

Title: Stock Charting: Percentages and Profits

Grade Ranges:

 K-4
 5-8
 X 9-12

Subject Tag:

Math: Statistics

Social Studies: Social Science: Economics

Computer: General

Synopsis:

Half of the first part of this lesson is instruction on calculating percentage change, and the other half is instruction on how to use Microsoft Excel or appropriate spreadsheet software. Students then monitor the progress of an individual stock (or similar financial indicator) over a three-week period. At the end of that time, students complete the assignment, print their spreadsheets, and submit the printed work for grading. This lesson is designed to teach students to understand the formula behind percentage change $((V2-V1)/V1)$ and apply reasoning about percentages in a real-world situation. This lesson provides students with career skills through study of the stock market or related financial indices.

Keywords:

percentage calculations, percentages, stock markets, spreadsheets, Microsoft Excel

Body:

On the first day, discuss percentage change with your students. Provide multiple examples that go beyond simple pie chart representations of percentage. Have students calculate monetary (or other numeric) values for percentages of larger numbers. Point out (or provide small problems on the board for students to work on) how 5% of 100 is dramatically smaller than 5% of 5000, for example. Then provide students with an easy-to-understand formula to calculate percentage change:

$(V2 - V1) / V1$, where V1 is starting value and V2 is ending value.

Next, lead students into a discussion of how stock market reports are quantified. You may want to have examples from a newspaper that you have photocopied or transferred to a transparency to show on an overhead. Point out that most stock reports list not only a point change for major indices (Dow Jones Index, for example) but also a percentage change. Relate this discussion back to the percentage change problems presented earlier. Demonstrate to students how a loss of 500 points from an index like the DJI, although appearing to be significant because of the number, may be nothing more than a 3-5% fluctuation depending on the starting value of the index.

Also point out the process of how to decipher the data provided about individual stocks. You'll need to point out opening price and closing price. Students may be able to pick out change in monetary price and percentage change. Students can use this data to double-check their spreadsheet formulas for accuracy as they track their stocks over the 15-day period. It will be up to you to look at their spreadsheets to ensure that they use the proper formulas when you grade their assignments.

Next, show students how to create a sample spreadsheet to track the changes of a particular stock or index over a 15-day period (three weeks of school). The spreadsheet should be formatted like the example here:

Date	Closing Price	Daily \$ Change Val = P2 - P1	Daily % Change Val = (P2 - P1) / P1
3/4/2002	\$24.50		
3/5/2002	\$24.60	\$0.10	0.41%
3/6/2002	\$25.10	\$0.50	2.03%
3/7/2002	\$25.05	-\$0.05	-0.20%
3/8/2002	\$24.50	-\$0.55	-2.20%
3/11/2002	\$25.35	\$0.85	3.47%
3/12/2002	\$25.75	\$0.40	1.58%
3/13/2002	\$26.30	\$0.55	2.14%
3/14/2002	\$25.95	-\$0.35	-1.33%
3/15/2002	\$26.05	\$0.10	0.39%
3/18/2002	\$26.25	\$0.20	0.77%
3/19/2002	\$26.50	\$0.25	0.95%
3/20/2002	\$26.40	-\$0.10	-0.38%
3/21/2002	\$26.60	\$0.20	0.76%
3/22/2002	\$26.55	-\$0.05	-0.19%
Start Price	End Price	Total \$ Change	Total % Change
\$24.50	\$26.55	\$2.05	8.37%

Formulas for certain cells are as follows:

for cell C3: = C3-C2

for cell D3: = (C3-C2)/C2

Point out the advantages of using the Edit → Fill → Down features of Excel. By highlighting cell C3 or cell D3 and then dragging your mouse down the length of the column, the formula can be transposed and will automatically be updated based on the number of each cell. The formulas displayed in cells C2 and D2 appear as text because the cells were formatted as text; tell students to do the same so that there is a visual representation of the formulas they use for monetary change and percentage change for their stocks.

Note: If you have questions about creating and/or manipulating formulas using Excel or an appropriate spreadsheet software package, see your school's technology coordinator or appropriate individual to ask for extra help prior to implementing this lesson in your classroom.

Have students format a final row of cells with formulas for total monetary value change and total percentage value change as well.

Following this presentation of the lesson, assign students a stock or an index that they will follow for the next three weeks. At the middle school level, chances are you will want to pre-assign stocks, but you can judge if your students are capable of selecting stocks for themselves without too much delay; this can also be given out as a homework assignment for the next day. (Students will likely be most interested in stocks they pick themselves or ones they are assigned if they are familiar with the companies' products.)

Once students have selected an appropriate stock or index, they can begin the data collection phase of the assignment. Have students record the closing price for their stocks on day one. From that point on, have students record the closing price on each successive day and use their formulas to determine point and percentage change (if the formulas have been set up correctly in the spreadsheet, the change values should update automatically). Remind students to track their stock changes on their spreadsheets on a daily basis. Provide a rotating schedule that allows students one to two minutes to update their stocks on a computer in your classroom (if applicable) or encourage them to use some of their free time to stop by the computer lab to input their changes.

