

Science TODAY™ Teacher Edition

USA TODAY

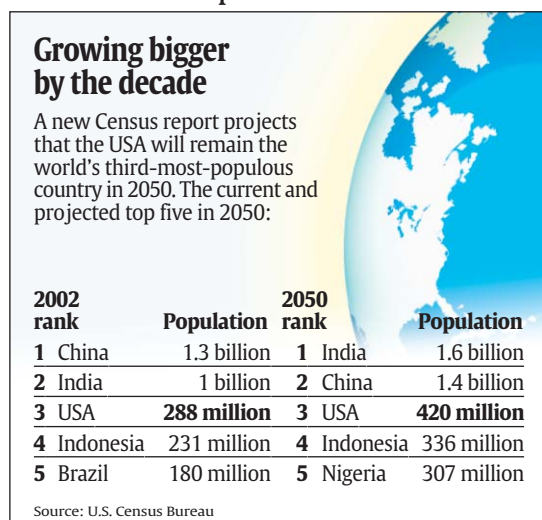
NO. 1 IN THE USA



Growing bigger by the decade

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USA TODAY Snapshots



By Shannon Reilly and Julie Snider, USA TODAY

Activity Overview:

Students will examine the current and predicted population data from the countries included in the USA TODAY Snapshot "Growing bigger by the decade." Using this data, they will calculate the percent change in the number of people in each country and determine which of the countries is growing at the fastest rate. They will be asked to answer questions such as: Which countries are growing the fastest? What would be the predicted impact of an increase in the population of these countries? Are there other countries where population growth is close to zero? Which countries have a population that is decreasing?

Concepts:

- Calculating percent change
- Global population growth
- Evaluating predictions
- Population density

Activity at a Glance:

- Grade level: 8-12
- Subject: Biology/
Environmental Science
- Estimated time required:
30-45 minutes

Materials:

- TI-83 Plus family or
TI-84 Plus family
- Overhead view screen calculator
for instruction/demonstration
- Student handout
- Transparency
- USA TODAY newspapers
(recommended)

Prerequisites:

Students should be able to:

- enter data into the List Editor.
- manipulate data in the List Editor
by entering formulas in lists.
- calculate percent change.



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Growing bigger by the decade

Objectives:

Students will:

- calculate the projected change in population for several countries.
- calculate the projected percent change in the populations.
- use the List Editor of the graphing calculator to enter formulas and manipulate lists.
- calculate population density of the countries in the USA TODAY Snapshot.

Background:

In this activity, students will examine current and projected population data in several countries. They will use the graphing calculator to determine the predicted change in population and the predicted percent change in population over the first half of the 21st Century. Many experts claim that the earth is quickly reaching its carrying capacity for humans and this activity will demonstrate to students how fast human populations are growing. It is important for students to recognize that some countries are growing at a much faster rate than others. Their understanding of percent change in population will help them appreciate the importance of population growth.

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 of 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 read carefully all parts of the graphic before they start collecting data.
- Students can work individually or in small groups on this activity. Working in groups is especially helpful as they learn the various features of the calculator.
- Ask students to explore population and demographic websites and assign them specific topics to explore. If each student (or pair of students) is assigned a different topic, more information will be gathered by the class.

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 family, TI-84 Plus family, List Editor
- TI-Navigator™ Basic Skills Guide for information on using the TI-Navigator Classroom Learning System

Growing bigger by the decade

Activity Extension:

- Have students locate articles in USA TODAY that relate to the topic of increasing population in heavily populated countries.
- How do natural disasters such as a tsunami impact population?
- Discuss the impact that AIDS is having in countries such as Nigeria, and have students brainstorm about how the AIDS epidemic may further impact African nations by the year 2050.
- Ask students to research how much of the land area of the various countries is actually considered inhabitable. Then, have them recalculate the number of people per inhabitable km².
- Have students convert the number of people per square kilometer to the number of people per square mile. 1 km² = 0.386 mi². Ask students to research when and how this type of data would be used and find an example in USA TODAY.
- Discuss some "limiting factors" that may serve to impose restrictions on the projected growth of the population in some of the countries in the USA TODAY Snapshot.
- Have the students write about the impact of an exploding population on the ability to provide food for everyone in that population. Consider topics such as land use, raising animals for food, eating "low on the food chain," etc.
- If students have access to computers, they may want to explore the Worldfacts website (www.cia.gov/cia/publications/factbook/). Demographic information is available on each country in the world.

Curriculum Connections:

- Algebra I
- World Geography
- World History

Teacher Notes:

Growing bigger by the decade

Assessment and Evaluation:

Country	2002 Population (millions)	2050 Population (millions)
China	1300	1400
India	1000	1600
USA	288	420
Indonesia	231	336
Brazil	180	228
Nigeria	131	307

Q. What is the projected change in millions of people for each of the countries listed in the USA TODAY Snapshot?

- A. China: 100 million
 India: 600 million
 USA: 132 million
 Indonesia: 105 million
 Brazil: 48 million
 Nigeria: 176 million

Q. Which country is projected to have the largest change in population from 2002 to 2050?

- A. India

Q. What is the projected percent change in population for each of the countries in the USA TODAY Snapshot from 2002 to 2050?

- A. China: 7.7% India: 60% USA: 45.8% Indonesia: 45.5% Brazil: 26.7% Nigeria: 134.4%

Q. Which country is projected to have the largest percent change in population from 2002 to the predicted 2050 population?

- A. Nigeria

Q. What are some reasons a country would have a change in population that appears small, but actually have a percent change in population that is large?

- A. Because the percent change is relative to the starting population. For example, a country that starts with 1 million people and adds another million shows a percent change of 100%. On the other hand, a country that starts with 5 million people and also adds one million shows a percent change of only 20%.

Growing bigger by the decade

Assessment and Evaluation (continued):

- Q.** Each of the countries in the USA TODAY Snapshot is listed below with its land area. Use your calculator in any way you wish to calculate the number of people per square kilometer for each country in 2002. This is called "population density". Next, calculate the projected number of people per square kilometer in 2050.
- A.** See table below.

Country	People/km ² in 2002	People/km ² in 2050
China	135.5	145.9
India	304.2	486.7
USA	29.9	43.6
Indonesia	120.4	175.1
Brazil	21.1	26.8
Nigeria	141.8	332.3

- Q.** Which country is projected to have the greatest increase in population density?

A. Nigeria

- Q.** Which country is projected to have the greatest percent increase in population density?

A. Nigeria



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.