USING GRAPHS

From the MAPS AND GLOBES Unit of Study

Teacher's Guide
USING GRAPHS

Grades 5 - 9

Teacher's Guide

Produced by
Colgren Communications

Written by: John Colgren

Distributed by

AGC/United Learning
1560 Sherman Avenue, Suite 100
Evanston, Illinois 60201
(800) 323-9084, Fax (847) 328-6706
agc@mcs.net http://www.agcunitedlearning.com
Using Graphs

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INTRODUCTION
This Unit of Study is designed for use in grades 5 - 9 as an introduction to the major ideas and concepts associated with the use of maps, globes, graphs, tables, charts, and diagrams.

INSTRUCTIONAL NOTES
Before presenting these lessons to your students, we suggest that you pre-view the videos and review this guide and the accompanying blackline master activities in order to familiarize yourself with their content.

As you review the materials presented in this guide, you may find it necessary to make some changes, additions, or deletions to meet the specific needs of your class. We encourage you to do so, for only by tailoring this program to your class will they obtain the maximum instructional benefits afforded by the materials.

It is also suggested that the video presentation take place before the entire group under your supervision. The lesson activities grow out of the context of the video; therefore, the presentation should be a common experience for all students.

UNIT GOALS
This Unit of Study is composed of four video presentations covering the topics of maps, globes, graphs, tables, charts, and diagrams. An understanding of map and globe skills is essential to developing an appreciation for the planet on which we live and its land and water resources. Because of the increased sharing of data and information in modern society, it is essential that students in this age group understand various tools for presenting information, such as tables, charts, graphs, and diagrams. Living in "the information age," it is important that students feel comfortable using tools that are so often used to present data and to organize ideas and plans.

After completing this Unit of Study students should be able to:
• Use maps and globes and their various features to identify locations, global relationships, and distances.
• Create bar graphs, line graphs, pie graphs, and pictographs
• Interpret information from tables, timelines, and diagrams
• Produce flow charts and storyboards

UNIT ASSESSMENT
The four-part Unit of Study, when purchased as a package, is accompanied by an assessment tool (Unit Post-Test) designed to test student comprehension of the Unit Goals.
USING GRAPHS

LESSON OBJECTIVES
After viewing the video and participating in the accompanying activities, the students should be able to achieve the following objectives:
• Describe the use of the four kinds of graphs; line, bar, pie, and pictographs.
• Read and interpret information from various graph types.
• Create graphs to represent data and information.

SUMMARY OF THE VIDEO
This video is about the four major types of graphs. Students learn about the organization, structure and use of line graphs, bar graphs, pie charts, and pictographs.

LESSON ASSESSMENT TOOLS
This lesson is accompanied by several assessment tools designed to help you determine student comprehension of the lesson objectives before the administration of the lesson, immediately following the video presentation, and after the lesson has been completed. A Pre-Test (Blackline Master #1) may be used prior to launching the lesson; a Video Quiz (Blackline Master #2) reflects the questions which appear on-screen at the end of the video; and a Post-Test (Blackline Master #8) may be contrasted to the results of the other assessment tools to gauge the efficacy of the lesson.

TEACHER PREPARATION
View the video and review the accompanying activities. Duplicate any blackline masters you wish to distribute. If you plan to use the Video Quiz, which immediately follows the video presentation, you may wish to have copies of the quiz ready to distribute at the completion of the video program. Also, plan to pause the tape between questions if students require more time.

INTRODUCING THE VIDEO
Computers and related technologies have often made our times referred to as the “Information Age.” With so much data and information available to us it is important to understand how graphs are organized and used. Much of today’s information is presented in graphic form using line, bar, pie charts, and pictographs. The video you will be viewing today will discuss how these important tools are helping to share information easily.

