

# ***Stock Trading in Class: A Multimedia Game***

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## Abstract

The opportunity to teach High School students about the intricacies of the stock market provided the motivation to prepare a one hour, interactive, multimedia lesson that excited students and dramatically increased student understanding of market trading and how new information is incorporated into stock prices. Student handouts and a teacher instruction set are attached and a Microsoft Excel worksheet for classroom presentations is available from the author.

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## *Introduction*

Stock markets, as an academic topic, seem to either elicit excitement or yawns from students. Those who are excited tend to have had long term interest in stocks and have a pretty firm idea, at least, of how money is made by market participants. Those who exhibit yawns tend to be difficult to reach and motivate to understand this most fundamental of markets. Over the course of the past year, this stock market experiment has been used successfully several times for groups of students at both junior high and high school levels. Furthermore, students become so involved with the interactive nature of this presentation that boredom is no longer a problem.

Groups of approximately 20 students had the opportunity to participate in this multi-round, interactive game to enhance their understanding of how the stock market works and how money can be made (and lost) by participants in this market. The original presentation of this material occurred during the course of our local high schools' interdisciplinary celebration of the 1920's. Therefore, the game was designed to show quick run-ups of price with the use of margin buying and at least the possibility of a stock crash.

The remainder of this paper contains a discussion of the game, a description of the mechanics of running the game, and a brief mention of the results obtained by the author from several exercises of the game. Appendices contain a copy of the participant handout and a set of teacher instructions for running the game. A copy of the Microsoft excel worksheet for overhead presentation will be cheerfully provided by the author upon request.

## *The Game*

The game itself consists of sequential rounds of stock trading with brief presentations by the teacher before and after each round. The market is represented by an overhead projection of a Microsoft Excel worksheet that shows the outstanding price for the single stock that students are allowed to buy. Each buy (regardless of the number of shares of stock in the transaction) causes the price to rise by 1 and each sell causes the stock price to fall by 1. Students may trade as many times as they wish each round in order to take advantage of the fluctuating prices. Depending upon trading activity, the teacher may need to close each round of trading by using an egg timer set for 5-7 minutes. At the end of the round something new occurs in the market that participants respond to during the next round of trading.

The first round occurs after student have received their assigned starting wealth and listened to a brief discussion about the mechanics of trading stock. If the teacher wishes to incorporate a lesson on the 1920's, for example, or just to use the opportunity to highlight wealth distribution, different levels of starting wealth can be assigned along with occupations. This works particularly well as a session in a meta-lesson on a time period or on other sociological issues for high schoolers. For younger students, assigning a uniform level of starting wealth and not distinguishing occupations simplifies the lesson.

At the end of the first round, stock holders receive cash dividends. Depending on the class level and time constraints, running another round with no other changes might be appropriate. After paying dividends, students are more likely to see a motivation for buying stock, so that more students will participate in the trading in the next round.

At the end of the round (or rounds) where dividends were paid, the teacher demonstrates a calculation of net worth and announces another payment of cash dividends in order to provide continuing motivation for stock purchases. Then, the teacher gives a presentation on borrowing money to purchase stocks (simplified margin trading).<sup>1</sup> Students calculate maximum purchases for the subsequent round.

Stock purchases during the following round demonstrate market volatility quite nicely. At the end of that round, large increases in net worth are quite likely. However, it is at this point that students will calculate their margin call trigger price (the price at which they must sell off their stock, because the price has become too low to support the loan they got to buy the stock). As the teacher makes rounds to determine that participants have calculated this correctly, he or she notes a common trigger price for many students.

