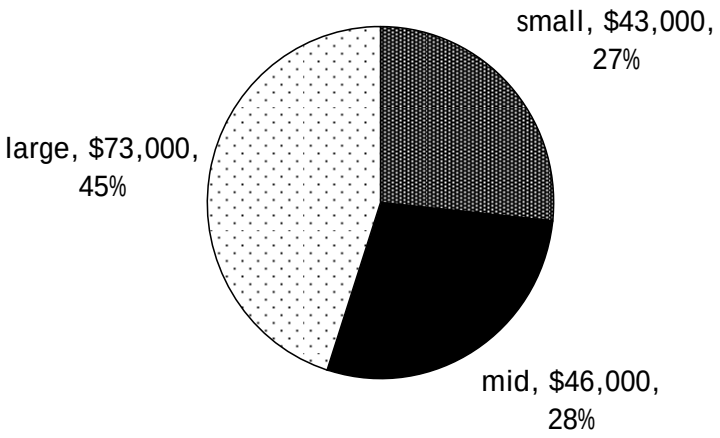
Creating Charts to Represent Diversification

There are many ways to represent a diversified portfolio and a few different ways to consider just what is considered a diversified investment portfolio.

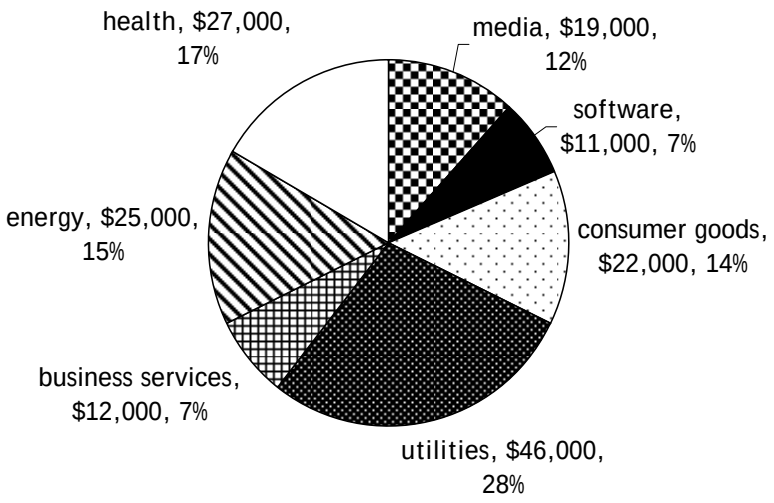
Company	Cap Size	Sector	Investment Value
A	Small	Media	$6,000
B	Mid	Software	$11,000
C	Mid	Consumer Goods	$10,000
D	Small	Consumer Goods	$7,500
E	Large	Utilities	$36,000
F	Small	Business Services	$12,000
G	Large	Utilities	$10,000
H	Small	Consumer Goods	$4,500
I	Mid	Energy	$25,000
J	Large	Health	$27,000
K	Small	Media	$13,000

The following graphs present the information above in different ways.

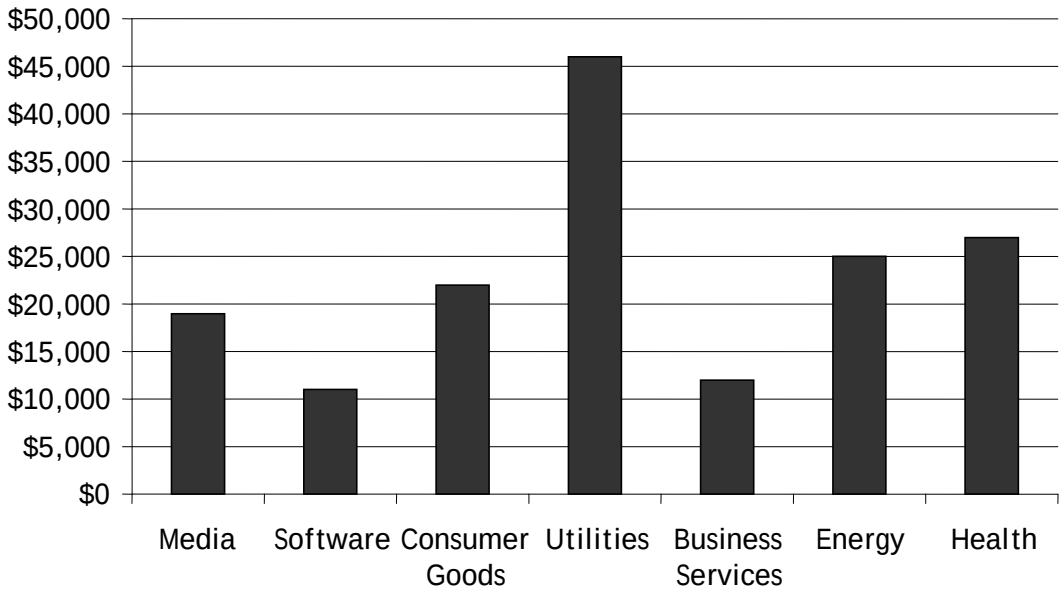
1. Next to each graph write a brief description of what information each graph presents.