VIEW THE VIDEO
Viewing Time is 10 minutes for the program and about 5 minutes for the Video Quiz.
FOLLOW-UP ACTIVITIES

BLACKLINE MASTER DESCRIPTIONS

Most of the follow-up activities for this program are designed for intermediate grades. An Answer Key appears on pages 5-7 of this guide.

• *Blackline Master #1: Pre-Test* is used to discern what students already know about maps prior to the administration of the lesson.

• *Blackline Master #2: Video Quiz* is to be used at the end of the video program. At the completion of the video, there is a short quiz. The narrator will read the questions which are displayed on the screen. Students can use *Blackline Master #2: Video Quiz* to record their answers. Answers to the questions are provided in the Answer Key section of this teacher's guide.

• *Line Graph* is the title of *Blackline Master #3* Students will answer questions based on a line graph on imports and exports from 1950 - 1995 in the United States.

• *Blackline Master #4: Bar Graph* asks students to interpret information from two bar graphs that share data about United States farms.

• *Blackline Master #5: Pie Chart* describes how to set up a pie chart from scratch. A calculator would be useful for this assignment.

• *Blackline Master #6: Pictograph* is about the U.S. armed forces between 1930-1996. Students will need to interpret information from the pictograph to answer questions at the bottom of the page.

• *Blackline Master #7: Make Your Own Pictograph* asks students to build their own pictograph using data from the table at the top of the page.

• *Blackline Master #8: Post-Test* is the assessment tool to be administered at the completion of the lesson. You may contrast its results with those of the Pre-Test to gauge student comprehension of the lesson objectives.

• *Blackline Masters #9 & 10: Enrichment Activity* is a stock market simulation for setting up an electronic portfolio. Use the master for your own reference and have the students help to set up the Excel or ClarisWorks spreadsheets. Don't duplicate this master for student use until the students have had a chance to suggest how the spreadsheets should be organized. Let them come up with the formulas.
DISCUSSION QUESTIONS

1. Ask students to relate examples that support the statement that we live in the "information age". How have computers and satellite technologies advanced our ability to share information and communicate in the world-wide network?

2. What are some of the ways students have used the internet to collect information? How has this changed the way they approach research projects and other assignments?

ENRICHMENT ACTIVITIES

1. Have students learn to use Excel or some other spreadsheet computer program. They could then practice creating graphs and see how easily the computer allows them to change from one type of graph to another.

2. Use the Enrichment Activity blackline master to help students set up an electronic stock portfolio. This is an excellent long range project that will incorporate the construction of spreadsheets and the creation of graphs.
ANSWER KEY

• VIDEO QUIZ, Blackline Master #1
  1. Line
  2. pie
  3. pictograph
  4. bar
  5. Record Sales for Rock Records
  6. line graph
  7. June
  8. 50,000
  9. April
  10. one month
  11. 42,500
  12. 40,000
  13. bar
  14. Imports and Exports
  15. millions of dollars
  16. 21,000,000
  17. 29,000,000
  18. 34,000,000
  19. 6,000,000
  20. 28,000,000

• VIDEO QUIZ, Blackline Master #2
  1. bar graph
  2. Land Area in millions of square miles for selected countries.
  3. The countries being compared.
  4. Millions of square miles
  5. former Russia
  6. France
  7. Canada, China and United States
  8. 2.9 million sq. miles
  9. 7 million sq. miles
  10. 1.2 million sq. miles

• LINE GRAPH, Blackline Master #3
  2. millions of dollars
  3. imports - - exports ...
  4. about 1977
  5. 1990 - 1995
  6. $740,000,000
  7. $570,000,000
  8. $700,000,000
  9. $520,000,000
  10. Office of Trade and Economic Analysis, United States Department of Commerce
• **BAR GRAPH, Blackline Master #4**
  1. Number of Farms in the U.S. (in millions)
     Size of Average Farm (in acres)
  2. 6,200,000
  3. 3,000,000
  4. 1950-1960
  5. 1.6 million
  6. As the number of farms decreased the number of acres for
     the average farm has increased.
  7. The small family farms are being consumed by larger farms.