Just before trading is to begin again, the teacher describes a sudden price decline for the stock based, perhaps, on current events or on something pertinent to the time period under study (Black Thursday or “the Babson Break,” in the case of the 1920's for instance). Another way to precipitate a sell off is to force a subset of the participants to sell because of outside influence (say, weather conditions, like the dust bowl for farmers, or OPEC price hikes for those in transportation or petroleum industries). A slightly different approach to causing a market price decline is to announce what the company actually does, this brings students to the notion of what is generally referred to as ‘market fundamentals.’ In the game for junior high students, we used ELS, Inc. and used this opportunity to explain that ELS stands for “Eric’s Lemonade Stand” (Eric being the name of my oldest son). Then, explaining that my son had limited the hours of operation of his stand for some reason, we lowered the stock price. Whatever the case, prices begin several points lower than they ended in the previous round.<sup>2</sup> Generally, a mass sell off ensues that may even bring the price to zero. There may, however, be market participants who did not margin that step in to buy at low prices preventing a general market rout.

At the end of the game, determine the final net worth and a winner (or two) can be brought to the front of the classroom. Presenting the winner with a nominal prize (say, gift certificates at a fast food restaurant or foreign currency with minimal value) is a dramatic way to end the hour.

Using the following lesson (either the next day, or in the case of extra time at the end of the period) to focus on the stock market game results and reinforce the learning objectives. A review of the learned vocabulary (stock, margin, trigger price, net worth, dividends, etc) and discussing market volatility drives home the lesson’s impact. The opportunity to integrate the market game with a “meta lesson” regarding a time period such as the 1920's or 1980's or to explore the ramifications of wealth dispersion can be profitably explored in a follow up as well.

### *Game Mechanics*

The game requires the use of an overhead projection set up using Microsoft Excel, the

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<sup>1</sup> In the actual market, the Federal Reserve Board's Regulation T regulates the amount actual market participants can borrow. Currently, this rate is 50% of the stock's purchase price (for eligible securities selling at \$10 per share or more - the same initial margin is required for selling short) with a minimum of \$2,000 maintained in a margin account and a 30% maintenance margin.

<sup>2</sup> More than one game trial had prices topping \$60 per share at this point.

availability of calculators for student participants, and student handouts copied in advance. The presenter (teacher) should also have a small timer with an audible alarm (an egg timer that can be set for 5 - 10 minutes works nicely). Students should be prepared with pencils, erasers, and hand held calculators.

Before the lesson begins, the teacher needs to prepare the student handouts for each participant. At this point, the decision needs to be made whether a “meta lesson” will be taught in tandem with the stock trading game. If not, assign each student the same starting wealth and omit mention of different occupations. Appendix A contains a sample student handout. The starting price for our stock is \$20 per share, so an appropriate level of initial wealth is no more than an average of \$100.<sup>3</sup>

The computer software and projection set up needs to be available and functioning. Open Microsoft Excel, load the worksheet “StockGame”, go to View and click on Full Screen. What appears on the screen (overhead) is the opening price of the stock in large print and a small spreadsheet on the lower part of the screen.<sup>4</sup> To enter a buy transaction, type the number of shares desired in the buy column and hit the down arrow key. The column labeled total will calculate the transaction total and the price value will increment appropriately. Appendix B contains a teacher ‘cheat sheet,’ or outline, for the lesson discussion.

The initial presentation before the first round introduces the game, and explains that students will be trading in a single stock (ELS, Inc. perhaps) with cash from their initial level of wealth. A careful description of stocks as actual shares of ownership in a particular company and how such ownership confers both opportunities (such as increases in the stock price - usually reflecting the underlying company’s value- and an actual say in the company’s operations such as annual meetings) and risks (decreases in the underlying company’s value) is necessary. Using this time to recount the stock price history of a local and/or well known company may further enhance these ideas. An example might be the Coca Cola Company (KO on the New York Stock Exchange - NYSE); it was trading at \$20 per share in 1992, \$85 per share in 1998, and currently trades around \$50 (10/01).

The teacher should also describe how stocks are traded in the ‘real world.’ There are two distinct types of stock trading: those with physical places where trading occurs such as the NYSE on Wall Street in New York, and those with non-centrally located computerized trading like the NASDAQ exchange. Most students will be familiar with scenes from the pits of the famous markets like the NYSE where trading is occurring amidst semi-mystical hand signals and yelling.

