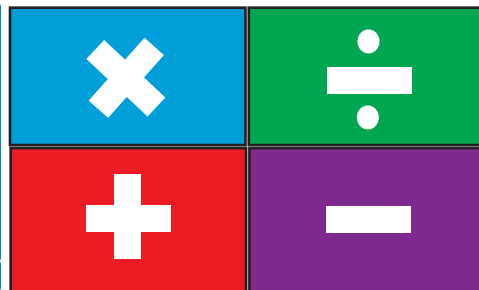


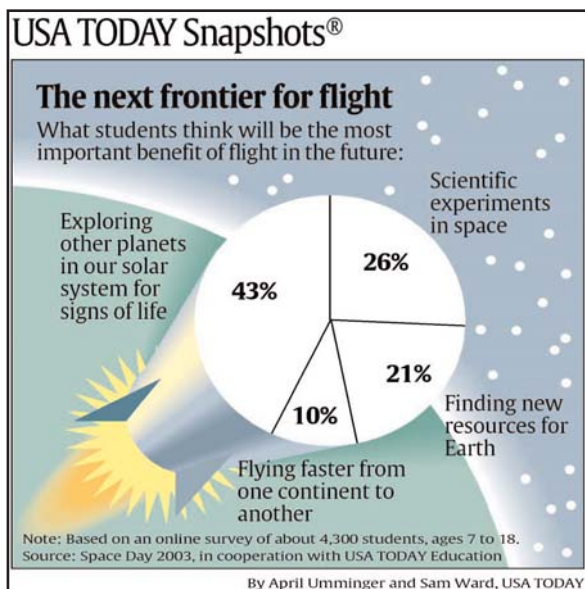
Math TODAY™

Teacher Edition



The Next Frontier for Flight

By: Robb Wilson



Activity Overview:

The USA TODAY Snapshot® pictured above, "The next frontier for flight," offers students the opportunity to gain experience in creating circle graphs on the graphing handheld and provides an excellent real-world review of computation with percents.

This activity is excellent practice for inexperienced users of technology and can be used to provide step-by-step instruction early in the school year. If the TI-83 Plus series handheld is being used, the activity provides students a chance to use unit-to-unit link cables to transfer programs and can provide an introduction to the use of TI Application software programs.

Concepts:

- Computation with percents
- Circle graphs
- Conversion between percents and fractions
- Simplifying fractions to lowest terms

Activity at a Glance:

- Grade level: 6-8
- Subject: Pre-Algebra
- Estimated time required: 15-30 minutes

Materials:

- TI-73 Explorer, TI-83 Plus, or TI-83 Plus Silver Edition
- CellSheet Application (if using the TI-83 Plus series handheld)
- Unit-to-unit Link cables to load CellSheet™ APP on student handhelds
- Overhead view screen handheld for instruction/demonstration
- Student handout
- Transparency

Prerequisites:

Students should:

- have some experience with using the TI handheld prior to this activity.
- have prior knowledge of circle graph or pie chart construction.
- understand and be able to compute percents of given values.
- be able to convert percents to fractions.
- be able to simplify common fractions to lowest terms.

©COPYRIGHT 2003 USA TODAY, a division of Gannett Co., Inc.

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

Copyright © 2000 by the National Council of Teachers of Mathematics, Inc. www.nctm.org. All rights reserved.

The Next Frontier for Flight

Objectives (using the TI-73 Explorer):

Students will:

- use a graphing handheld to create a circle graph using the data shown in the USA TODAY Snapshot.
- find the percent of a number.
- convert percents to fractions in lowest terms.
- be able to evaluate, synthesize and analyze real-world data.

Objectives (using the TI-83 Plus Series):

Students will:

- use the TI CellSheet APP to create a circle graph.
- use a unit-to-unit link cable to transfer APPS from one handheld to another.
- find the percent of a number.
- convert percents to fractions in lowest terms.
- be able to evaluate, synthesize and analyze real-world data.

Background:

This activity is primarily a review of percents and circle graphs, but also offers an excellent opportunity to introduce a variety of functionality features of handheld technology. Circle graphs are one of the eight types of statistical plots available on the TI-73 Explorer. Creating "pie charts" with a graphing handheld will provide numerous opportunities to discuss the uses of circle graphs and other representations of various data.

If the TI-83 Plus handheld is used, you will note that circle graphs are not one of the six statistical plots available. The TI CellSheet Application provides a "pie chart" option that allows students to create circle graphs in much the same way as using the TI-73 Explorer.

This activity is especially effective if used early in the school year and can be an introduction to the wide variety of charts, graphs and tables that students will see both in textbooks, media (such as USA TODAY), and on many of the statewide tests currently being used. The TI graphing handheld can be a valuable instructional tool to demonstrate and create multiple representations of many types of statistical data.

Note that the USA TODAY Snapshot states that "...about 4300 students" responded to the survey. This will allow for some discussion of ranges of values. Not all answers to the focus questions will be exact numbers of students.