• **PIE CHART, Blackline Master #5**
  lunch money 16%
  arcade 9%
  movie 17%
  clothes 33%
  bus fare 3%
  savings 22%

• **PICTOGRAPH, Blackline Master #6**
  2. 500,000 soldiers
  3. 1945
  4. 12,000,000
  5. World War II
  6. cold war years
  7. Vietnam War

• **MAKE YOUR OWN PICTOGRAPH, Blackline Master #7**
  Answers will vary

• **POST-TEST, Blackline Master #8**
  1. Computers and communication satellites have made the
     transfer of data and information many times faster than ever
     before.
  2. Bar graph, line graph, pie chart, and pictograph
  3. bar graph - used to compare information
     pie chart - used to compare the parts of a whole
     line graph - used to show change over time
     pictograph - used to compare data using symbols or graphics
  4. bar graph
  5. Exports for Country A and B
  6. $2,600,000
  7. country B
  8. $2,000,000
  9. line graph
  10. Stock Price for Company A
11. $12
12. April
13. $20
14. $10
15. August
16. $17
17. $10

• **ENRICHMENT PROJECT: STOCK MARKET, Blackline Masters #9 & 10**

  Students will be developing their own record of the history of stocks they have purchased during this simulation. Part of the evaluation of their progress would be the spreadsheets they create and resulting graphs from their data.
**USING GRAPHS**

Script of Narration

We live in a time often referred to as the “Information Age.” Computers and related technologies have made the sharing of information much easier and faster. For instance, Abraham Lincoln had to mail his invitations for his inaugural ball four months in advance to be certain people received them in time. Today we can e-mail someone on the other side of the world and receive a response moments later. The internet is an excellent tool for gathering information and data. People can locate information about just about every imaginable topic or subject. Stock information is a perfect example of how information is now available in ways it has never been before. You can look up a specific company and see a history of its activity. Notice that a graph is used to show the ups and downs of the stock activity. The information could be presented in a table such as this with a column identifying dates and another column showing closing price of the stock for that date. However, to get a real feel for how the stock has been doing a line graph is used to illustrate the same information. Notice that the graph is easy to read. The same information is found in the table but we would have to work to compare the numbers whereas the line graph provides an easy method of visualizing the information. That’s the purpose of this video to demonstrate how graphs have helped people interpret information and how important these tools have become in the “Information Age.”

There are four main types of graphs: the line graph, the bar graph, the circle or pie graph, and a pictograph. Each type of graph has different purposes and displays information in different ways. The line graph is one of the easiest graphs to read. It is used to show change over a period of time. The stock market information was shown as a line graph because it covered the performance of the stock over a period of months. The line graph like other graphs has some main parts or components that can help you to interpret the information. The main title tells what the graph is designed to show. The vertical axis which runs up and down and the horizontal axis which runs left to right will be labeled to indicate what they stand for. Notice on the stock graph that the vertical axis is labeled closing cost and the horizontal axis is labeled date. You could look up the closing cost of the stock for a specific date by finding that date on the horizontal axis and moving up to the point where the graph line intersects with the date line. Then follow over to the vertical axis to read the closing cost. One feature that is nice about the line graph is that you can predict what might happen next by extending the line. Here is another example of how the line graph can help us visualize change over time. This table lists the world’s population from 1 A.D. to the late 1990s and projects what it will be into the millennium. The table shows the world population in millions of people. Notice that in the year 1 A.D. the population was about 250 million people. By the year 1000 the population had only increased by 25 million. Over
the next 500 years it increased by 179 million. In terms of doubling time it took from 1 A.D. to 1650 for the population to double. Then 200 years later in 1850 it doubled again. Then in less than a hundred years it doubled again. Getting information like this from the table may take awhile but when the information is displayed as a line graph you can quickly see the slow gradual population growth that occurred before the 1800s and then the dramatic increase that has taken place since then as the line goes almost vertical on the graph. We can predict the future by extending the line past the year 2000.