A very brief discussion about what supply and demand do to prices may be appropriate as well. Note to students that when there are more shares offered for sale than the number of shares buyers wish to purchase, stock prices will fall and vice versa. In this game, every buy (no matter how many shares are transacted) causes prices to rise by \$1 and every sell causes prices to fall by \$1. Before the first round begins, the teacher needs to stress that students must figure out exactly

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<sup>3</sup> For the 1920's related game, I used wealth levels of \$60 for farmers, \$80 for laborers, \$100 for merchants and \$150 for ‘Barons of Industry.’ The number of expected participants was broken down into occupations according to the rough percentages of such occupations during the actual time period: for a class of 20, 2 Barons, 7 farmers, 3 merchants and 8 laborers. The handout can be color coded for each occupation if so desired.

<sup>4</sup> You may safely ignore the rest of the columns on the lower part of the screen, but if you wish to change the starting price, change cell I7 (labeled in the adjacent cell ‘base price’).

how many shares they wish to purchase/sell and that trading is strictly 'first come, first serve' (this creates the scramble to trade seen so often in news footage of the trading floors of actual stock markets). A note that prices rise with each purchase so that someone with \$100 will be able to buy 5 shares ONLY if they are first to get to the market maker will further enhance the excitement of the trading session. Students should also be aware that trading time will be limited for each round (5 minutes for the first round should be sufficient - subsequent rounds may need 7 minutes or more at the teacher's discretion).

The first round commences with the teacher sitting at the computer, starting the session clock and accepting bids. The teacher enters the quantity of the first trader in the appropriate buy or sell column and notes the total in the adjacent column. That amount is then written on the student's sheet under the first round stock with (say) "buy 5" and under cash "-100". Use the next line in the table for the next transaction. The stock price shown will increment by one for every buy and decrease by one for every sell, and the total column will show the amount for the transaction. When the bell rings (or when trading dwindles), the round is over.

The teacher next defines and discusses, briefly, dividends. These are payments to stock owners from the company out of company profits. It is nice to mention that, in the real world, some companies always pay dividends and some never do. Furthermore, dividends can be in the form of more stock shares instead of cash. In this game however, cash dividends are paid; students get \$10 for every share of stock they own. A student with 4 shares, therefore, gets to add +\$40 to the cash total they currently have. Students then calculate their net worth. This is done by taking their cash total and adding it to the *current price* of the stock (shown on the overhead) times the number of shares of stock they hold at the end of the round. These calculations are shown in the handout, but the teacher should demonstrate them and spot check some student handouts as well.

The next round may be identical to the first if time permits (as shown on the handout in Appendix A) or students may move on to margin trading. Using a second round of trading after dividends are paid entices more students into the market and will usually still fit within a one hour time constraint. At the end of that round, dividends are again paid and net worth again calculated. A verbal comparison of what current student net worth's looks like gives motivation to those students that have not yet taken the market plunge.

At the end of that round, dividends are not paid. The teacher then discusses how to margin stock purchases: margin buying is using borrowed money as well as your own to purchase stocks. There are rather complicated limits on such transactions (see footnote 1, above). In this game, however, we will use a very simple margin of 25%. This means that students can borrow up to 25% of the stock's value at purchase: to buy \$100 worth of stock, students can borrow only up to \$25 and must put in \$75 of their own cash. The calculations are shown on the handout. Care in checking student calculations at this point is vital. Also, the teacher needs to make clear that this amount is NOT the amount of net worth a student has, only the MAXIMUM amount of stock that can be purchased using borrowed money, with the student's current amount of cash on hand. Point out that students may want to sell a few shares of stock, take the proceeds and rerun the calculation to obtain the amount that they could borrow to purchase more stock.

This next round requires a little more time than the previous rounds, because of the additional calculation required by the students. I recommend, however, no more than 10 minutes. Having an assistant to aid students with these calculations can be helpful. This round may see students purchasing \$400 worth of stock (for those who had not yet purchased any

stock, for example). If students take advantage of this opportunity, prices can go over \$100 a share quite easily.

