Spreadsheets, Functions, and 12 Days of Christmas

by – Beth Loughry

Activity overview

The concept of "percent of change" is explored by analyzing price changes for the cost of gifts in the holiday song "The Twelve Days of Christmas." Students will use Lists and Spreadsheets to enter gift costs from the previous year and compare to this year's prices. They will then determine the percent of change in cost for each item. Both current and historical data are available at www.pncchristmaspriceindex.com

Essential Questions

1. *What tools are included in the Lists and Spreadsheets application that will help the student be more efficient, effective, and productive in examining numerical data?*
2. *How are functions used in a spreadsheet?*
3. *What difficulties could be encountered in learning how to use a spreadsheet, and how can these problems be overcome?*

Objectives

1. *Use correct terminology to identify the features of Lists and Spreadsheets.*
2. *Create a spreadsheet and use that spreadsheet to manipulate data.*
3. *Identify functions, choose applicable functions, and correctly enter those functions into the spreadsheet to analyze data.*
4. *"Purchase" a combination of items listed in "The Twelve Days of Christmas" to determine the total cost of the items.*
5. *Use functions to determine the percent of change in cost of the gifts from last year to the current year.*

Concepts
o *Functions in Lists and Spreadsheets*
o *Frequency Tables*
o *Percent*
o *Percent of Change*

Teacher preparation

Prior to presenting the lesson, verify student understanding of percent and percent of change. A basic understanding of the handheld is necessary, as well.

Provide students with a copy of the song from Fact Sheet 1: The Twelve Days of Christmas on page 5 at http://www.pncchristmaspriceindex.com/downloads/StockMarketGame-07.pdf

An alternate method of determining the number of gifts presented by the "true love" is to play the song and allow students to create a frequency table and tally the gifts as they are sung. Music without lyrics can be found at http://www.cvc.org/christmas/12days.htm

Classroom management tips

If possible, students should have access to a computer with an internet connection to access current data atwww.pncchristmaspriceindex.com . If internet access is not possible, current data should be downloaded, printed, and copied for student use. Data for the 2006 and 2007gifts is provided. Each student should have access to a TIN-spire handheld unit.

TI-Nspire Applications

Lists and Spreadsheets
Calculator
Notes

Step-by-step directions

I. TI-Nspire Lists and Spreadsheets

    *A. After turning on the TI-Nspire handheld, Choose Home and select **3. Lists and Spreadsheets**. Press **Enter** or the **Click Button**.*

        1. Highlight the white space just to the right of A in column A, type "cost06".
        *2. While the space is still highlighted, press **MENU**. Highlighted is **1.ACTION**. Press the **RIGHT ARROW** on the navpad for **ACTION** choices.*
        *3. From this menu, highlight **2.Resize**, and press the **Click Button**.*
        *4. With the entire column highlighted, press the right arrow on the navpad to widen the column. Make sure the entire text is visible, then press the **Click Button**, then press ESC (escape).*
        5. Highlight the white space just to the right of B in column B, type "cost07" and press ENTER.
        6. Use the same procedure on column B as you used on Column A to widen the column.

II. Data

    A. How many of each gift does "my true love" give you?
        While listening to the song, "The Twelve Days of Christmas,"
        make a tally (mark) each time you hear each gift in the song. Record your data on the provided Frequency Table.

    B. Now determine the total number of each gift given to you by "your true love."

    C. In the next step, refer to www.pncchristmaspriceindex.com to find the current individual price of each gift in the song, and enter the values in the table below. Double-check all

entries!!! If you don't enter the correct numbers, you won't get a correct
answer!!!!
D. Press **CTRL** (Control), then **Home** to access the Tools Menu. From this menu, select **2.Edit**.
After scrolling right with the navpad, choose **7.Insert Page**, then **ENTER**. Select **1. Add
Calculator**, **ENTER or CLICK BUTTON.** With your calculator, calculate the
total cost of each gift, and enter in the table.
E. In the next step, refer to <u>www.pncchristmaspriceindex.com</u> and find the previous year's
individual price of each gift in the song, use your calculator screen to calculate the total cost of
each gift at last year's prices, and enter the values in the table below. If the calculation is a
repetition of a calculation on the current year, the calculator application allows you to scroll back
up to that data to avoid repeating the same calculation.

III. Data Analysis, Functions

*You are now ready to enter values and functions in the cells of your spreadsheet. Press **CTRL**, then the
left arrow on the navpad to move back to page 1, Lists and Spreadsheets.*

A. Beginning in Cell A1, manually enter the 2006 true cost of the each gift in the rows of column
A.
B. Beginning is Cell B1, manually enter the 2007 true cost of each gift in the rows of column B.
C. Highlight the white space just to the right of C in column C, type "Change."
D. Widen the column with the same procedure used to widen columns A and B.
E. Highlight the shaded space below the C, and enter the function "=cost06-cost07" then
ENTER. The change in cost for each item is now displayed in column C. You may need to
widen this column.
F. Highlight the white space just to the right of D in column D, type "percentchange". Widen the
column to display the heading.
G. Highlight the shaded space below the D, and enter the function "=change X 100 ÷ cost06"
then ENTER. The percent of change in the cost of each item from 2006 to 2007 is displayed.
a. Justify the selection of this function to find percent of change of each item.
b. Which item had the greatest percent of change? Explain the reason the change may
have been greater than other changes.
c. Which items did not change? Explain why no change occurred.

Activity extensions
- Create the lists of 2006 and 2007 costs of the gifts in "The Twelve Days of Christmas." Create two Box and
Whiskers Plots, one with 2006 data, and one with 2007 data. Compare and contrast the two graphs.