Another popular graph is the bar graph. It is used to compare information. Here is a bar graph that shows the population growth of North America from 1650 to 1997. North America includes the United States, Canada, Mexico, and the Caribbean. The title for the graph is Population of North America from 1650 to 1997. The vertical axis shows population in thousands. So 5,000 really means five thousand thousand which is five million. The horizontal axis shows the year being compared. It goes from 1650 to 1997 with intervals of fifty years. It ends with 1997 because that was the last available year for data collection. In a bar graph you move up to the top of the bar and then across to the vertical axis to find the number.

This graph could be easily changed to include other major continents or regions of the world. The title would be changed to Population of World Regions. Nothing else would need to be changed but now additional information for other regions of the world would be added. Each region will have its own colored bar for each year. A key is added to the graph to identify the color each region will be assigned. So in cases where there are multiple items being compared a key is added.

A third kind of graph is a circle or pie graph. This kind of graph is used when comparing the parts of a whole. The entire graph represents 100 percent. The parts are then divided up into percentages. If we were going to make a pie graph that represents the composition of the earth’s atmosphere we would collect our data. The atmosphere is made up of 78% nitrogen, 21% oxygen and the remaining 1% is made up of many other gases. The three numbers add up to 100% so all we have to do is figure out how to draw this graph. A pie graph is a complete circle which is made up of 360 degrees. We can use a protractor to divide the pie up correctly. First, think of the circle as being divided into 100 equal parts. There are 360 degrees in the circle divided by 100 gives us 3.6 degrees for each division. Now we can mark off an area that is 3.6 degrees or 1 percent of the circle. That area will be the 1% of additional gases in the atmosphere. Then to calculate the number of degrees for the 21% of oxygen we would multiply 21 times 3.6 to get 75.6 degrees. This number will represent the area that represents oxygen. The remaining area is the 78% nitrogen that makes up most of our earth’s atmosphere.
Sometimes the information we wish to share in a pie graph isn't represented in percentages. Let's say you wish to show how you spend an average day. You would begin by identifying how time is spent. You may say that eight hours is spent sleeping, seven hours are at school, one hour is spent eating, two hours are used working on homework, and three hours watching TV, and four hours with outside sports and free time. These numbers are not given in percentages so we will have to change them for the pie graph. The entire pie is 24 hours. To find what percentage of time is spent sleeping we would divide the 8 hours spent sleeping by 24 hours. The answer is rounded off to .33 which is then multiplied by 100 to determine the percentage. Remember, to change this to degrees we would multiply by 3.6. This way we can figure out how to draw this area on the pie. The answer is 118.8 which is rounded to 119 degrees. We can then use the protractor to draw out an area that represents 119 degrees or 33% of the circle. This method is continued for all the other data.

Fortunately many computer programs now have a method for inputting data that is automatically put into a pie chart format. The program does all the calculating we did to represent the pie chart divisions properly. These software programs also make it easy to create line and bar graphs and to even change from one to another.

The final type of graph is the pictograph. This graph is used to compare things but instead of using bars to represent the information it uses pictures or symbols. The symbol used to represent the information is usually designed to reflect the item being compared. For instance when showing the average income by education we might use coins or dollar bills.

Population comparisons are often portrayed with symbols that look like a person. Whatever symbol is used somewhere on the graph there will be a key that identifies what the symbol stands for. In the case of the income by education each bill represents 5,000 dollars. To show an amount that is 2,500 dollars we would use half a bill. To show an amount that is 4,000 dollars we would show 4/5 of a bill. In the case of population the symbol is also divided to show amounts less than the full value of the symbol. Pictographs are often fun to read and because of the use of images or symbols they lend themselves nicely to creative representation.