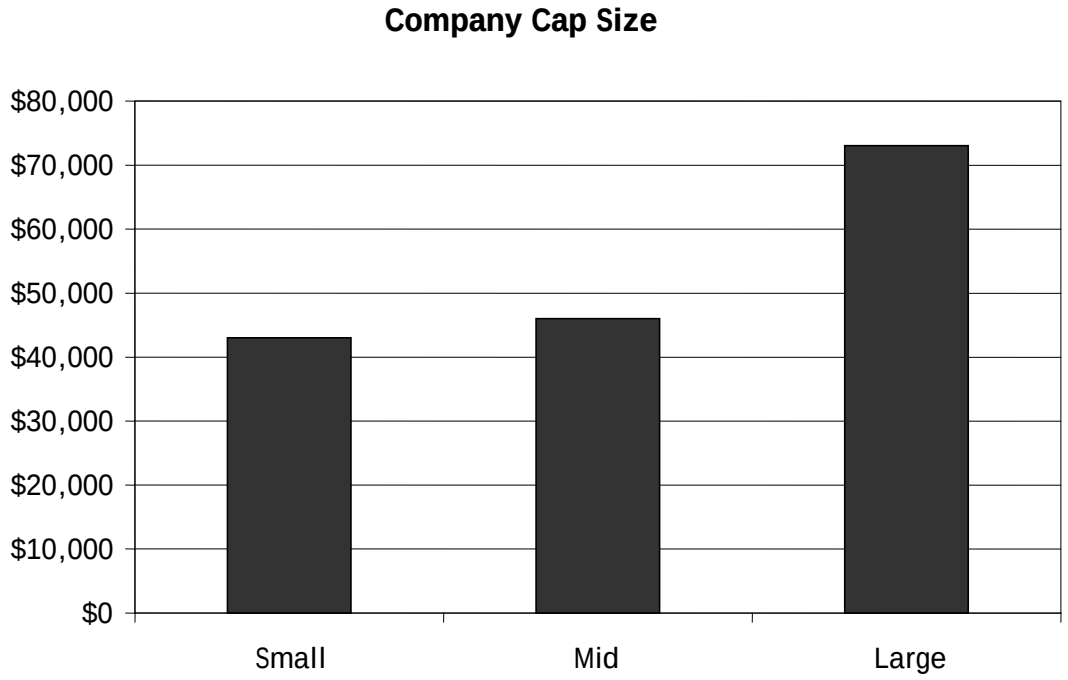


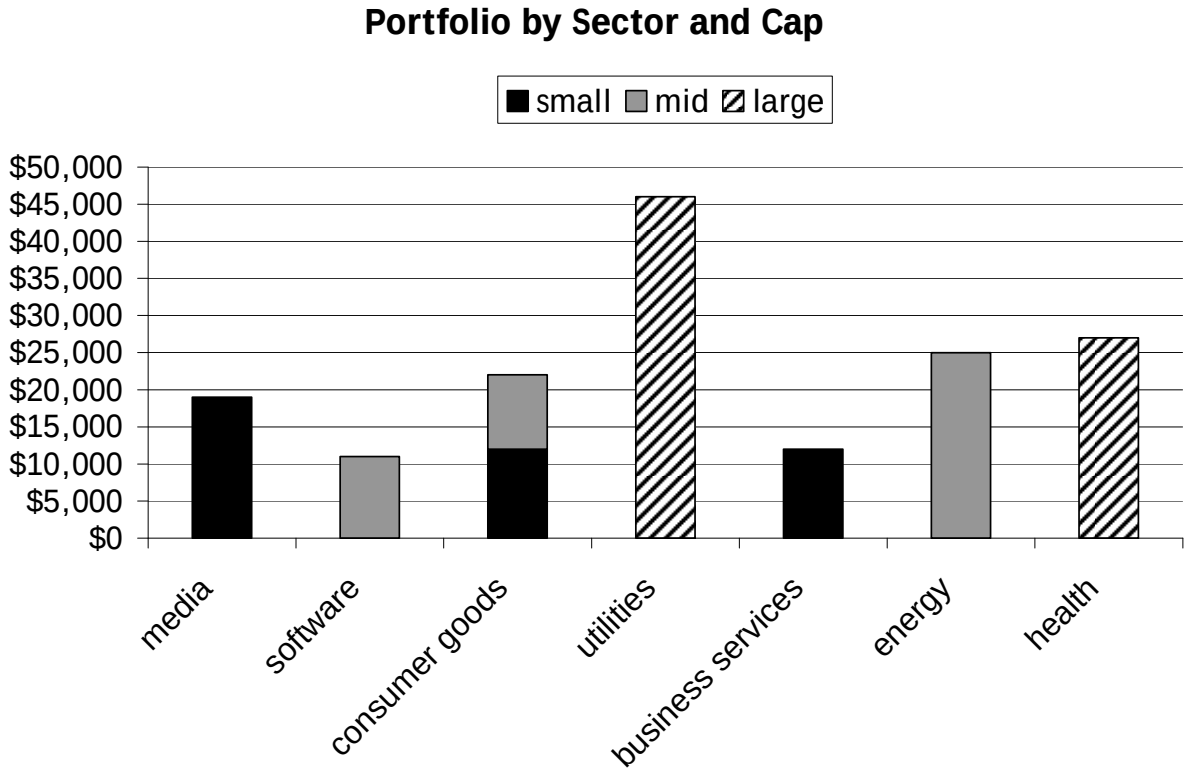
Investment by Sector



Investment by Sector




Company Cap Size
$80,000
$70,000
$60,000
$50,000
$40,000
$30,000
$20,000
$10,000
$0
Small
Mid
Large


Portfolio by Sector and Cap
small
mid
large
$50,000
$45,000
$40,000
$35,000
$30,000
$25,000
$20,000
$15,000
$10,000
$5,000
$0
media
software
consumer goods
utilities
business services
energy
health

2. Below is one portfolio with which you can practice. The stocks listed include information on the size of the company, the industry it operates within, and the value of the investment. Use this information to create three graphical representations to show the diversification of this portfolio both in terms of sector and cap size.

Company	Cap size	Sector	Investment Value
A	Mid	Consumer Services	$8,500
B	Mid	Software	$9,000
C	Small	Software	$13,500
D	Large	Media	$20,000
E	Mid	Telecommunications	$15,00
F	Large	Software	$12,000
G	Mid	Energy	$9,000
H	Small	Software	$50,000
I	Small	Telecommunications	$7,000
J	Mid	Financial	$5,000
K	Small	Consumer Goods	$9,000

Evaluating Diversification
Below are the stocks a team has in their portfolio.

Stock	Price per Share	Number of Shares	Cap Size
Amerisafe Inc. (AMSF)	$12.43	800	Small
Boeing Corporation (BA)	$79.20	125	Large
Citigroup (C)	$49.74	240	Large
Intel Corporation (INTC)	$20.68	390	Large
Peerless Manufacturing Company (PMFG)	$26.51	225	Small
Princeton Review (REVU)	$5.21	2700	Small
Radio Shack Corp. (RSH)	$17.53	950	Mid
U.S. Airways Group Inc. (LCC)	$46.50	80	Mid
Verisign Inc. (VRSN)	$21.14	450	Mid

1. What is the total value of their portfolio?

2. Determine what proportion of their investment is in small cap, mid cap and large cap stocks.

3. Would you advise them to diversify? Why or why not?

Five months later, the stock prices have changed to the new values in the table below.

4. Recalculate the proportions of their investment in small cap, mid cap, and large cap companies.

Stock	Price per Share	Number of Shares	Cap Size
Amerisafe Inc. (AMSF)	$18.30	800	Small
Boeing Corporation (BA)	$88.83	125	Large
Citigroup (C)	$51.05	240	Large
Intel Corporation (INTC)	$19.13	390	Large
Peerless Manufacturing Company (PMFG)	$32.00	225	Small
Princeton Review (REVU)	$5.53	2700	Small
Radio Shack Corp. (RSH)	$27.74	950	Mid
U.S. Airways Group Inc. (LCC)	$45.05	80	Mid
Verisign Inc. (VRSN)	$25.16	450	Mid

5. Compare the portfolio's diversification now to its diversification five months ago.

6. What advice would you give the portfolio manager?

What is a Mutual Fund?

Lesson Summary

What is a Mutual Fund? explains mutual funds and how can they aid in investment strategies.

Lesson Objectives

- Define and identify the characteristics of a mutual fund.
- Use the newspaper and Internet to research mutual funds.
- Use their research on mutual funds to help determine team investments for The Stock Market Game.
- Create and deliver a presentation on mutual funds, their risk, and performance.

NCTM Standards

1A - Understand numbers, ways of representing numbers, relationships among numbers, and number systems.
1B - Understand meanings of operations and how they relate to one another.
2A - Understand patterns, relations and functions.
5A - Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.
5B - Select and use appropriate statistical methods to analyze data.
5C - Develop and evaluate inferences and predictions that are based on data.
5D - Understand and apply basic concepts of probability.
6A - Build new mathematical knowledge through problem solving.
8B - Communicate mathematical thinking coherently and clearly to peers, teachers, and others.
8C - Analyze and evaluate the mathematical thinking and strategies of others.
8D - Use the language of mathematics to express mathematical ideas precisely.
9A - Recognize and use connections among mathematical ideas.
9C - Recognize and apply mathematics in contexts outside of mathematics.
10A - Create and use representations to organize, record, and communicate mathematical ideas.
10C - Use representations to model and interpret physical, social, and mathematical phenomena.

Mathematical Strands

	Thinking Algebraically	Students find percentages.	
	Interpreting Statistics	Students interpret information on mutual fund assets by calculating percentages.	
	Communicating Quantitative Information	Students use information on different companies to construct a graphical representation of the holdings of a mutual fund.	
	Tackling Complex Problems	Students will read the profiles of different investors. Given this information, they will then hypothesize what type of mutual fund would be the best investment for each person and then sketch a histogram to show how the assets of that mutual fund would be allocated.	

Practicing with Percentages

Percentages are a very important part of analyzing financial information.
In this exercise, you will find the percentage of the total mutual fund's worth invested in different stock types.

