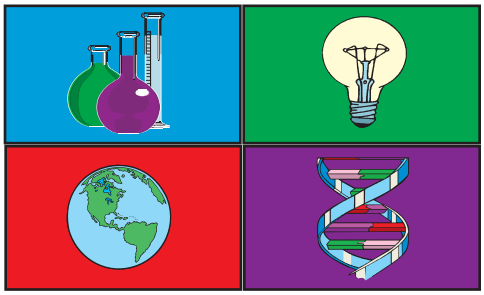
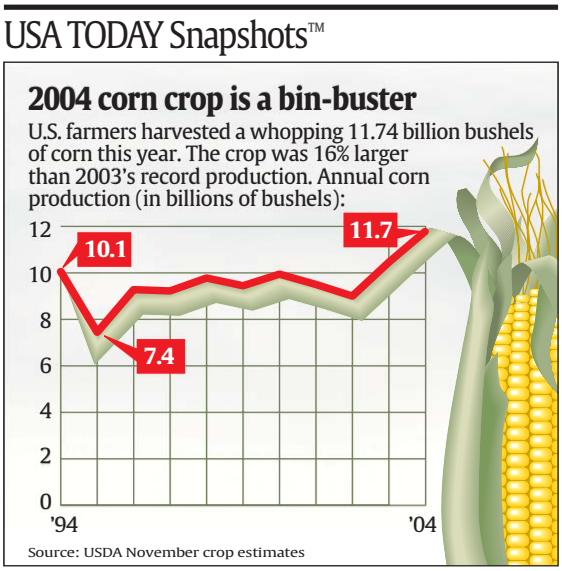
Science TODAY™ Challenge
Student Edition

USA TODAY
NO. 1 IN THE USA



2004 Corn Crop is a bin-buster



By Shannon Reilly and Marcy Mullins, USA TODAY

Activity Overview:

The USA TODAY Snapshot™ "2004 corn crop is a bin-buster," graphically displays the United States corn harvest from 1994-2004. By examining the Snapshot, you can see the trend in the harvest from one year to the next and over the entire 11 years. Many factors affect whether a farmer will have a "bin-buster bumper crop" or a sparse harvest. What are the causes in the fluctuations of crop harvest from year to year? By what percentage has the corn crop changed during the last decade?

The United States produces more corn than any other country on earth. Which states are usually the "leaders" in corn production? Why are these states so productive?

Another important factor in growing crops is the amount of land that is used for the production. In the United States, how much land is devoted to growing corn? Has the amount of land used for corn production changed during the last decade? If so, explain the change. When you look at the amount of corn that is harvested and the amount of land on which corn is grown, you can calculate the amount of corn that is harvested per acre of land that is used for corn production. What has happened to the corn "yield" (bushels per acre) in the United States in the past decade?

Focus Questions:

- What are some of the causes affecting the grain harvest in the United States from year to year?
- What has been the percent change in corn harvest from one year to the next?
- Which states are the leaders in corn production? Why are they so productive?
- How much of the land in the U.S. is used for corn production?
- What is happening to the amount of land used for corn production?
- What has happened to the corn yield, in bushels per acre, during the last decade?
- What is meant by "biotech" corn?
- What are the advantages and/or disadvantages to planting biotech corn?

This activity was created for use with Texas Instruments handheld technology.

2004 Corn Crop is a bin-buster

Activity Part I:

Using the USA TODAY Snapshot™ "2004 corn crop is a bin-buster" and the table below, calculate the percent change in the corn harvest from one year to the next during 1994 through 2004. For example, the percent change for 1995 would be calculated as
[(7.40 - 10.05)/10.05] x 100% = -26.37%.

Year	Corn Harvest (in billions of bushels)	Percent Change from Previous Year
1994	10.05	NA
1995	7.40	-26.37
1996	9.23	
1997	9.21	
1998	9.76	
1999	9.43	
2000	9.92	
2001	9.50	
2002	8.97	
2003	10.11	
2004	11.74	

Assessment and Evaluation for Part 1:

1. Between which two consecutive years was there the greatest percent increase in corn production?

2. Between which two consecutive years was there the greatest increase in the number of bushels of corn produced?

3. Between which two consecutive years was there the greatest percent decrease in corn production?

4. Between which two consecutive years was there the greatest decrease in the number of bushels of corn produced?

Data Source:

USDA November crop estimates

Materials:

- TI-83 Plus family or TI-84 Plus family
- SciTools Application

Additional Information:

- The United State Department of Agriculture Statistics website provides data about all crops grown in the United States.

  www.nass.usda.gov

2004 Corn Crop is a bin-buster

Assessment and Evaluation for Part 1 (continued):

5. What was the percent difference in corn production from 1995 to 2000?

6. What was the percent difference in corn production from 1995 to 2004?

7. From 1994 to 2004, what has been the total number of bushels of corn harvested in the United States?

8. A "bushel" has a volume of 1.25 cubic feet (ft3). Using the 2004 corn harvest, calculate the volume of the harvest in cubic feet (ft3).