Graphs can brighten up a presentation and help to represent information and data in an easy to understand fashion that helps to clarify ideas and concepts.
Maps and Globes Unit of Study

USING GRAPHS
BLACKLINE MASTERS

Blackline Master #1: Pre-Test
Blackline Master #2: Video Quiz
Blackline Master #3: Line Graph
Blackline Master #4: Bar Graph
Blackline Master #5: Pie Chart
Blackline Master #6: Pictograph
Blackline Master #7: Make Your Own Pictograph
Blackline Master #8: Post-Test
Blackline Masters #9 & 10: Enrichment Project
**Name ________________________

1

**Using Graphs**

**PRE-TEST**

**DIRECTIONS: Circle the correct answer.**

1. A graph that is used to show change over time is the _______ graph. (bar, line, pie, or pictograph)
2. A graph used to compare parts of a whole is the _______ graph. (bar, line, pie, or pictograph)
3. A graph used to compare data using symbols or graphics is the _______ . (bar, line, pie, or pictograph)
4. A graph used to compare information is the _______ graph. (bar, line, pie, or pictograph)

**Directions: Use the graph to answer the questions that are found next to it.**

**Record Sales for Rock Records**

**in thousands of copies**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>55</td>
<td>40</td>
<td>35</td>
<td>30</td>
<td>25</td>
<td>20</td>
<td>15</td>
<td>10</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

5. What is the title of this graph? ________________________
6. What kind of graph is this? ________________________
7. What month had the greatest sales? _____________
8. What was the total sales for that month? ____________
9. Sales dropped to its lowest in what month? __________
10. How long did this slump last? ______________
11. What was the number of sales in August? _________
12. From May to June how much did sales increase? __________

**Imports & Exports**

**in millions of dollars**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Imports</td>
<td>35</td>
<td>30</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td>Exports</td>
<td>15</td>
<td>10</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

13. What kind of graph is this? ______________
14. What is the title of this graph? ____________
15. What is the unit of measurement? ___________
16. What was the amount of imports in 1960? __________
17. What were imports in 1970? _________________
18. What were the number of exports in 1990? __________
19. What was the total of imports in 1990? __________
20. How much greater was the total for 1990 exports compared to 1990 imports? ______________
DIRECTIONS: At the end of the video production there is a video quiz. You can write the answers on this blackline master.

1. What kind of graph is this?
2. What does this graph show?
3. What does the horizontal axis show?
4. What does the vertical axis show?
5. Which country being compared has the largest land area?
6. Which country from this group has the smallest land area?
7. Which three countries have almost the same land area?
8. What is the land area of Australia?
9. What is the land area of Canada and the US combined?
10. What is the land area of India?
DIRECTIONS: Use the line graph at the bottom of the page to answer the questions below.

1. What is the title of this graph?
2. What unit of measurement is being used in this graph?
3. What symbol is used to show imports?
   What symbol is used to show exports?
4. Exports used to exceed imports for many years. At what point did this reverse?
5. During what 5 year period was the greatest increase in imports occur?
6. In 1995 what would you estimate the total amount of imports for the United States?
7. In 1995 what would you estimate the total amount of exports for the United States?
8. Between 1970 and 1995 how much did the amount of imports increase?
9. During the same period how much did the amount of exports increase?
10. What is the source of this information?
Using Graphs
BARGRAPH

DIRECTIONS: Use the bar graphs on this page to answer the questions.

1. The two bar graphs on this page provide information about U.S. farms. Identify what each graph is designed to tell about and its unit of measurement.

2. The number of farms in 1940 was approximately ______________.

3. In 1970, thirty years later the number had dropped to ______________.

4. During which ten year time span did the number of farms in the United States drop the most?

5. During the ten year span in question #4 how many millions of farms does the graph drop?

6. What do you notice when comparing these two graphs?

7. The answer in question #6 can lead to an assumption about what has been happening to smaller farms over the past sixty years. What general statement can you make about the changes happening to U.S. farms?

