

The Stock Market Project

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Introduction

The Stock Market Project is a relatively simple six-week math project. Students produce an essay (Executive Summary) with several Microsoft Excel attachments. I have used it with 11th and 12th grade students, but it would be appropriate for students in middle or high school. Students will learn the following:

- How stocks and the stock market work, including how to look up the closing price of a stock in the newspaper, calculating investment value and percentage return, and researching company background.
- Math skills, including manipulating decimal numbers, signed numbers, and percentages.
- How to organize and analyze a large amount of data.
- Practical presentation and data organization skills.

The main benefit of the project is that it is relevant and generates excitement among the students. They want to learn how to calculate gain, losses, and percentages in order to figure out how much money they made. As the deadline to see the stock approaches, you should keep asking, “Who is going to win?” or “Who will lose the most?” This is an excellent project for students who are uninspired by math class or ask why they need to learn math.

Program Overview

The Initial Investment

Pick a day for the students to buy their stocks. I “give them” \$10,000 and tell them they must spend at least \$9,900 on three companies, with a minimum of \$1,000 in each. The process for picking the stocks includes:

1. Students pick their three companies and decide in round numbers how much to spend on each (e.g., Company A gets \$5,000; Company B \$2,000; and Company C \$3,000).
2. They look up the closing prices of their three stocks from the day before (note: closing prices published in the newspaper represent the prior day’s activity).
3. If Company A cost \$43.30, they divide their \$5,000 invest by this price and arrive at the number of shares they can purchase (in this case, 115 shares--it is not possible to buy partial shares).
4. After the number of shares for all three companies has been calculated, students multiply this by the closing price, giving them the exact investment values.
5. Students record all of this information on an *Initial Investment Summary*. These investment values will be used throughout the project to calculate weekly and final gain and loss on each stock. This is their starting point.

Daily Price Tracking

I provide the students with a *Price Tracking Worksheet*. Every day they come to class and look up their closing prices in the newspaper and record them manually on the three-column worksheet. If the students miss a day, it is good practice to look at the “Change” price in the newspaper and back into the closing price the day before (e.g., if the stock closed at \$43.00 and the change was +0.53, the closing price the day before was \$42.47). Updating daily prices is a good “Do Now” activity.

Weekly Investment Summaries

Every week, the students manually prepare a *Weekly Investment Summary*. They multiply the closing price on that day with the number of shares they own, and then compare this to their initial investment values. The difference is their gain or loss. At the end of the project, the final investment summary is done in the same way.

Preparing the Excel Exhibits

Once the six-week price tracking is complete, students prepare a worksheet summary and a line graph of daily closing prices for each company (six pages in total) plus an Overall Investment Summary in Excel. The company worksheets include the following columns:

- Date – only the active closing dates are listed (skip weekends and holiday dates), otherwise the line graph will not work
- Closing Price – the closing price that day, formatted as currency.
- Daily Price Change – use a formula to subtract the current day’s closing price from the prior day’s price.
- Daily Percent Change – formula that divides the current day’s price change by the prior day’s closing price.
- Investment Value – formula to multiply the current day’s closing price by the number of shares the student owns.
- Change from Original Value – formula to subtract the original investment value the day stocks were purchased from the current day’s investment value.
- Percent Change in Value – formula to divide the current day’s change from original value by the original investment value.

The line graph is created by highlighting the first two columns (Date and Closing Price) and then using “insert/graph” in Excel.

The *Overall Investment Summary* is similar to the *Weekly Investment Summaries* but done in Excel and using formulas to calculate the gains and losses and totals. This overall summary is necessary in order to see the total gain or loss each student made on their entire \$10,000 investment.

Preparing the Executive Summary

This is an overall summary of how the \$10,000 was invested and what the result was, including transaction dates (dates the stock was bought and sold), overall movement and return of each stock, and any highlights as to why the stock gained or lost over the period (particularly if the price of the stock changed significantly). Students are required to describe in some detail what happened to each stock over the six weeks, including the buy and sell price, and highs and lows for the period. The analysis should emphasize numbers, dates, and percentages. There is opportunity to do many calculations, including extrapolating annual returns or recalculating what the profit would have been had they invested their entire \$10,000 in their best company.

The Executive Summary also includes a Company Background section, which is a brief description of what the company does and why they invested in it, including any relevant financial information and news about the company.

Other – Teaching Expertise and Resources

The teacher needs to be well versed in how stocks and investing works, including how to read the stock tables in the newspaper. The teacher also must have a good working knowledge of Excel, especially how to use formulas to calculate the various fields, how to create graphs, and how to format the exhibits for printing.

You need a newspaper that has complete stock tables every day (e.g., *The New York Times* or *The Wall Street Journal*). You also need computers with both Microsoft Word and Excel for students to prepare their reports.

In addition to the instructions above, I have included the *Elements of an Exhibition*. I give this document to my students about four weeks into the project so they know what they are expected to produce.

Elements of an Exhibit-- Integrated Math Stock Market Project (Fall 2002)

Introduction/Objectives – Using a hypothetical investment (\$10,000) in the stock market, you will learn about investing, stock prices, tracking daily changes, calculating returns, preparing spreadsheets, using software (i.e., Microsoft Excel) to prepare tables and graphs, and summarizing results.