Data Source:

Space Day 2003, in cooperation with USA TODAY Education

National Council of Teachers of Mathematics (NCTM) Standards*:

For Grades 6-8:

Number and Operations

- Work flexibly with fractions, decimals, and percents to solve problems.

Data Analysis and Probability

- Select, create, and use appropriate graphical representations of data including histograms, box plots and scatterplots.

*Standards are listed with the permission of the National Council of Teachers of mathematics (NCTM), www.nctm.org. NCTM does not endorse the content or validity of these alignments.

The Next Frontier for Flight

Preparation:

- Provide one graphing handheld for each student.
- Each student should have a copy of the corresponding student activity sheet.
- If using the CellSheet APP, be sure to have enough unit-to-unit link cables.

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 carefully read all parts of the graphic before they start collecting data.
- Students can work individually or in small groups on this activity.
- Students can work individually or in groups to assist each other as they learn the various features of the handheld.
- Technology appeals to almost all students. Encourage all students to handle and use the graphic handhelds. The TI graphing handhelds are designed to be durable for daily classroom use and backpack portability.
- If possible, use an overhead view screen graphic handheld for instruction. It will make it much easier for you to provide instructions and directions if the students can see the display on your graphing handheld.

Additional Resources:

Student Handout

Transparency

TI Technology Guide, for information on the following:

- TI-73 Explorer
- TI-83 Plus
- List Editor
- CellSheet APP

USA TODAY Education (special section links are subject to change)

- 100 Years of Flight
(<http://www.usatoday.com/educate/flight/index.htm>)
- Visions of Exploration
(<http://www.usatoday.com/educate/afaindex.htm>) - requires sign-in but is free.

USA TODAY.com

- Weather
(<http://www.usatoday.com/weather/weatherfront.aspx>)

Space Day

- (<http://www.spaceday.com>)

Additional Information:

To locate additional information concerning USA TODAY surveys and additional Snapshot activities, check out USA TODAY's Education website at www.usatodayeducation.com

The Next Frontier for Flight

Activity Extensions:

- Have student groups select a topic or issue in USA TODAY that interests them. Then, have each group formulate five to seven questions about the topic/issue. Next, ask students to survey at least 10 adults in their community. After the surveys are completed, have them create a circle graph or other graphic representation that displays the results. Surveys on politics, favorite foods, music, sports, and TV are just a few examples of data that could be collected.
- Encourage students to practice using both percents and numerical data to construct circle graphs.

Curriculum Connections:

MATH

- Discuss the parts of a circle.
- Measure the central angles of any circle graph using a protractor.

CROSS-CURRICULAR

- Math/Science/Social Studies - Ask students to explain how this data may impact future space exploration; government budgeting for research; education initiatives; their future.
- Social Studies - Have students read about issues, events and trends in USA TODAY and discuss uses of circle graphs to represent data presented in the newspaper.
- English/Language Arts - Have students write informational articles about the data represented in circle graphs found in newspapers or magazines.

Teacher Notes:

The Next Frontier for Flight

Assessment and Evaluation:

Q. If 4,300 students took part in this survey, how many students thought that "Scientific experiments in space" would be the most important benefit of flight in the future?

A: By reading the graph, students will see that 26% of the survey sample selected "Scientific experiments in space." Twenty-six percent of 4,300 equals 1,118. Therefore, 1,118 students who took part in the survey selected "Scientific experiments in space" as the most important benefit of flight in the future.

Remember, the word "about" as used in the Snapshot infers a rounded estimate and allows for a range of values. What if there were only 4,276 students or 4,349 students in the survey. Discussions of "about" need to take place as the focus questions are reviewed and significant digits, margin of error, intervals and rules of rounding and estimation are considered.

The TI-73 Explorer has a percent key and can quickly display the computed the solution. The TI-83 Plus does not have a percent key for quick computation. Students need to know that 0.26 is the equivalent of 26 percent.

Q. How many more students thought that "Finding new resources for Earth" was a more important benefit of flight in the future than "Flying faster from one continent to another"?

A: Be reading the graph, students will note that 21% of the survey sample selected "Finding new resources" and 10% selected "Flying faster." Twenty-one percent of 4,300 equals 903 and 10 percent of 4,300 equals 430. Therefore, 473 more students that were surveyed selected "Finding new resources..." than "Flying faster..."

Some students may have found it easier to compare the difference in the percents first. Since 11% more students in the survey sample selected "Finding new resources..." than "Flying faster..." the same solution can be found by simply finding that 11 percent of 4,300 is also equal to 473.

Note: The solutions to the focus questions are exact based on 4,300 students. If there were "about 4300 students," answers would vary.

Q. Ten percent of the students surveyed thought that "Flying faster from one continent to another" was the most important benefit of flight in the future. What is the value of 10 percent written as a fraction in lowest terms?

A: Ten percent is equivalent to 0.10 or 10/100. Ten hundredths simplified to lowest terms is 1/10. This computation can be done mentally, using paper and pencil, or by using the handheld. The TI-73 Explorer is designed as a fraction graphing handheld and the TI-83 Plus has a fraction conversion capability in the **MATH** menu.