9. The Louisiana Superdome in New Orleans is a huge sports stadium that can seat about 70,000 people. It encompasses 13 acres of land and is 27 stories tall. A story is about 10 ft. in height. Using the SciTools Unit Converter program on the graphing calculator, calculate the volume of the Superdome in cubic feet (ft3).

10. Using your calculations for questions 8 and 9, write a statement that describes the volume of the corn harvest in 2004 when compared with the volume of the Superdome.

11 The average weight of a bushel of corn is about 56 lbs. What was the weight of the 2004 corn harvest?

12. A mature African bull (male) elephant can reach a weight of 13,000 lbs. Write a statement that describes the weight of the 2004 corn harvest when compared with the weight a 13,000 lbs. bull elephant.

Student Notes:

2004 Corn Crop is a bin-buster

Activity Part II

Now you will research the issue of land use in agriculture. Access the USDA Statistics Service website at (www.nass.usda.gov) and explore thesection that provides data about the amount of land devoted to the production of corn in the United States.

Click on "Crops and Plants" in the window on the left. Click on "Field Crops." Select "Corn Field" from the menu and click on "Search." From this page, you can explore historical data about the corn harvest in the U.S. Make note of the number of bushels of corn harvested each year and the number of acres that were actually planted in corn. Carefully examine the column headings to note the units for each column. Convert the corn harvest in the table below from "billions of bushels" to "thousands of bushels." This will make your next calculations easier.

Once you have found and recorded the data in the table below, calculate the "yield" for each year-that is, the number of bushels produced per acre of land planted in corn. To do this, enter the "Year" in L1 of the graphing calculator, enter the "Corn Harvest in thousands of bushels" in L2 and then enter "Acres Planted" in L3. Divide L2 by L3 to calculate the "Yield" in L4. Record these yields in the table. Using your graphing calculator, plot the corn yield (L4) spanning the years 1994-2004.

Year	Corn Harvest (in billions of bushes)	Corn Harvest (in thousands of bushels)	Acres Planted (in thousands of acres)	Yield (in bushels/acres)
1994				
1995				
1996				
1997				
1998				
1999				
2000				
2001				
2002				
2003				
2004				

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Activity Part II - Evaluation and Assesment

1. In which year was the corn yield the largest?

2. In which year was the corn yield the smallest?

3. When you graph the data (year and yield), which should be the independent variable?

4. Which should be the dependent variable?

5. Using your graphing calculator, calculate the average yield (in bushels/acre) from 1994-2004.

6. Why might the corn yields fluctuate so much from year to year?

USA TODAY

2004 Corn Crop is a bin-buster

EPA approves corn modified to eliminate No. 1 crop pest

LIFE SECTION - WEDNESDAY - FEBRUARY 26, 2003 - 10D

By Elizabeth Weise
USA TODAY

The Environmental Protection Agency gave permission Tuesday to the Monsanto Co. to begin selling a genetically engineered corn for planting by farmers this spring. A gene from a soil bacteria has been added to the corn so that its roots secrete a protein that kills the corn rootworm, the crop's No. 1 pest.

The EPA granted the company a time-limited registration of three years, during which it will require extensive additional testing and evaluation, agency spokesman Stephen Johnson says.

The agency says the corn, YieldGard Rootworm, will provide growers with a safe, non-chemical pest control alternative against a widespread and destructive insect that unchecked can reduce yields as much as 28%.

To reduce the chance of the rootworm developing resistance to the corn, the EPA has required that growers set aside 20% of planted acreage for non-transgenic corn as a refuge. Rootworm populations in the refuge will not be exposed to the protein and should help keep the total population from developing resistance to it.

The 20% requirement angered environmentalists because the agency ignored the findings of the majority of its own scientific panel, which voted to require farmers to plant refuges covering 50% of the planted acreage.

"The EPA's decision jeopardized the environmental benefits of this product by ignoring the advice of their scientific experts and instead gambling with the long-term viability of this promising new crop," says Gregory Jaffe of the Center for Science in the Public Interest in Washington, D.C.

The EPA's Johnson counters that the agency made its decision, subsequent to the advisory panel's meetings, after Monsanto submitted additional information. "Bottom line, we received additional scientific data that convinced us we were certainly OK within this time-limited registration range."

Monsanto says its new corn will benefit the environment. Of the 80 million or so acres of corn planted every year in the USA, about 14 million are treated with roughly 50 million pounds of insecticide to control rootworm, product manager Jennifer Ozimkiewicz says.

Monsanto says it hopes "a large percentage" of those acres will eventually be planted with the transgenic corn. YieldGard Rootworm corn seed will "be competitive" with what it now costs growers to buy both seed and pesticides, Ozimkiewicz says.

In 2003, Monsanto estimates that less than 1 million acres of its YieldGard Rootworm seed will be planted, in part because the company hasn't had the chance to build up seed stocks.