Essential Question – *How can numbers, tables, and graphs be used to tell a story?*

General Instructions/Procedures:

1. Each student invests \$10,000 in three publicly traded companies (listed on the New York Stock Exchange, NASDAQ, or American Stock Exchange). You invest the money on the same date (9/17/02), decide on the initial allocation, and sell on the same date (10/29/02).
2. You record the closing price of all three stocks on a worksheet every day.
3. Once a week, you prepare a “Weekly Investment Summary” showing how much your initial investment is worth that day, the gain/loss on each stock, and the net gain or loss.
4. You will manually calculate the percentage return on each stock and the overall portfolio, and then plot the same using MS Excel.
5. You will manually graph the initial investment breakdown and then plot the same on MS Excel.
6. You will manually graph daily price changes of each stock and then plot the same on MS Excel.
7. For more advanced or projects, you should research and report more extensively on the companies selected and develop more sophisticated MS Excel spreadsheets and graphs.

Critical Concepts/Criteria for Assessment – you should demonstrate the following:

- A clear understanding of how investing works, including how much it costs to buy certain quantities of stock, how much profit or loss results when the stock is sold, and the associated percentage returns.
- The meaning of stock price fluctuations and when they are significant.
- Some understanding of what the companies that you bought do.
- Which charts or graphs best represent the data being analyzed and why.

Resources:

- Daily stock prices are found in the *New York Times* Business Section (we track the closing price each day, shown as “last” price).
- Microsoft Excel on the personal computers.
- Company information can be found in various places, including the *New York Times* or other newspapers and magazines, and on the Internet at the company websites or various other news or financial websites.

Due Dates:

First draft will be due **NOVEMBER 1**; the final project will be due **NOVEMBER 15**.

Below is an outline of the final exhibit

Executive Summary

Overall summary of how the \$10,000 was invested and the result, including transaction dates (when the stock was bought and sold), overall movement and return of each stock, and any highlights as to why the stock gained or lost over the period (particularly if the price of the stock changed significantly).

Company Background

A brief summary of what the company does and why you invested in it, including any relevant financial information and news about the company.

Attachments – Excel Spreadsheets

- An *Overall Investment Summary* with graphs showing how the money was distributed at the beginning and the end of the period
- Three *Company Summaries* with the daily stock prices, daily changes, percent changes, and effect on investment with (line) graphs of the stock prices
- Other spreadsheets and graphs, as appropriate

Attachments – Manual Spreadsheets

- Initial Investment Summary
- Weekly Investment Summaries
- Daily Price Tracking Worksheets

Integrated Math – Stock Market Project Initial Investment Summary

Name: _____

	Share Price on the Day Purchased (9/17/02)	Number of Shares Bought	Total Value of Investments on 9/17/02
Company #1			
Company #2			
Company #3			
Total Investment			

Out of your initial \$10,000, how much cash do you have left over? _____

Stock Market Project – Price Tracking Worksheet

Integrated Math

Name _____

Date	Closing Price per Share		
	Company #1	Company #2	Company #3
9/17/02			
9/18/02			
9/19/02			
9/20/02			
9/23/02			
9/24/02			
9/25/02			
9/26/02			
9/27/02			
9/30/02			
10/01/02			
10/02/02			
10/03/02			
10/04/02			

Stock Market Project – Price Tracking Worksheet # 2

Integrated Math

Name _____

Date	Closing Price per Share		
	Company #1	Company #2	Company #3
10/07/02			
10/08/02			
10/09/02			
10/10/02			
10/11/02			
10/14/02			
10/15/02			
10/16/02			
10/17/02			
10/18/02			
10/21/02			
10/22/02			
10/23/02			
10/24/02			
10/25/02			
10/28/02			
10/29/02			

Integrated Math – Stock Market Project

Week #1 Investment Summary

Name: _____

	Number of Shares Bought	Share Price on 9/24/02	Value of Investments on 9/24/02	Value of Investments on 9/17/02	Gain/(Loss)
Company #1					
Company #2					
Company #3					
Total Investment					

Out of your initial \$10,000, how much cash did you have left over? _____

Integrated Math – Stock Market Project

Week #2 Investment Summary

Name: _____

	Number of Shares Bought	Share Price on 10/01/02	Value of Investments on 10/01/02	Value of Investments on 9/17/02	Gain/(Loss)
Company #1					
Company #2					
Company #3					
Total Investment					

Out of your initial \$10,000, how much cash did you have left over? _____

Integrated Math – Stock Market Project

Week #3 Investment Summary

Name: _____

	Number of Shares Bought	Share Price on 10/08/02	Value of Investments on 10/08/02	Value of Investments on 9/17/02	Gain/(Loss)
Company #1					
Company #2					
Company #3					
Total Investment					

Out of your initial \$10,000, how much cash did you have left over? _____

Integrated Math – Stock Market Project

Week #4 Investment Summary

Name: _____

	Number of Shares Bought	Share Price on 10/15/02	Value of Investments on 10/15/02	Value of Investments on 9/17/02	Gain/(Loss)
Company #1					
Company #2					
Company #3					
Total Investment					

Out of your initial \$10,000, how much cash did you have left over? _____

Integrated Math – Stock Market Project

Week #5 Investment Summary

Name: _____

	Number of Shares Bought	Share Price on 10/22/02	Value of Investments on 10/22/02	Value of Investments on 9/17/02	Gain/(Loss)
Company #1					
Company #2					
Company #3					
Total Investment					

Out of your initial \$10,000, how much cash did you have left over? _____

Integrated Math – Stock Market Project

Week #6 Investment Summary

FINAL SUMMARY – WE SELL TODAY!!