Remember,

$$\frac{part\_of\_investment}{total\_investment} \cdot 100\%$$

1. Mutual Fund A (total value = $51.7 million)
   - $13.4 million invested in growth stocks _____ % invested in growth stocks
   - $20.1 million invested in value stocks _____ % invested in value stocks
   - $18.2 million invested in blend stocks _____ % invested in blend stocks

2. Mutual Fund B (total value = $51.3 million)
   - $34.8 million invested in small cap stocks _____ % invested in small cap
   - $10.2 million invested in mid cap stocks _____ % invested in mid cap
   - $6.3 million invested in large cap stocks _____ % invested in large cap

3. Mutual Fund C (total value = $1,881 million = $1.881 billion)
   - $500 million (services) _____ % invested in services
   - $280 million (healthcare) _____ % invested in healthcare
   - $126 million (consumer goods) _____ % invested in consumer goods
   - $975 million (technology) _____ % invested in technology

4. Mutual Fund D (total value = $3,177 million = $3.177 billion)
   - $37 million (industrial goods) _____ % invested in industrial goods
   - $1.2 billion (basic materials) _____ % invested in basic materials
   - $755 million (conglomerates) _____ % invested in conglomerates
   - $85 million (financial) _____ % invested in financial services
   - $1.1 billion (utilities) _____ %invested in utilities

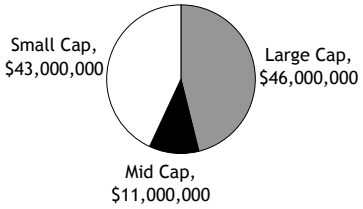
Understanding Mutual Funds' Holdings

In order for investors to tell what kinds of stocks a mutual fund has invested in, investors often turn to graphs designed specifically to explain this information.

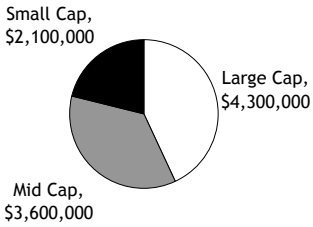
Below are pie charts that represent the assets of different mutual funds. For each mutual fund, state or calculate what percentage of assets is invested in each category presented in the pie chart.

1.

Mutual Fund A

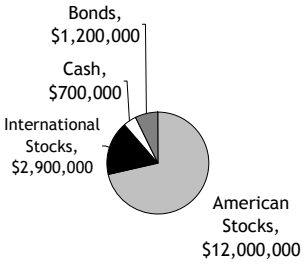


Mutual Fund B



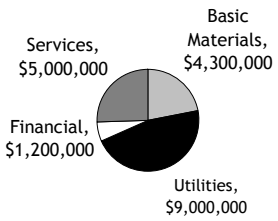
2.

Mutual Fund C



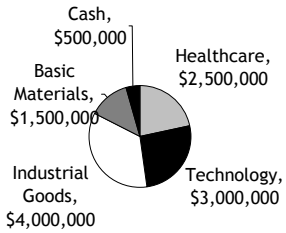
3.

Mutual Fund D



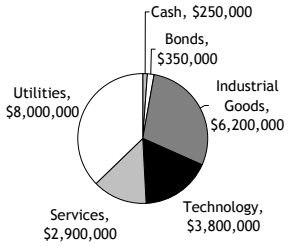
4.

Mutual Fund E



5.

Mutual Fund F

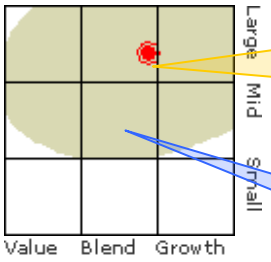


6.

Interpreting Ownership Zone Graphs

Mutual funds can be thought of as someone else's stock portfolio. If you buy shares of a mutual fund, it's like buying shares of a very large portfolio that has many different stocks in it. Investors often like to know in what kinds of stocks mutual funds are invested, and they can use "Ownership Zone" graphs to find that information. Because mutual fund managers won't reveal their exact combination of stocks, they instead publish these graphs that show the types of stock the mutual fund owns.

Below is an ownership zone graph of Janus Contrarian (JSVAX) mutual fund from February 20, 2007. (Source: http://quicktake.morningstar.com/fundnet/Portfolio.aspx?Country=USA&Symbol=JSVAX#anchor1)

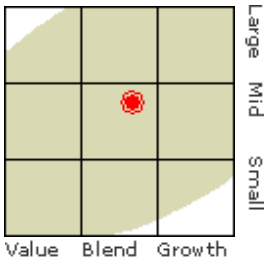


This red dot shows us the average type of company that the mutual fund holds. So we know that on average, the stocks in this mutual fund come from large cap companies. It also tells us that on average, the companies that this mutual fund invests in are a mix of high-growth companies and companies that are projected to grow slowly over time.

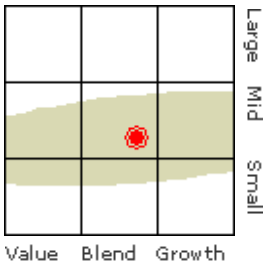
This shaded gray area represents three quarters of the companies that the mutual fund holds. The position of the gray area tells that there are very few companies in the mutual fund's portfolio that are small caps *and* characterized as value stocks.

Below are ownership graphs for different mutual funds. Interpret the information provided by writing a few sentences about each graph.

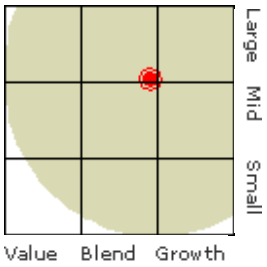
1.



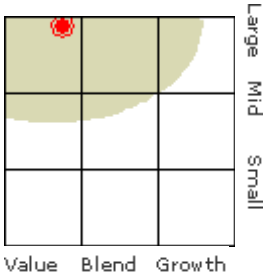
2.



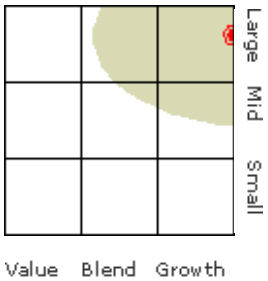
3.



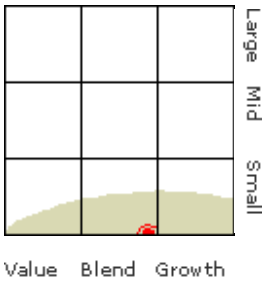
4.



5.



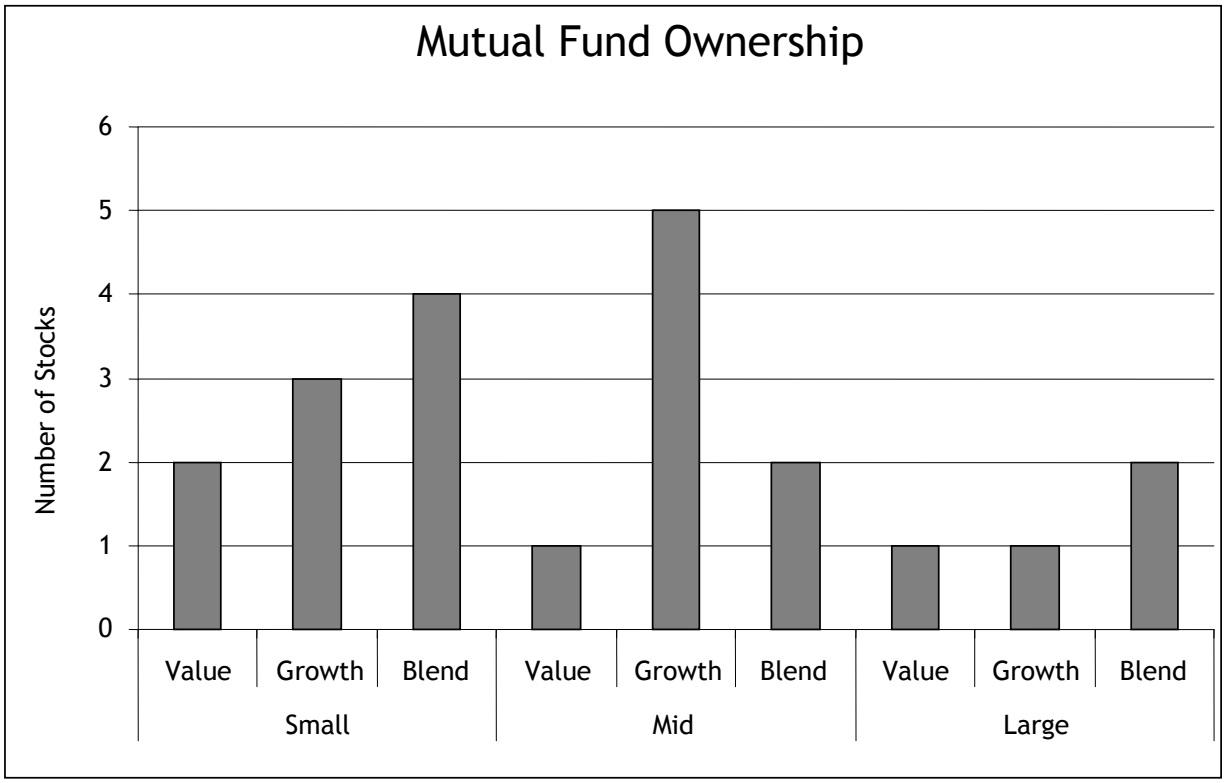
6.