At the end of the three-week period, provide about 15 minutes (or more, depending on your school's lab and print capabilities and your class size) for all students to go to the lab as a group and print out their spreadsheets. Have students hand in their spreadsheets for grading. At the end of the assignment, you may want to take an additional 10-15 minutes to have students estimate (based on their spreadsheets) the percentage change on a few problems you can create for them on the board. Tell the students not to use a calculator or complete the problems on a sheet of paper, but instead encourage them to guess based on the data they will have in their spreadsheets.

Optional Extension: Teach students how to insert charts into their spreadsheets and create line graphs that track closing price, point change, and percentage change for the time period.

Related Links:

Microsoft Excel Tutorial

<http://www.bcschools.net/staff/ExcelHelp.htm>

Good quality online MS Excel tutorial

Introduction to Microsoft Excel 97

<http://www.unt.edu/training/Excel97/>

Another nice and easy-to-understand MS Excel 97 tutorial published by the University of North Texas

Microsoft Excel Help

<http://www.computerhope.com/excel.htm>

Of most interest is the "Excel formulas" section of this site — also provides good information about Excel 2002 and 2000, ideas should be intuitively translatable to Macintosh or PC and to older versions of Excel

Ask Mr. Excel — Tips and Solutions for Excel

<http://www.mrexcel.com/>

FAQ and message board pages for help with Excel

Microsoft Office – Excel Home Page

<http://www.microsoft.com/office/excel/default.asp>

homepage for Microsoft Excel

Objectives:

1. Provide students with working understanding of percentage calculation and estimation
2. Introduce a real-world perspective on mathematical relationships and ratios
3. Integrate computer skills into standard curriculum objectives

Standards:

NY: 3.3: Students use mathematical operations and relationships among them to understand mathematics. **3.6:** Students use ideas of uncertainty to illustrate that mathematics involves more than exactness when dealing with everyday situations. **3.7:** Students use patterns and functions to develop mathematical power, appreciate the true beauty of mathematics, and construct generalizations that describe patterns simply and efficiently.

NYC: M1e. Interprets percent as part of 100 and as a means of comparing quantities of different sizes or changing sizes. **M1f.** Uses ratios and rates to express “part-to-part” and “whole-to-whole” relationships, and reasons proportionally to solve problems involving equivalent fractions, equal ratios, or constant rates, recognizing the multiplicative nature of these problems in the constant factor of change. **M3a.** Discovers, describes, and generalizes patterns, including linear, exponential, and simple quadratic relationships, i.e., those of the form $f(n)=n^2$ or $f(n)=cn^2$, for constant c , including $A=s\sqrt{r^2}$, and represents them with variables and expressions. **M3c.** Analyzes tables, graphs, and rules to determine functional relationships. **M6f.** Uses equations, formulas, and simple algebraic notation appropriately. **M7a.** Uses mathematical language and representations with appropriate accuracy, including numerical tables and equations, simple algebraic equations and formulas, charts, graphs, and diagrams.

CT: Learning Resource and Information Technology: 5. Application. Students will use appropriate technologies to create written, visual, oral and multimedia products to communicate ideas, information or conclusions to others. **Mathematics:3.** Estimation and Approximation. Students will make estimates and approximations, and judge the reasonableness of results. **4.** Ratios, Proportions and Percents. Students will use ratios, proportions and percents to represent relationships between quantities and measures and solve problems involving ratios, proportions and percents. **9.** Algebra and Functions. Students will use algebraic skills and concepts, including functions, to describe real-world phenomena symbolically and graphically, and to model quantitative change.

Technology Education: 4. Problem Solving/Research and Development. Students will recognize technology as the result of a creative act, and will be able to apply disciplined problem-solving strategies to enhance invention and innovation.

NJ: Mathematics: 4.1: All Students Will Develop The Ability To Pose And Solve Mathematical Problems In Mathematics, Other Disciplines, And Everyday Experiences. **4.3:** All Students Will Connect Mathematics To Other Learning By Understanding The Interrelationships Of Mathematical Ideas And The Roles That Mathematics And Mathematical Modeling Play In Other Disciplines And In Life. **4.5:** All Students Will Regularly And Routinely Use Calculators, Computers, Manipulatives, And Other Mathematical Tools To Enhance Mathematical Thinking, Understanding, And Power. **4.10:** All Students Will Use A Variety Of Estimation Strategies And Recognize Situations In Which Estimation Is Appropriate. **4.13:** All Students Will Develop An Understanding Of Algebraic Concepts And Processes And Will Use Them To Represent And Analyze Relationships Among Variable Quantities And To Solve Problems. **Cross-Content Workplace Readiness: 2:** All students will use technology, information and other tools. **3:** All students will use critical thinking, decision-making, and problem-solving skills.

Prerequisite Skills:

1. Students should have familiarity with ratios and percentages but not at a level of mastery.
2. Students should have some familiarity with the stock market or the financial world. This is not required for successful implementation of this lesson.
3. Students should have some familiarity with the basics of how to operate a computer and print to a networked printer in your school's computer lab (if applicable).

Time Required:

Two to three 45-minute lessons, depending on class size and pacing of the events of the assignment.

Technology and Materials Needed:

1. Computers, preferred ratio of 1:1 computers to students, but 1:2 is possible

Assessment Criteria:

1. Grading of spreadsheets– teacher should design their own rubric
2. Follow-up quiz or test with questions related to percentage change – enhance any question with references to the computer experience

Recommended Lesson Plan Review Date:

Review Comments:

Check Web sites.