

## **Lesson Plan 5:**

### **The Introduction and Diffusion of Household Technology**

#### **Grades**

6-8, 9-12, College 100 level

#### **Description**

Students research and develop a matrix describing the introduction and spread of common household items such as electricity, refrigeration 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.

#### **Learning Objectives**

By fully participating in this lesson, students will be able to:

- (1) read, understand, and extract data from charts and tables;
- (2) explain the basic household technology that most Americans used in 1900
- (3) trace the invention and diffusion of household technology in the 20th century;
- (4) create a matrix that shows household technology in various parts of the house; and
- (5) explain how improvements in household technology caused broader changes in society.

#### **Time Required**

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

#### **Materials and Resources**

NOTE: You will need to have Adobe Acrobat installed on your computer to access the Student Worksheets. You may download Adobe Acrobat free of charge at <http://www.adobe.com/products/acrobat/readstep.html>.

For this lesson you will need:

1. Computers connected to the internet for conducting research and to access "The First Measured Century" website.
2. Television, VCR, and videotape of the first hour of "The First Measured Century," which can be

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purchased at <http://www.shop.pbs.org> , ordered by phone by calling 1-800-PLAY-PBS, or recorded during the broadcast:

**The First Measured Century Premieres on PBS Wednesday December 20th, 2000 from 8:30 to 11:30 PM Check your local listings at:**  
<http://www.pbs.org/whatson/index.html>

Schools are permitted to tape The First Measured Century and use the program for educational purposes for one year following each PBS broadcast. Additional information about teacher taping rights can be found at PBSTeachersource:

[http://www.pbs.org/teachersource/copyright/copyright\\_trights.shtm](http://www.pbs.org/teachersource/copyright/copyright_trights.shtm)

3. The Annual Report from the Federal Reserve Bank of Dallas:

<http://www.dallasfed.org/htm/pubs/pdfs/anreport/arpt97.pdf>

This annual report from the Federal Reserve Bank of Dallas contains a vast amount of data on the spread of household technology. The report also details the falling prices of many items and the rapidly rising standard of living in America in the 20th century. Students should be provided with the color version of the report because many of the charts are in full-color. These charts show the percentage of households with electricity, range, refrigerator, radio, color television, telephone, automobile, microwave, clothes washer, VCR, air conditioning, clothes dryer, dishwasher, computer, and cellular phone; along with a whole host of other great data about the spread of household technology in the 20th century.

## Teaching Strategy

### Class Session 1

1. Prepare for this lesson by queuing "The First Measured Century" to the [Middletown](#) segment of the program. You will find this segment about 47 minutes into tape 1 where the Ford Model T comes on the screen.

2. Once the video is set to begin, prepare students for learning by conducting the pre-viewing discussion below:

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.
- 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. Show the Middletown segment of the video. Have students take notes on technologies observed in Middletown.

4. After viewing the program, draw lines on the board to divide it into 3 columns. Call on students to tell you what technologies were observed in by the Lynds in Middletown. Use the middle third of

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the board to list the inventions that came into Middletown between 1890 to 1925.

### Class Session 2

1. Distribute the [handouts](#) to the students. Distribute the Dallas Fed annual report. 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. You may also order copies of this report from <http://www.dallasfed.org/html/pubs/ordervid.html>.
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.

### Class Session 3

1. After the matrix is filled in, have students look again at the graph on page 22 for the following discussion.
  - 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?

### Class Session 4

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.

Have the students use their matrix to create their own version of a timeline.

## Assessment Recommendations

1. Students should all participate in the discussion. You may wish to call on students who do not volunteer questions or responses during the discussion. Students should be able to provide thoughtful responses to the discussion questions.
2. Assess the worksheets and timelines for effort and accuracy.

## Related Links

See the portion of the *The First Measured Century* book on [diffusion](#).

## Extensions

For higher-level grades you might have students conduct their own research and produce their own graphs, matrixes and timelines representing technology over the past century. Technology need not be household: students could chart the diffusion of computers or other technology.

## Adaptations

For younger students you may want to use simpler bar charts to discuss diffusion of technology such as those in *The First Measured Century* book in the Living Arrangements section on [Machines in the Home](#).

## Relevant Standards

### Standards for School Mathematics

From the National Council of Teachers of Mathematics (<http://www.nctm.org>)

#### Connections

Instructional programs from prekindergarten through grade 12 should enable all students to—

- recognize and use connections among mathematical ideas;
- understand how mathematical ideas interconnect and build on one another to produce a coherent whole;
- recognize and apply mathematics in contexts outside of mathematics.

#### Representation

Instructional programs from prekindergarten through grade 12 should enable all students to—

- create and use representations to organize, record, and communicate mathematical ideas;
- select, apply, and translate among mathematical representations to solve problems;
- use representations to model and interpret physical, social, and mathematical phenomena.