Which of the above funds is the most diversified in terms of risk and cap size? Which is the least diversified by the same criteria? How do you know?

Displaying Mutual Funds' Holdings

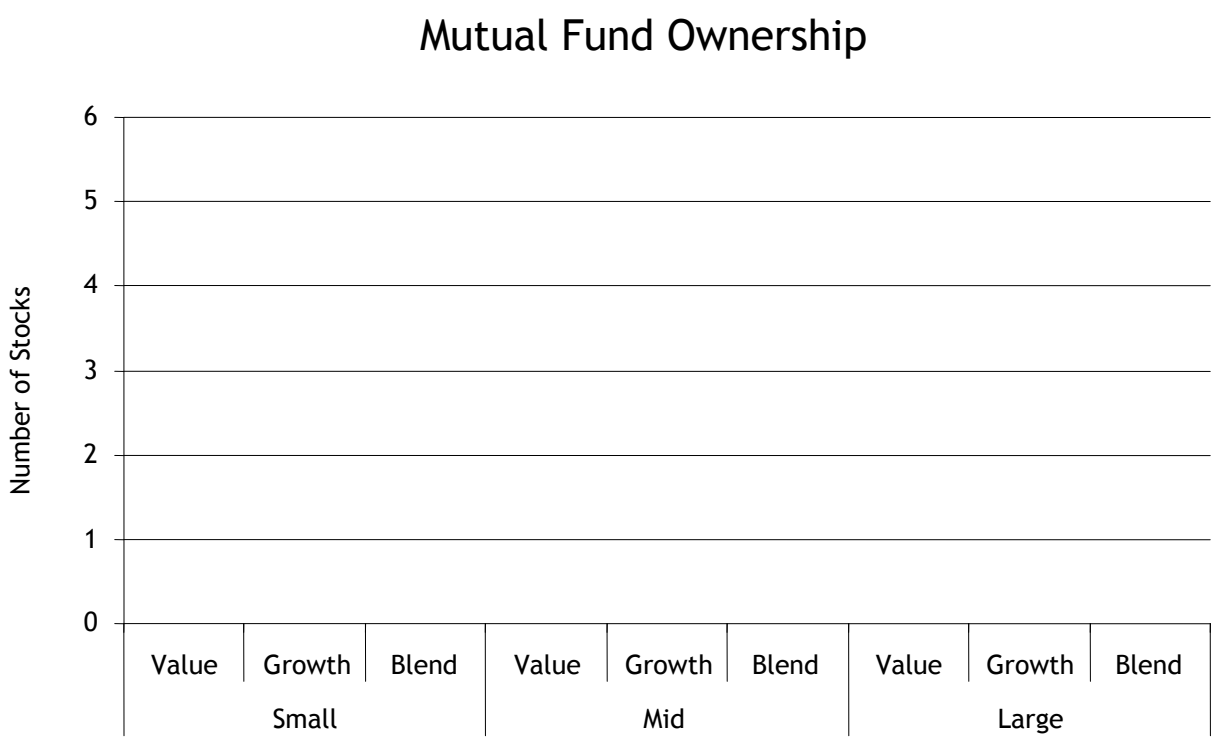
One way to show how a mutual fund is invested is to use a histogram, as shown below.



To construct a histogram, add one unit to the appropriate column for each company listed. Use the companies' profiles below. (Hint: For this exercise, use the following to categorize the market capitalization for each company: small cap < $1 billion, $1 billion ≤ mid cap ≤ $5 billion, and large cap > $5 billion.)

Company	Growth Rating	Cap	Cap-Size Category
1	Value	13.22 B	
2	Blend	1.30 B	
3	Growth	18.17 B	
4	Value	1.20 B	
5	Blend	27.04 B	
6	Growth	22.96 B	
7	Value	746.12 M	
8	Value	26.06 B	
9	Value	13.42 B	
10	Growth	17.95 B	
11	Blend	1.23 B	
12	Blend	1.27 B	
13	Growth	34.42 B	
14	Growth	34.31 B	
15	Blend	35.45 B	

16	Growth	960.57 M	
17	Blend	38.38 B	
18	Growth	211.80 M	
19	Growth	390.61 M	
20	Blend	404.86 M	
21	Growth	419.14 M	
22	Blend	421.20 M	
23	Blend	589.42 M	
24	Blend	37.27 B	
25	Blend	44.04 B	
26	Growth	4.34 B	
27	Growth	1.04 B	
28	Blend	433.55 M	
29	Value	1.06 B	



On average, what type of stocks does this mutual fund invest in?

Choosing Mutual Funds for Investors

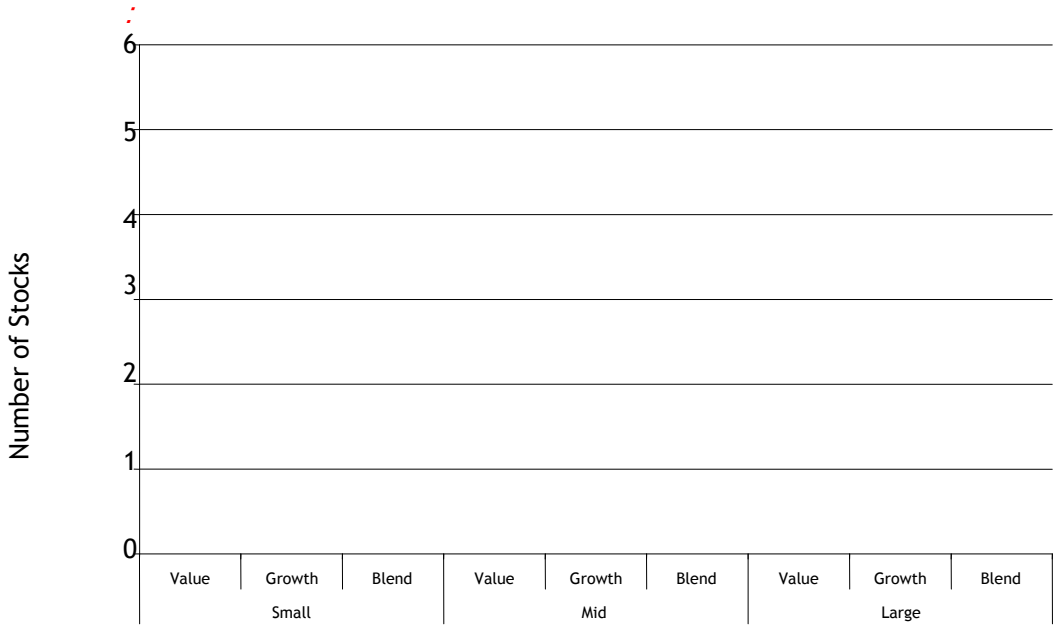
As you have been learning, different investors have different priorities and need different investment strategies. Some investors chase volatile stocks, while others invest in stable, small-growth companies for the long term.

Given the profiles of the investors below, think of the type of mutual fund that would best fit each investor. Write a brief description of the mutual fund you would choose for each. Then graph what the asset allocation of that mutual fund might look like.

1. Susan is interested in a diversified portfolio, but can tolerate some risk in the stocks that she owns. While she is not a financial whiz, her financial advisor has been very good about giving her a basic education in the workings of the stock market. She is most concerned about being broadly invested.