Name ____________________________
Using Graphs
PIE CHART

DIRECTIONS: Follow the steps below to set up a pie chart. Use a calculator to help with the numbers.

1. Identify the data that you will be using for your pie chart. Use the following information from the table below.
   Expenditure of Monthly Allowance (Total = $45.00)

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lunch money</td>
<td>$7.00</td>
</tr>
<tr>
<td>Arcade Games</td>
<td>$4.00</td>
</tr>
<tr>
<td>Movie</td>
<td>$7.50</td>
</tr>
<tr>
<td>Clothes</td>
<td>$15.00</td>
</tr>
<tr>
<td>Bus Fare</td>
<td>$1.50</td>
</tr>
<tr>
<td>Savings</td>
<td>$10.00</td>
</tr>
</tbody>
</table>

2. Notice that the data isn’t in percentages. We will need to calculate the percentage that each category represents of the total allowance. Each of the six expenditures items is divided by 45 which represents the total allowance.
   - Lunch money: $7.00 divided by 45 equals 0.1555555556 which is rounded to 0.16
   - Arcade Games: $4.00 divided by 45
   - Movie: $7.50 divided by 45
   - Clothes: $15.00 divided by 45
   - Bus Fare: $1.50 divided by 45
   - Savings: $10.00 divided by 45

3. Now calculate the degrees for each of the categories. Think of the circle as being divided into 100 equal parts. There are 360 degrees in a circle so if we divide that into 100 equal parts each division will be 3.6 degrees. To calculate the degrees for each category multiply the percentage by 3.6 degrees. This will give the number of degrees the category should occupy in the pie graph.
   - Example: Lunch money is 16% of the graph so 16 times 3.6 equals 57.6 degrees.
   Then use the protractor to mark off a 57.6 degree angle on the circle below.
Using Graphs
PICTOGRAPH

DIRECTIONS: Answer the questions at the bottom of the page by consulting the pictograph below.

U.S. Armed Forces 1930 - 1996

1930
1940
1945
1950
1960
1970
1980
1990
1996

Each symbol equals 500,000 soldiers

1. What is the title of this graph?
2. What does each symbol stand for?
3. Which year had the greatest number of armed forces?
4. How many armed forces were there in that year?
5. Why do you think the armed forces were so large at that time?
6. The number of armed forces has been declining since 1970. Why do you think that has been happening?
7. The number of armed forces was up during 1960 and 1970. Why?
Using Graphs
MAKE YOUR OWN PICTOGRAPH

DIRECTIONS: Use the information from the table to design your own pictograph.

U.S. Motor Vehicle Production 1950-1996 (in thousands)

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
<th>Year</th>
<th>Number</th>
<th>Year</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>8,006</td>
<td>1960</td>
<td>7,905</td>
<td>1970</td>
<td>8,284</td>
</tr>
<tr>
<td>1980</td>
<td>8,010</td>
<td>1990</td>
<td>9,783</td>
<td>1993</td>
<td>10,898</td>
</tr>
</tbody>
</table>

Title: ________________________________
Using Graphs
POST-TEST

DIRECTIONS: Answer the following questions in the space provided.

1. Why is the present time in history often referred to as the "information age"?

2. What are the four main types of graphs?

3. Match the type of graph listed under column A with the description given in column B. (Draw lines from the graph name to the description that matches it.

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar graph</td>
<td>used to compare data using symbols or graphics</td>
</tr>
<tr>
<td>Pie graph</td>
<td>used to show change over time</td>
</tr>
<tr>
<td>Line graph</td>
<td>used to compare information</td>
</tr>
<tr>
<td>Pictograph</td>
<td>used to compare the parts of a whole</td>
</tr>
</tbody>
</table>

Use the following graphs to answer the questions that are found next to them.

