



Professional Development

Classroom Applications for Excel

This presentation explores some ideas for how your students can use Excel to practice and learn about your curriculum. While many people see the obvious applications of Excel in the math classroom, it can be used to help students visualize many types of patterns and relationships, and use higher level thinking skills. These learning goals are found in all areas of the curriculum.

In their paper “Classroom Instruction that Works: Research-Based Strategies for Increasing Student Achievement” the authors (Robert J. Marzano, Debra J. Pickering, and Jane E. Pollock) identified nine strategies that have positive effects on student learning. Many of these strategies can be implemented using Excel.

1. Identifying Similarities and Differences
 - a. Use graphs to demonstrate comparisons
2. Summarizing and Note Taking
 - a. Students can take notes in Excel.
 - b. They can create outlines of chapter headings and organize them in a spreadsheet
 - c. Study guides for certain information can be effectively organized or “mapped” in Excel
3. Reinforcing Effort and Providing Recognition
 - a. Progress tracking charts are easy, visual and can be colorful and eye-catching in Excel
4. Homework and Practice
 - a. Create Excel templates that students can use to enter data for practice – they can instantly see the results when only one variable is changed.
5. Nonlinguistic Representations
 - a. Graphic organizers that can be created in Excel are limited only by your imagination. One teacher had students score the amount of “power” held by Piggie and Ralph in each chapter in the novel Lord of the Flies. They entered the numbers in a spreadsheet when they finished the book, created a line chart with a line for each character, and voila! You could see how the power of one diminished as the other increased in the book.
 - b. Descriptive, time-sequence, process, cause-effect, and other patterns can be seen using Excel features.
6. Cooperative Learning
 - a. Excel lends itself to group projects. All group members can collect data; then, pool it together to create a “total picture” in one spreadsheet.
 - b. Another example: Second graders in pairs guess how many M & Ms of each color are in a packet. After they each make a prediction, they open the packages and sort by color. Data is easily converted into a bar graph and pie chart.
7. Setting Objectives and Providing Feedback

- a. As in the “self-test” example, students can receive immediate feedback when you create an “interactive worksheet” with Excel.
- 8. Generating and Testing Hypotheses.
 - a. Excel helps students see the stages of decision making, data collection, testing, estimating, correcting and evaluating their final results.
- 9. Cues, Questions and Advance Organizers
 - a. You can use Excel to create certain “table” types of advance organizers.

These are some general ideas of where or how Excel can be integrated in the classroom. For a variety of interactive Excel spreadsheets that you can save from the Internet and modify and use, refer to: http://collaboratory.nunet.net/hou/i_excel/interactive_excel.htm The online examples are almost all for the sciences – physical, chemical and biological. Following are additional examples of projects or spreadsheets that use Excel, including specific directions for creating the spreadsheet.

What if?

This activity is for younger students and helps them to understand planning for expenses. Select a hypothetical item students want to save money to purchase, and provide the cost of the item. Students may ask “How many weeks would it take to reach this goal?” Using a spreadsheet to answer this question, students can experiment and explore different outcomes based on these “what if” questions:

1. What if I earned \$1.80 per week?
2. What if I saved half of it each week?

After creating the sample spreadsheet below, students can change the amount earned or the amount they saved each week and measure the impact. They might also consider purchasing a less costly item. In the sample, formulas rather than values are shown where required. In the spreadsheet, formulas won’t show, only the results. Use the fill handle to copy repeating entries.

Sample:

Item Cost	Earnings per week	Portion saved per week	Dollar amount saved per week	Weeks to reach goal
\$16.49	1.80	.5	=B2*C2	=E1+D2
	1.80	.5	=B3*C3	=E2+D3
	1.80	.5	=B4*C4	=E3+D4
	1.80	.5	=B5*C5	=E4+D5

When the amount in column E is equal to or greater than the item cost, students can count the number of rows to determine the number of weeks required to save. They can then save more or less of their earnings and enter the new amounts in columns B or C, or change the cost of the item in column A to see how much more or less time it would take to reach their goal.

For older students, or those familiar with Excel, you could include a the count function to count the number of weeks, and you could include an additional column with If statements to automatically compare the value in column E with the amount in cell A2 to determine if the goal has been reached. Count the cells in column F where the value is “yes”, and you have an automatically generated number of weeks to reach the goal...