2. Rajib is a young, very well-paid consultant who knows a lot about investments and how the market works. His job requires a good working knowledge of stocks, mutual funds, and bonds. Rajib is comfortable taking risks with his investments and is not concerned with short term volatility of stocks because he plans to invest money for a long time.

3. Omar is looking for small, but consistent growth from his investments. He is very cautious about investing and wants to know that while he may not make great gains from his investments, his money is safe. He knows that he will only be invested for a short time in the stock market and only wants to invest if he can be persuaded that the investment won't be volatile.



What Causes Stock Prices to Change?

Lesson Summary

What Causes Stock Prices to Change? explores the influences that affect stock prices.

Lesson Objectives

- Analyze and interpret market indices, which influence change in the price of stock.
- Discuss the various ways stock prices are influenced.
- Evaluate the ways investors can be affected by the change in market prices when choosing to buy, sell, or hold.
- Interpret charts and graphs to better understand the growth and change in stock prices.

NCTM Standards

1A - Understand numbers, ways of representing numbers, relationships among numbers, and number systems.
5A - Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.
5B - Select and use appropriate statistical methods to analyze data.
5C - Develop and evaluate inferences and predictions that are based on data.
5D - Understand and apply basic concepts of probability.
7B - Make and investigate mathematical conjectures.
7C - Develop and evaluate mathematical arguments and proofs.
8A - Organize and consolidate mathematical thinking through communication.
8B - Communicate mathematical thinking coherently and clearly to peers, teachers, and others.
8C - Analyze and evaluate the mathematical thinking and strategies of others.
8D - Use the language of mathematics to express mathematical ideas precisely.
9C - Recognize and apply mathematics in contexts outside of mathematics.
10A - Create and use representations to organize, record, and communicate mathematical ideas.

Mathematical Strands

	Thinking Algebraically	Students calculate Price/Earnings Ratios as well as solve for stock prices and earnings-per-share values.	
	Interpreting Statistics	Students examine the trajectories of two stocks after Hurricane Katrina, write about the information presented, and hypothesize why certain sectors did poorly after this event while others gained.	
	Communicating Quantitative Information	Students will write a brief description of events that might make a company perform the way shown in the graph.	
	Tackling Complex Problems	Students use announcements from the Federal Reserve to predict market activity.	

Calculating Price/Earnings (P/E) Ratios

A P/E ratio is the quotient of a share's current price to the company's earnings per outstanding share.

$$\text{P/E ratio} = \frac{Price\_per\_Share}{Earnings\_per\_Share}$$

Use this information to answer each problem.

1. If the company's earnings per share are $1.75, and the current share price is $14.50, what is the P/E ratio?

2. A company's earnings per share are $0.80, and the current share price is $40.95. What is the P/E ratio for this company?

3. A stock is trading at $53.28 while the company's earnings per share are $1.39. What is the P/E ratio for this stock?

4. If a company's earnings per share are $2.01 and its stock is currently valued at $21.70, what is the stock's P/E ratio?

5. If a company's stock is trading at $38.42, and its P/E ratio is 25.69, what are its earnings per share?

6. A company has a P/E ratio of 17.51 and a stock value of $42.80. What are its earnings per share?

7. A company's earnings per share are $2.04 and its P/E ratio is 29.55. What is the value of the company's stock?

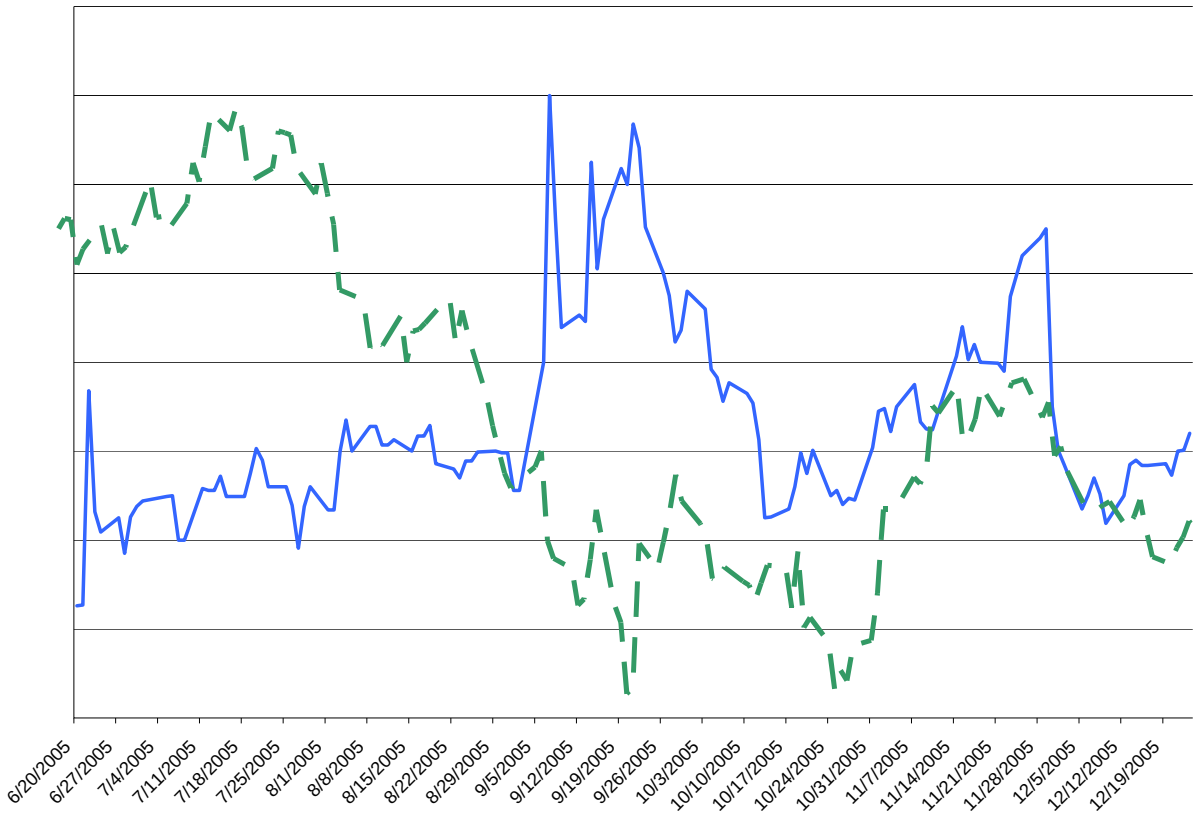
8. If the P/E ratio of a stock is 1.49 and its earnings per share are $1.17, how much would it cost to buy 550 shares of its stock?

Shocks to the Stock Market

Hurricane Katrina, one of the deadliest hurricanes in American history, struck the Gulf Coast in late August of 2005. This tragedy also affected the stock market because investors knew that companies would be influenced differently by this event.

The graphs below show two different industries' performances over the same time period. One of the trend lines shows the performance of companies that owned lumber businesses, while the other trend line tracks the performance of residential insurance companies.

1. Which trend line, the dotted or solid, do you think belongs to the lumber businesses and which belongs to the residential insurance companies? Explain your answer.



2. The two sectors either rise or drop suddenly right around the time of Hurricane Katrina, and then begin to recover from the initial shock. Where in the graph do you see this recovery?