Name: _____

	Number of Shares Bought	Share Price on 10/29/02	Value of Investments on 10/29/02	Value of Investments on 9/17/02	Gain/(Loss)
Company #1					
Company #2					
Company #3					
Total Investment					

Overall Investment Summary

Company	Number of Shares	Initial Investment Value	Final Investment Value	Gain/Loss	Percentage Return
Company A	200	\$5,000.00	\$5,600.00	\$600.00	12.0%
Company B	220	\$1,998.00	\$1,962.00	-\$36.00	-1.8%
Company C	45	\$2,974.00	\$2,222.00	-\$752.00	-25.3%
Total Investments		\$9,972.00	\$9,784.00	-\$188.00	-1.9%
Cash		\$28.00	\$28.00		
GRAND TOTAL		\$10,000.00	\$9,812.00	-\$188.00	-1.9%

Company A Daily Activity Summary (200 Shares)

Date	Closing Price	Daily Price Change	Daily Percent Change	Investment Value	Change from Original Value	Percent Change in Value
17-Sep	\$25.00			\$5,000.00		
18-Sep	\$24.56	-\$0.44	-1.8%	\$4,912.00	-\$88.00	-1.8%
19-Sep	\$24.50	-\$0.06	-0.2%	\$4,900.00	-\$100.00	-2.0%
20-Sep	\$23.98	-\$0.52	-2.1%	\$4,796.00	-\$204.00	-4.1%
23-Sep	\$23.60	-\$0.38	-1.6%	\$4,720.00	-\$280.00	-5.6%
24-Sep	\$23.50	-\$0.10	-0.4%	\$4,700.00	-\$300.00	-6.0%
25-Sep	\$24.01	\$0.51	2.2%	\$4,802.00	-\$198.00	-4.0%
26-Sep	\$24.06	\$0.05	0.2%	\$4,812.00	-\$188.00	-3.8%
27-Sep	\$24.81	\$0.75	3.1%	\$4,962.00	-\$38.00	-0.8%
30-Sep	\$24.29	-\$0.52	-2.1%	\$4,858.00	-\$142.00	-2.8%
1-Oct	\$25.00	\$0.71	2.9%	\$5,000.00	\$0.00	0.0%
2-Oct	\$25.74	\$0.74	3.0%	\$5,148.00	\$148.00	3.0%
3-Oct	\$25.30	-\$0.44	-1.7%	\$5,060.00	\$60.00	1.2%
4-Oct	\$25.99	\$0.69	2.7%	\$5,198.00	\$198.00	4.0%
7-Oct	\$26.27	\$0.28	1.1%	\$5,254.00	\$254.00	5.1%
8-Oct	\$25.78	-\$0.49	-1.9%	\$5,156.00	\$156.00	3.1%
9-Oct	\$25.08	-\$0.70	-2.7%	\$5,016.00	\$16.00	0.3%
10-Oct	\$24.02	-\$1.06	-4.2%	\$4,804.00	-\$196.00	-3.9%
11-Oct	\$26.11	\$2.09	8.7%	\$5,222.00	\$222.00	4.4%
14-Oct	\$26.10	-\$0.01	0.0%	\$5,220.00	\$220.00	4.4%
15-Oct	\$26.83	\$0.73	2.8%	\$5,366.00	\$366.00	7.3%
16-Oct	\$27.44	\$0.61	2.3%	\$5,488.00	\$488.00	9.8%
17-Oct	\$27.15	-\$0.29	-1.1%	\$5,430.00	\$430.00	8.6%
18-Oct	\$27.60	\$0.45	1.7%	\$5,520.00	\$520.00	10.4%
21-Oct	\$26.95	-\$0.65	-2.4%	\$5,390.00	\$390.00	7.8%
22-Oct	\$27.54	\$0.59	2.2%	\$5,508.00	\$508.00	10.2%
23-Oct	\$27.64	\$0.10	0.4%	\$5,528.00	\$528.00	10.6%
24-Oct	\$27.74	\$0.10	0.4%	\$5,548.00	\$548.00	11.0%
25-Oct	\$27.00	-\$0.74	-2.7%	\$5,400.00	\$400.00	8.0%
28-Oct	\$27.98	\$0.98	3.6%	\$5,596.00	\$596.00	11.9%
29-Oct	\$28.00	\$0.02	0.1%	\$5,600.00	\$600.00	12.0%

Company A Closing Price