At the end of this round, the teacher needs to show not only the net worth calculation (demonstrated on the board, perhaps) but also to discuss what a trigger price is. A trigger price is the value of the stock that means the owner MUST sell stock to pay off the loan made to purchase it (Trigger Price =  $\text{Loan} \div (.75 * \text{number of shares of stock you own}) = \underline{\hspace{2cm}}$ ). For instance, if a student has a cash total that reads '-100' this means the student has a loan of 100. If this same student has 10 shares of stock, the trigger price will be  $100 / (.75 * 10)$  or \$13.33 per share. Make sure that students know that if the stock price on the screen is at, or below, \$13, this student must sell ALL of his/her stock. Teachers need to keep a careful eye on the trigger price calculations. Many students will have very low trigger prices, though some may have trigger prices fairly close to the prevailing price.

At this point, when the teacher is satisfied that students have correctly calculated their trigger prices, that a discussion about the underlying value of the stock (ELS being a lemonade stand, for instance) or the time period under discussion is done. At any rate, the teacher drops the outstanding price of the stock several points (to a point below several students' trigger prices, if possible). Trading in this last round may prove to be brisk. Depending on the 'mob' behavior, the price may even drop to zero (at which point, trading must cease) or it may just fluctuate as 'profit takers' buy when the price falls. At any rate, the end of this round is the end of the game. Have students calculate their final net worth and showcase the winner. Do not be surprised if the winner is not from among the group of students who had thought they would surely be the top profit maker.



**Maximum Purchase = 4\* (remaining cash) = \_\_\_\_\_**

*Note 1: this is the MAXIMUM you may purchase, NOT your current net worth.*

*Note 2: you may sell stock to get cash in order to 'buy on margin.'*

### **Round 3**

Cash	Stock (shares)	Loan
<i>Cash remaining after Round 2</i>	<i>Stock shares (total share purchases from Round 1+Round 2)</i>	

### **Margin Requirements:**

**Trigger Price = Loan ÷ (.75\*number of shares of stock you own)= \_\_\_\_\_**

*Note: If the stock drops below your trigger price, you MUST sell stock to cover your loan.*

### **Round 4**

Cash	Stock (shares)	Loan
<i>Remaining cash from Round 3</i>	<i>Total of Shares from Round 3</i>	<i>Loan Total from Round 3</i>

**Final Net Worth = Cash + (shares of stock)\*(current stock price) - loan:**

**Appendix B**



## ***Stock Market Simulation Game***

### **Before Round 1:**

How stock markets work (shares of ownership) and how stocks are traded

### **After Round 1:**

What are dividends? Repayment of some portion of profits to 'owners.' Why do companies pay them? What does newly available information (such as the payment of dividends) do to stock prices? Think about how much you are worth now:

cash + #shares of stock \* current value = net worth

### **After Round 2:**

What is margin? Borrowing money from a bank (or brokerage house) to buy stock using the stock as collateral for the loan.

Figure margin (max purchase = current cash \* 4) We're using 25% = 1/4 for max margin. (In 1929, it was common to be at 90%, the current law is 50% of purchase value with a 30% call margin. )

You may want to sell a few shares of stock to get cash in order to buy on credit.

### **After Round 3:**

How to calculate the trigger price. Take the total loan and divide by number of shares of stock you hold. THEN divide by .75 (this is what guarantees a 25% margin). If the stock price falls below this level, you must sell all of your stock (in the real world, the broker generally does this for you, but only sells the stock you bought on margin—we need to get the game moving along).

No new dividends.

Prices drop - maybe because of 'rumors' about 'softness' in technology stocks or profit taking by a few wealthy individuals. Keep tabs on prices!! Remember you must sell if the stock price falls below your 'trigger price.' In this game, let's say you have to sell everything you have (in the real world you only have to sell enough to make margin).

### **After Round 4:**

Calculate net worth. Cash + current stock price \* number of shares you own - loan.

Game Over. Winner gets what?