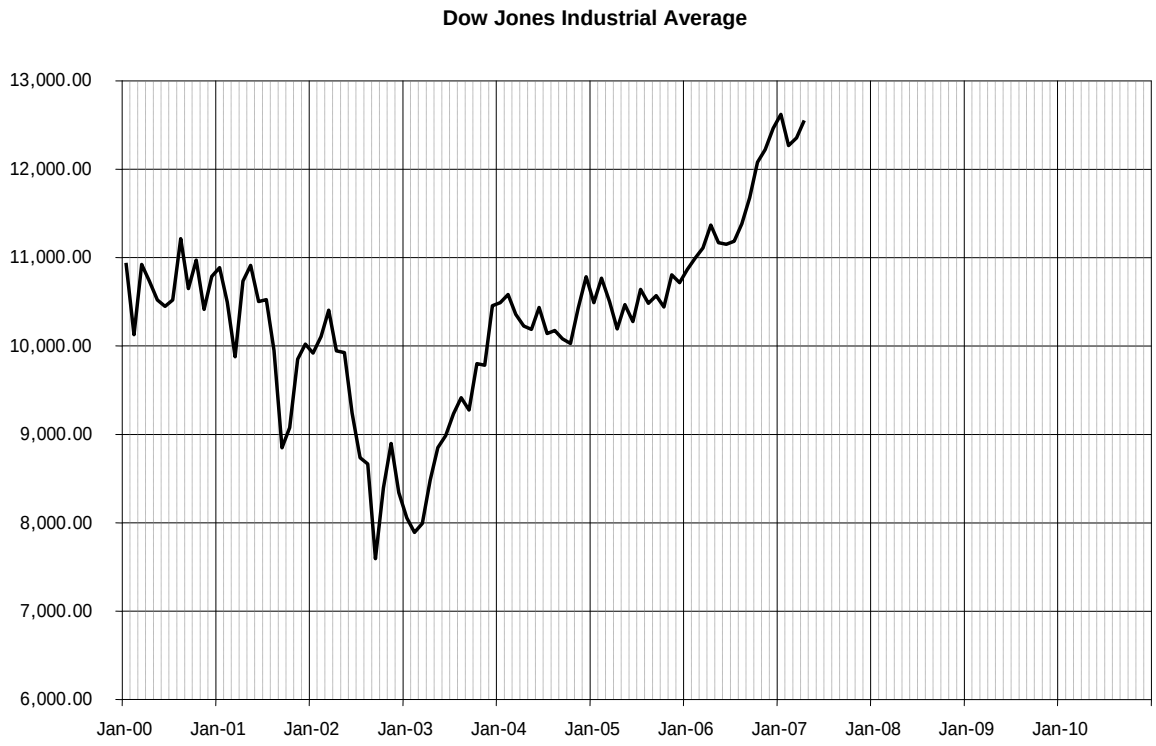
3. What is another example of an industry that would have experienced great losses after Hurricane Katrina? Sketch a trend line for this industry on the graph above.

   -.

4. What is an example of an industry that would have experienced gains after Hurricane Katrina? Sketch a trend line for this industry on the graph above.

Looking at the Effect of World Events

Below is a graph of the Dow Jones Industrial Average from January 2000 to April 2007.



Use the graph to identify where each historical event occurred and what happened to the market.

1. Terrorists attacked the United States in September 2001.

2. President Bush was re-elected in November 2004.

3. The Euro was introduced in January 2002.

4. The merger between AOL and Time Warner was approved in February 2001.

Find another dramatic rise or drop in the market, and research what was happening in financial and world news at that time.

Looking to the Federal Reserve

Investors listen to the announcements made by the Federal Reserve (Fed) to determine whether the stock market will rise or fall.

If the Fed thinks that the economy is doing well, the stock market tends to rally. If the Fed thinks that inflation (how much the prices of goods rise over time) is under control, the stock market also tends to rally.

For the following statements, summarize what the Federal Reserve has said, and then predict what the market would do after each announcement.

1. "Recent indicators have suggested somewhat firmer economic growth, and some tentative signs of stabilization have appeared in the housing market. Overall, the economy seems likely to expand at a moderate pace over the coming quarters." (January 31, 2007)

2. "Readings on core inflation have improved modestly in recent months, and inflation pressures seem likely to moderate over time. However, the high level of resource utilization has the potential to sustain inflation pressures." (January 31, 2007)

3. The Federal Reserve Open Market Committee judges that some further policy firming might be needed to address inflation risks.

Answer these questions based on information about actions by the Federal Reserve.

4. After an announcement from the Fed, the stock market dropped .064%. If a major market index was previously at a value of 11,230, what would you predict to be the value of the index after the announcement?

5. If an announcement from the Fed caused a major index to jump from 12,843 to 13,006, how big was this jump as a percentage?

Buy, Sell, or Hold?

Lesson Summary

Buy, Sell, or Hold? teaches students to use key resources to help them determine whether to buy, sell or hold a stock. It includes tips on how to read an annual report and compare a company with others in the same industry.

Lesson Objectives

- Draw conclusions on whether to buy, sell, or hold based on group and individual research.
- Compare and contrast companies based upon stock market statistical data.
- Analyze basic financial data.
- Use the Internet to obtain annual reports and research companies across the same industry.

NCTM Standards

1A - Understand numbers, ways of representing numbers, relationships among numbers, and number systems.
2A - Understand patterns, relations, and functions.
5A - Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.
5B - Select and use appropriate statistical methods to analyze data.
5C - Develop and evaluate inferences and predictions that are based on data.
5D - Understand and apply basic concepts of probability.
6D - Monitor and reflect on the process of mathematical problem solving.
7B - Make and investigate mathematical conjectures.
7C - Develop and evaluate mathematical arguments and proofs.
8A - Organize and consolidate mathematical thinking through communication.
8B - Communicate mathematical thinking coherently and clearly to peers, teachers, and others.
8C - Analyze and evaluate the mathematical thinking and strategies of others.
8D - Use the language of mathematics to express mathematical ideas precisely.
9A - Recognize and use connections among mathematical ideas.
9B - Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.
9C - Recognize and apply mathematics in contexts outside of mathematics.
10C - Use representations to model and interpret physical, social, and mathematical phenomena.

Mathematical Strands

	Thinking Algebraically	Students practice using formulae to calculate dividends, net income, and shares outstanding.	
	Interpreting Statistics	Students interpret commonly presented statistics that describe a company. Students examine and compare statistics from two different companies to determine whether a stock should be rated a "buy," "sell," or "hold."	
	Communicating Quantitative Information	Students decide whether to buy, sell, or hold by picking the most relevant information. Individually, they will write a persuasive memo defending their position.	
	Tackling Complex Problems	Students are presented with information on a company's net income and reinvestment allocation, outstanding shares, and/or dividend worth. Students analyze the information provided in each word problem to answer each question.	

Calculating Dividends

Use the formula below to calculate the appropriate answer for each question.

$d = \frac{p \cdot i}{n \cdot s}$, where d is the value of the dividend given out n times per year, p is the proportion of the net income, i is the annual net income of the company, and s is the number of outstanding shares.

1. If a company is dedicating 15% of the $31.2 million annual income to pay quarterly dividends for the 7,850,000 outstanding shares, how much will each dividend payment be per share?

2. A company has decided to allocate 11% of its annual net income, which was $1.56 billion, to pay dividends. It would like to give out three equal dividends during the year for each of the 800,000,000 shares they have outstanding. How much will the dividend payment be per share?

3. A company awarded $0.274 dividends twice during the year, when they had 44,000,000 shares outstanding. If the net income for the company was $2.78 billion dollars, what proportion of their income was dedicated to dividend payments?

4. A company awarded $0.327 dividends during each of four quarters. The company reported that it used 16% of its net income of $695,000,850 to do this. How many shares outstanding did the company have?

5. A company has $45,922,000 of net income, and it wants to give out three equal dividends annually of $0.31 to each of its 4,650,000 shares. What percentage of its net income would it need to use to do this?

6. A stock pays a dividend of $0.68 annually for each of its 120 million shares. If the company stated that this total amount represents 8% of its annual net income, what was the company's annual net income?

INTERPRETING STATISTICS

Using Data to Decide Whether to Buy, Sell, or Hold 1

There are many statistics that describe companies' and stocks' performance. For each of the statistics below, write a description of what each tells you.

1. One-day price change %

2. Market Cap

3. Price to Earnings Ratio (P/E)

4. Dividend Yield %

5. Earnings Per Share

INTERPRETING STATISTICS

Using Data to Decide Whether to Buy, Sell, or Hold 2

You are a junior analyst for a financial management company, and your boss has asked you to develop a preliminary recommendation for whether the following companies should be rated "Buy," "Sell," or "Hold."

