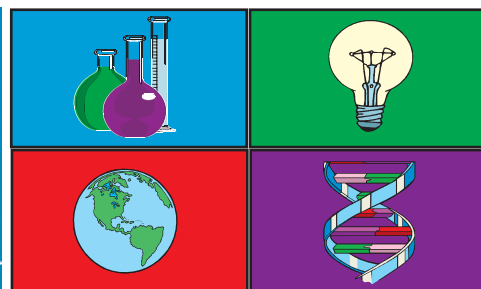


# Science TODAY™

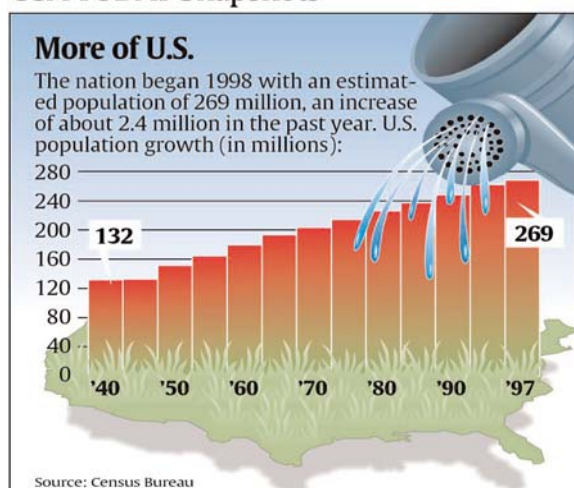
## Teacher Edition



## More of U.S.

By: Jeff Lukens

### USA TODAY Snapshots



By Cindy Hall and Marcy E. Mullins, USA TODAY

### Activity Overview:

Students will examine the USA TODAY Snapshot™ "More of U.S." and construct a graph from the data. The students will then produce a mathematical model (linear) for the population data, determine the rate of change for the data, and make predictions about future population levels.

### Concepts:

- Population growth
- Population dynamics
- Reading and interpreting graphs
- Rate of change (slope)
- Making predictions based on a mathematical model
- Calculating percent change

### Objectives:

Students will:

- build and analyze a population growth model for the United States.
- predict future data from a mathematical model.
- name independent and dependent variables.
- make recommendations about the future based on population data.

### Activity at a Glance:

- Grade level: 9-12
- Subject: Biology, Environmental Science
- Estimated time required: 30-40 minutes

### Materials:

- TI-83 Plus family or TI-84 Plus family
- Overhead view screen calculator for instruction/demonstration
- Student handout
- Transparency

### Prerequisites:

Students should be able to:

- enter data into the List Editor.
- create a linear regression model.
- make predictions from the model.
- determine independent and dependent variables.
- calculate percent change.



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## More of U.S.

### Background:

In this activity, students will examine the increase in the U.S. population since 1940. Upon entering the population data in the graphing handheld, students will analyze the data by creating a scatterplot, and then a linear regression model. Since this is real-world data, they will be able to make predictions about the population of the U.S. in future decades. Students will have the opportunity to incorporate algebraic thinking into their science class by examining graphs and rate of change of a mathematical model. This activity has connections to any high school Biology class, as well as being applicable to Environmental Science courses.

### Preparation:

- Provide one graphing handheld for each student.
- Each student should have a copy of the corresponding student activity sheet.
- Familiarize students with reading a bar graph.

### Classroom Management Tips:

- Students will have a better understanding how to read the graphic and retrieve data if you use the transparency for a class discussion before the students start working.
- Remind students to carefully read all parts of the graphic before they start collecting data.
- Students can work individually or in small groups on this activity.

### Data Source:

U.S. Census Bureau

### National Science Education Standards:

#### Grades 9-12: Life Science The Interdependence of Organisms

- Living organisms have the capacity to produce populations of infinite size, but environments and resources are finite. This fundamental tension has profound effects on the interactions between organisms. (p.186)
- Human beings live within the world's ecosystems. Increasingly, humans modify ecosystems as a result of population growth, technology, and consumption. Human destruction of habitats through direct harvesting, pollution, atmospheric changes, and other factors is threatening current global stability, and if not addressed, ecosystems will be irreversibly affected. (p.186)

### Additional Resources:

- Student handout
- Transparency
- TI Technology Guide, for information on the following:  
TI-83 Plus/TI-84 Plus, List Editor, and regression models
- TI Navigator™ Basic Skills Guide for information on using the TI-Navigator Classroom Learning System

## More of U.S.

### Activity Extension:

- Have students research which areas of the country are experiencing the fastest population growths. Why are these areas growing so fast?
- Have students compare the population growth rate of the United States to other countries.
- Find articles in USA TODAY that relate to the challenges a city or state faces when the population grows. Have a class discussion on your findings.
- Have students research the causes of population changes in various regions. Consider factors such as birth rates, death rates, immigration, and emigration.
- Compare the graph of the growth rate of the U.S. population to a graph showing exponential growth of a population of organisms such as bacteria.

### Curriculum Connections:

- Algebra I and Algebra II
- Sociology
- Political Science

## Teacher Notes:

## More of U.S.

### Assessment and Evaluation:

**Q. In this activity, which is the independent variable?**

A. Years

**Q. What is the dependent variable?**

A. Population

**Q. What is the slope of the regression line?**

A. 2.43

**Q. What would be the appropriate unit label for the slope?**

A. Million people/year

**Q. What do you predict the population would be in 2025?**

A. Approximately 337 million

**Q. Complete the remaining cells in the data table.**

A. See table below.

Year	U.S. Population (millions)	Change in Population (millions)	Percent Change in Population (millions)
1940	132	XXX	XXX
1950	152	20	15.2%
1960	180	28	18.4%
1970	205	25	13.9%
1980	227	22	10.7%
1990	249	22	9.7%
1998	269	20	8.0%
2000	281	22	8.2%



If you are using the TI-Navigator Classroom Learning System, send the provided LearningCheck assessment to your class to gauge student understanding of the concepts presented in the activity. See the TI-Navigator Basic Skills Guide for additional information on how this classroom learning system may be integrated into the activity.