Create a “Self Test”

You will need:

- Short questions, short answers
- Optional list of words for matching
- Indicator of right or wrong answer
- The “IF” function

Layout:

- Heading with directions
- Sub-heading with optional list of words from which to choose
- OR, additional column with list of words from which to choose
- First column for question
- Second column for answer
- Third column contains “IF” function to indicate if the answer is right or wrong

Example: Test your planetary knowledge

Enter the name of the celestial body that corresponds with each fact.

Choose from the following: Sun, Moon, Jupiter, Saturn, Pluto, Mercury, Mars, Venus

All planets rotate around me.		=IF(A3="Sun","YES","NO")
I have five moons.		=IF(A4="Jupiter","YES","NO")
I am the most recently discovered planet.		=IF(A5="Pluto","YES","NO")
I am the closest to the sun.		=IF(A6="Mercury","YES","NO")
I am a gaseous planet.		=IF(A7="Venus","YES","NO")

Explanation:

Note the following components of the “IF” function:

- =IF()

All formulas or functions begin with an equal sign. IF indicates the function to be performed. The parenthesis enclose the “variables” to be considered.

- A3=

This gives the cell address whose content is to be compared.

- “Sun”,

This is the value with which to compare the cell content. It must be in “quotation” marks if it is text. Note that ALL text must be in quotation marks. Also, if a student typed “sun” with a lowercase S, there would not be a match. CASE MATTERS when text is in quotation marks. The commas separates the comparison value from the next value.

- “YES”,

This is the value which is shown in the cell where you type the “IF” function, IF A3 does equal “Sun”. Again, quotation marks are necessary to indicate text. The comma separates this value from the last.

- “NO”

The final value in the function is the value which appears IF A3 does not equal the value given immediately following the equal sign.

Compare Two Groups

You will need:

Two groups for which to collect data
The same set of information for both groups
The SUM formula
The Chart Wizard

Layout:

Enter a general title or heading.
Create a row heading for each group.
Create a column heading for each set of information to be compared.

Example: Compare expenses for boys and girls

Who costs more each month – boys or girls?

	Hair style (1)	Snacks (1 day)	Clothing (1 outfit)	Sport/hobby (supplies)	Totals
Boys					=sum(B3:E3)
Girls					=sum(B4:E4)

Insert a column chart to compare each item and a pie chart to show which percent of the total boys consume and which percent girls consume.

Explanation:

- To create a column chart -

Drag and select the first five columns for all three rows. Note that you select the column and row headings as well as the data. Excel automatically labels the data with these headings. Do not select column six because, if you included the totals in the column chart, the “range” shown in the chart would be too big.

With the “range” selected, click on the chart wizard button on the toolbar. Choose a column chart you prefer. You have already selected the range. In the following screen enter a chart title, and titles for the X axis (expense) and the Y axis (amount). The next screen allows you to enter the chart in the current sheet, OR have it large enough to fill an 8.5 x 11 page by itself. Choose “as object in”. Finish the wizard.

You may move or change the size of the chart or the pieces within it by dragging the chart or the edges as you would with any other drawing object.

- To create a pie chart –

Drag and select all three rows of the first column (blank, boys, girls). Hold down the Ctrl key and drag to select all three rows of the last column (totals, number, number). Click the chart wizard button. Choose a pie chart that you prefer. Complete the wizard.

Show Change over Time

You will need:

A set of data that changes over time

A line chart

AutoFill to quickly fill in repeating days, months or dates

Layout:

First row - enter a general title or heading and explanation

Second row - headings for the columns

Note: It is more common to represent data over time going across the sheet.

Example: Number of Students in Class (Attendance)

Determine the period of time over which you wish to track attendance, and also the frequency you will note the attendance. In this case, enter daily totals over a period of one month.

	January 1	January 2	January 3	January 4	January 5
Number of students present	10	12	12	13	9

Explanation:

- Speed up entry of date headings

Enter January 1, and a second date, January 2. Then, select both cells and position the cursor over the small black square in the lower right corner of that cell. Drag the cursor across 31 columns.

- Multiple rows of data

If you wish only to count total students, you need one row for data. If you wish to track attendance of boys and girls separately, or of bus-riders and non-bus-riders separately, you may have several rows.

- To create a line chart –

Drag and select all rows and columns with data in them. Click the chart wizard button. Choose a line chart you prefer. Complete the wizard.

Students can review the data at the end of the month and form hypotheses about why attendance was greater on some days than others (holiday?), and look for trends (attendance decreases toward the end of the month?).

They can look at the numerical data in the table and compare that with the chart that represents the data visually. Which is easier to understand and explain?