For both companies below, compare each of the statistics provided to the same statistic for the sector, industry, and the competitor. Then use that analysis to decide whether each company should be rated a "Buy," "Sell," or "Hold."

Statistics for the Sector

1 Day Price Change %	*Market Cap*	*P/E*	*Div. Yield %*	*Long-Term Debt to Equity*
-1.76	4421.1B	14.62	2.22	0.71

Statistics for the Industry

1 Day Price Change %	*Market Cap*	*P/E*	*Div. Yield %*	*Long-Term Debt to Equity*
-1.49	92.8B	13.00	2.62	0.72

Company A

1 Day Price Change %	*Market Cap*	*P/E*	*Div. Yield %*	*Long-Term Debt to Equity*
-2.73	24.6B	16.12	0.80	0.29

Answer:

Company B

1 Day Price Change %	*Market Cap*	*P/E*	*Div. Yield %*	*Long-Term Debt to Equity*
-3.18	17.8B	21.63	0.60	0.20

Convincing Others to Sell

Your task is to write a persuasive memo convincing a team member that it is time to sell shares of Lending & Leasing, Inc. Use the pieces of the data below that you think are the most persuasive in making your case. After you have written your memo, share it with the rest of your group and come to a decision about how to convince the rest of the class that this stock should be sold.

Lending and Leasing, Inc.

This company missed its fourth quarter earnings mark. Its P/E ratio is 15.91, while the P/E ratio for the industry is 14.26. Its market cap is $106.3 billion, while the industry's average market cap is $230.4 billion. The company was started 55 years ago, and has been publicly traded for the last 13 years.

Below are more statistics you may find helpful.

Stock Price History	
Beta	0.79
52-Week Change	-12.56%
S&P500 52-Week Change	8.52%
52-Week High (20-Mar-06)	52.09
52-Week Low (01-Aug-06)	30.94
50-Day Moving Average	43.29
Shares Short	3.26M

Average Volume (3 month):	3,085,410
Average Volume (10 day):	3,556,510
Shares Outstanding:	516.40M
Float:	515.88M
% Held by Insiders:	0.07%
% Held by Institutions:	86.30%
Short Ratio:	1.1

Convincing Others to Buy

Your task is to write a persuasive memo convincing a team member that it is time to buy more shares of Lending & Leasing, Inc. Use the pieces of the data below that you think are the most persuasive in making your case. After you have written your memo, share it with the rest of your group and come to a decision about how to convince the rest of the class that more of this stock should be bought.

Lending and Leasing, Inc.

This company missed its fourth quarter earnings mark. Its P/E ratio is 15.91, while the P/E ratio for the industry is 14.26. Its market cap is $106.3 billion, while the industry's average market cap is $230.4 billion. The company was started 55 years ago, and has been publicly traded for the last 13 years.

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Float:	515.88M
% Held by Insiders:	0.07%
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Short Ratio:	1.1

Convincing Others to Hold

Your task is to write a persuasive memo that it is time neither to buy nor to sell shares of Lending & Leasing, Inc. Use the pieces of the data below that you think are the most persuasive in making your case. After you have written your memo, share it with the rest of your group and come to a decision about how to convince the rest of the class that the best decision about this stock is to hold.

Lending and Leasing, Inc.

This company missed its fourth quarter earnings mark. Its P/E ratio is 15.91, while the P/E ratio for the industry is 14.26. Its market cap is $106.3 billion, while the industry's average market cap is $230.4 billion. The company was started 55 years ago, and has been publicly traded only for the last 13 years.

Below are some more statistics you may find helpful.

Stock Price History	
Beta	0.79
52-Week Change	-12.56%
S&P500 52-Week Change	8.52%
52-Week High (20-Mar-06)	52.09
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TACKLING COMPLEX PROBLEMS

How Dividends Affect Whether to Buy, Sell, or Hold
Investors sometimes decide to buy stocks depending on how big a dividend the stock will provide. These problems demonstrate how a company decides how much money it will offer investors through dividends.

When a company is deciding how much money it will pay its investors in the form of dividends, it considers its net income, allocating a certain amount to reinvestment in the company and the rest to pay dividends to investors.

Use this information to answer the following:

1. Fabulous Furnishings Inc., had a net income of $35.8 million at the end of the fiscal year. It decided to reinvest 80% of the net income back into the company and to use the rest to create equal dividends for all 9.23 million outstanding shares of stock. It will pay the dividends to stockholders over four quarters. How much will each dividend be worth?

2. Industrial-Strength Industrials, Inc., decided to reinvest 85% of its $1.3 billion net income and use the rest to create dividends for investors. It estimates that it has about 482 million outstanding shares. If the dividend will be paid quarterly, how much will each dividend be worth?

3. Mega Media Moguls Corporation gave out dividends worth $0.272 per share per quarter. If there were 8,250,000 shares outstanding each time the dividend was awarded, and the total worth of all dividends was only 12% of the company's net income, how much money did the company reinvest from the net income?

4. BioFuel & BioEnergy Company awarded quarterly dividends of $0.184 per share for each of the 67,342,000 shares outstanding. If its total net income for the year was $1.14 billion, what proportion of its net income was used for dividends?

5. a. Which company paid out the most money in total dividends?

   b. Which company paid the highest dividend per share?

   c. If an investor wanted to buy stocks that paid the highest dividends per share, which two companies would he/she choose?

How Successful Was My Investment Strategy?

Lesson Summary

How Successful Was My Investment Strategy? asks students to reflect on the investment decisions their team made during the course of The Stock Market Game.

Lesson Objectives

- Draw supported conclusions as to whether their strategy in preparing their portfolio was successful, and what investment changes they might have made to improve portfolio performance.
- Generate a detailed report including support material.
- Deliver a convincing presentation.
- Give and receive constructive criticism.
- Evaluate the work of other team members and other students.

NCTM Standards

1A - Understand numbers, ways of representing numbers, relationships among numbers, and number systems.
2A - Understand patterns, relations, and functions.
5A - Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.
5B - Select and use appropriate statistical methods to analyze data.
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5D - Understand and apply basic concepts of probability.
7B - Make and investigate mathematical conjectures.
7C - Develop and evaluate mathematical arguments and proofs.
8A - Organize and consolidate mathematical thinking through communication.
8C - Analyze and evaluate the mathematical thinking and strategies of others.
8D - Use the language of mathematics to express mathematical ideas precisely.
9A - Recognize and use connections among mathematical ideas.
9B - Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.
9C - Recognize and apply mathematics in contexts outside of mathematics.
10A - Create and use representations to organize, record, and communicate mathematical ideas.
10C - Use representations to model and interpret physical, social, and mathematical phenomena.

Mathematical Strands

	Thinking Algebraically	Students calculate percentage change in stock price for each stock they held in their portfolio in order to compare the gains and losses.	
	Interpreting Statistics	Students advise whether to buy, sell, or hold stock at specific points in time.	
	Communicating Quantitative Information	Students are asked to compare a team's portfolio performance to major indices. They will then write a letter assessing the fictional team's performance in light of major market indices as well as the fictional team's rankings.	
	Tackling Complex Problems	Students will choose three stocks and chart their performance over the course of the ten-week investment period. They will then compare the stocks' performances to the performance of the same stocks one year previous.	

Biggest Gainers and Biggest Losers

1. For each of the stocks that you had in your portfolio, calculate the % gain/loss per share over the course of time you held the stock.