4. What kind of graph is shown here?

5. What does this graph show?

6. How much was exported in 1980 by country A?

7. Which country seemed to hold steady for twenty years?

8. How much did country A's exports drop from 1980 to 1990?

9. What type of graph is shown here?

10. What does this graph show?

11. What was the starting price of the stock?

12. When did the stock reach its highest point?

13. What was the closing price at that highest point?

14. What was lowest closing price?

15. When did the low price hit?

16. What was the closing price in October?

17. How much did the stock drop from April to August?
DIRECTIONS: This is a stock market simulation. Students will be allotted $5000 to spend on the purchase of stocks of their choice. They will then track the progress of the stock over a one month period and record daily closing prices. After the one month period, results of the stocks’ activity will be generated including line graphs of the one month history of each stock purchased. Students may spread their initial stock purchases over more than one company.

If your class has access to computers and a spreadsheet program such as Excel or ClarisWorks then sign up for the lab and consider having the students create an electronic portfolio for this project. If not they can keep records in a notebook. Either way the first step is to set up the structure for keeping records. Consider this an excellent opportunity for the entire class to participate in designing their portfolio. Discuss with the class what type of information they will need and how this information interrelates. Give the students every opportunity to contribute headings for columns and formulas for cells of the spreadsheet.

Here are some things to consider:
The first process is to spend the initial $5000. This is accomplished by determining what companies to purchase stocks from, establishing how many stocks to buy from each company, and to build in the 2% brokerage fee. It would be a good idea to set up a spreadsheet just for this initial purchase. That way running totals can be established and students will know immediately when they have reached their $5000 goal.

The spreadsheet might look like the following example. Formulas are included in parenthesis. Let students come up with as much of this as they can. This example is based on 5 companies.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPANY NAME</td>
<td>DATE OF PURCHASE</td>
<td>COST PER SHARE</td>
<td>NUMBER OF SHARES</td>
<td>COST OF TOTAL SHARES</td>
<td>BROKERAGE FEE 2%</td>
<td>TOTAL COST</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>(=C2*D2)</td>
<td>(=E2*.02)</td>
<td>(=E2+F2)</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The total cost under column G will help students to make choices that come very close to the $5000 budget.

At the conclusion of the project additional columns will be added to this table.

<table>
<thead>
<tr>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>SELLING PRICE OF STOCK</td>
<td>TOTAL SALES</td>
<td>BROKERAGE FEE 2%</td>
<td>REVENUE MINUS FEE</td>
<td>NET CHANGE</td>
<td>PERCENTAGE GAIN OR LOSS</td>
</tr>
<tr>
<td>(=D2*H2)</td>
<td>(=I2*.02)</td>
<td>(=I2-J2)</td>
<td>(=K2-G2)</td>
<td>(=L2/G2)</td>
<td></td>
</tr>
</tbody>
</table>
Step two is to set up a spreadsheet for each company to record the history of the stock over the one month project. The main information on this sheet will be the closing price for each day and an indication if that is a gain or loss from the previous closing. Here is a sample of what that spreadsheet might look like:

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DATE</td>
<td>NUMBER OF SHARES</td>
<td>CLOSING PRICE</td>
<td>TOTAL (=B2*C2)</td>
<td>Net CHANGE (=D3-D2)</td>
</tr>
</tbody>
</table>

There is a lot of great data to graph and if you are using a computer program like Excel the process of graphing is greatly improved. Here are some ideas for graphs:

1. The basic graph would reflect the closing price history of the stock over the 30 day period. Students would move the Closing Price column C next to column A the Date. This shifts column B over to the right. Now they would highlight columns A and the new B to indicate this is the data to graph. Then they would indicate they want to make a line graph of this data. Following the directions they can establish headings for the x and y axis as well as provide a name or title for the graph.

2. Another graph might be a daily record of gain or loss for the stock. This time column E would be moved between column A and B where it will replace Number of Shares. Then follow steps in #1.

3. A double line graph could be generated with Closing Price and Gain or Loss.

4. Students can easily convert graphs from line graphs to bar graphs using a program like Excel.