

“Chilling Out”- Lesson Plan 4

Title: Data Management and Probability

Recommended Time Requirements:

This lesson is expected to require approximately 4 hours of class time.

Task / Student Scenario

Students research and develop a matrix describing the introduction and spread of common household items such as refrigeration, electricity, and cell phones, from 1900 to 2000 in the U.S. Each section of the matrix will represent a 10-year period. Where available, statistics for the items will be included. The matrix will be used by students to construct a timeline of household technologies.

Intended Grade Level / Subject Matter Area:

Mathematics Grades 7 & 8 – Data Management and Probability; History Grade 8 – Canada: A Changing Society

Instructional Outcomes:

Students will:

- systematically collect, organize, and analyse data from charts and tables;
 - recognize the different levels of data collection;
 - use computer applications to examine and interpret data in a variety of ways;
 - develop an appreciation for statistical methods as powerful means of decision making;
 - create a matrix that shows household technology in various parts of the house; and
 - interpret displays of data and present the information using mathematical terms;
 - evaluate data and make conclusions from the analysis of data;
 - use and apply a knowledge of probability.
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- explain the basic household technology that most Americans (and Canadians) used in 1900
 - trace the invention and diffusion of household technology in the 20th century;
 - explain how improvements in household technology caused broader changes in society.

TEACHER INSTRUCTIONS

Prior knowledge and skills required

To complete this task, students should have some knowledge or skills related to the following:

Materials and Resources

For this lesson you will need:

- Computers connected to the Internet for conducting research and to access “Chilling Out” Website.
- Time Well Spent: The Declining Real Cost of Living in America - The Annual Report from the Federal Reserve Bank of Dallas
<http://www.dallasfed.org/fed/annual/1999p/ar97.pdf>

This is an American report in American dollars. A Canadian report will be substituted once one becomes available.

Task Instructions

Introductory activities:

Pre-task 1: Household Technology Timeline

1. Introduce the idea of household technology.
 - Ask the students for examples of current household technology and have a volunteer write the examples on right third of the board.
2. Link to the HVACR Heritage Centre of Canada “Chilling Out” exhibit at <http://pilot.hhc-canada.net/>. With the class, read the section on “Changing Lives” and clarify and language or concepts through discussion.
 - Ask the students to describe household technology in 1900 and write their responses on the left third of the board.
 - Where does new household technology come from? [inventions]
 - What is the word for the spread of these new technologies through the society? [diffusion]
3. Refer students to the Science Odyssey Web site <http://www.pbs.org/wgbh/aso/tryit/tech/#>. Ask students to record technological advances in the refrigerator and other household technology beginning with the year 1900. The journey can be presented as a teacher led activity, in student pairs, or independently, depending on computer/internet access. You may wish to use the Student Worksheet provided.
4. After viewing the Web site, draw lines on the board to divide it into 3 columns. Use the middle third of the board to list the inventions that became popular between 1890 and 1925.

Pre-task 2:

1. Distribute the “Time Well Spent” Dallas Fed Bank annual report (See Resources section below for link). If color printing is a problem, distribute only exhibit B on page 22 of the report (page 24 of the pdf file) or have the students view the chart directly on a computer screen.
2. Show them how to read the graph to estimate when half of American households had each item. For example, approximately when did half of American households have TV? [About 1972] This is done with a piece of paper placed so that one edge is at the 50 percentile, the corner is on the line representing a particular piece of technology, and the other edge indicates the year.
3. The students should use the graph along with a blank piece of paper to estimate when each technology had diffused to half of American households. These dates should be placed in the appropriate part of the matrix in the student handout. Each technology should be associated with the appropriate room or rooms.

Pre-task 3

1. After the matrix is filled in, have students look again at the graph on page 22. You might ask the following questions to get started:
 - Most of the lines are steeper in the middle than they are at the ends. What does this represent? [The slope of the line represents the speed of diffusion at that point in time. Diffusion tends to be slow at first. Most diffusions are fastest when about half the population has gotten a particular technology and half have not yet gotten it. Then diffusion slows again when almost everybody has a particular technology.]

- Which technologies diffused faster: mechanical or electronic?
2. Have the students lightly shade the part of the graph representing the Depression and World War II. What can they say about the effect of these great events on the diffusion of household technology?

Task:

1. Draw a sample of a “Diffusion of Technology Timeline” on the board using the years where technology had diffused to half of American households as the time where a particular technology would show on the timeline.
2. Have the students create their own version of a timeline for the diffusion of household technologies. You might ask the question: Where does the refrigerator fit in?

RESOURCES

- Links
“Changing Lives” section of “Chilling Out: Origins of Home Refrigeration” exhibit at <http://pilot.hhc-canada.net/>.

Science Odyssey Web site <http://www.pbs.org/wgbh/aso/tryit/tech/#>

“Time Well Spent: The Declining Real Cost of Living in America,” Annual Report from the Federal Reserve Bank of Dallas TX USA

<http://www.dallasfed.org/fed/annual/1999p/ar97.pdf>

This is an American report in American dollars. A Canadian report will be substituted once one becomes available.

This lesson was inspired by “The First Measured Century: Lesson Plan 5: The Introduction and Diffusion of Household Technology”

<http://www.pbs.org/fmc/lessons/lesson5.htm> Accessed May 3, 2004