   Remember the formula for calculating percent change is:

$$\% \text{ change} = \frac{current\_price - Net\_cost/share\_price}{Net\_cost/share\_price} \cdot 100\%$$

Ticker symbol	Net Cost/Share	Current price	Unrealized Gains Losses %

2. Calculate how much money you earned/lost from each investment in dollar amounts.

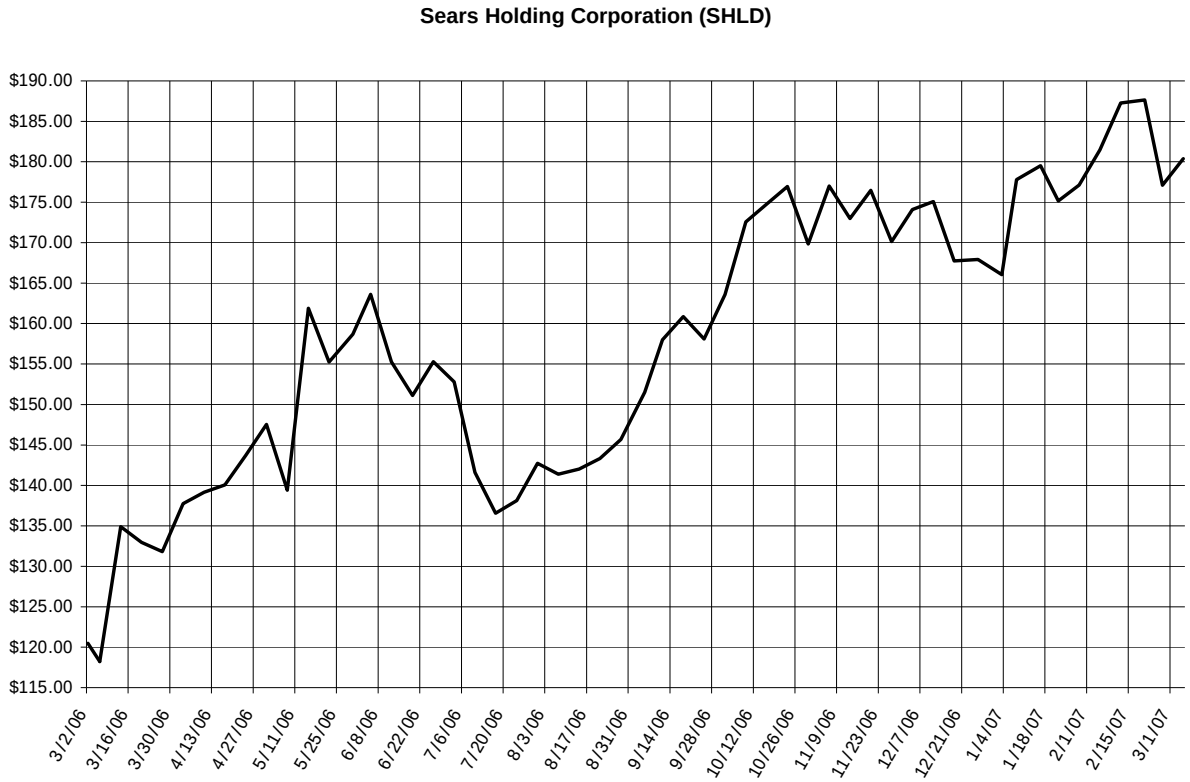
When you are done with your calculations, answer the following questions:

3. Which stock was the biggest gainer in terms of percentages?

4. Which was the biggest loser in terms of percentages?

5. Were there any stocks that were great gainers in terms of percentages but did not earn your team much money overall? Why would that be?

Deciding When to Sell



A group playing The Stock Market Game™ bought 300 shares of Sears Holding Corporation (SHLD) during the first day of the game on December 29, 2006. Over the previous year, its stock ranged in price from a low of $116.50 to a high of $189.97.

For each date below, use the graph above to state what your advice to the group would have been (buy, sell, or hold, and why), given how much information you would have had at the time.

1. January 4, 2007

2. January 18, 2007

3. February 15, 2007

4. February 23, 2007

5. Many financial advisors encourage investors to invest for the "long-haul," instead of buying and selling over short periods of time. Why do you think they give this advice?

What is Successful?
Below are the values of a team's portfolio over a ten week period.

Week	Value
0	$100,000
1	$101,248
2	$102,429
3	$117,320
4	$116,487
5	$117,974
6	$121,338
7	$106,429
8	$104,355
9	$108,656
10	$108,449

The team was ranked last in their class, seventh (out of 18) in their grade, and 64th (out of 70) in their school. The Dow Jones Industrial Average started at 12,191.13 at the beginning of their investment and reached 12,276.33 by the end of the tenth week of the game. The S&P 500 Index started at 1,396.71 and finished at 1,402.84. The NASDAQ composite went from 2,413.21 on the first day of the game to 2,387.55 on the last day of the game.

Several members of the team feel badly about their performance, and some members of the team feel very good about their performance.

1. *Describe the trend in the value of the portfolio over the ten-week period.*

2. *Show calculations of the percentage change in the portfolio and percentage changes in the indices.*

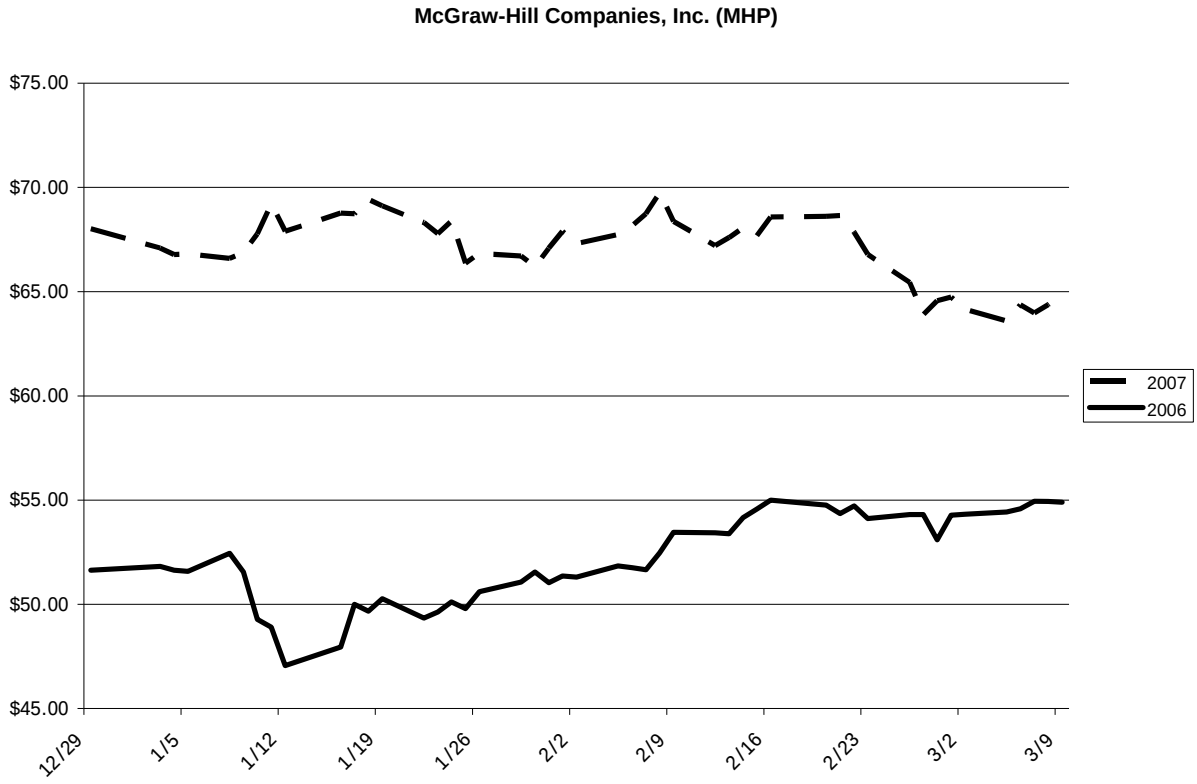
3. *How did the portfolio perform in relation to the performance of the major indices listed?*

4. *Write the team a brief letter putting their performance in context and telling them your honest assessment. Use your own experience and some of the above information to support your evaluation of their portfolio.*

Looking at Past Performance

Choose three stocks from your portfolio and chart each of their share prices over the ten weeks.

Use online financial information to look up the historical prices of those same stocks during the same ten-week period last year. Chart the previous history on the same graph for each company. (An example is shown below.)



- Given the information, did each stock outperform or underperform their history?

- Why might it be important that you compare the same weeks in previous years?