

Patterns in Percent

Grades 4 - 6

Overview

Students will use the $\%$ key to collect data about percentages of a given number. They will organize the data and look for patterns in percents. (For example, 10% of 20 is twice as much as 5% of 20.)

Math Concepts

- multiplication
- equivalent fractions, decimals, and percents

Materials

- TI-15
- pencil
- student activity (page 4)

Introduction

1. After students use manipulatives to develop the meaning of percent ($1\% = 1$ part out of 100 parts), have them explore what happens when they press $\%$ on the calculator.

2. Present the following scenario to students:

Metropolis East (M.E.) and Metropolis West (M.W.) are neighboring cities. The sales tax in M.E. is 10%, but the sales tax in M.W. is only 5%. Collect data and display your results for each percent in a table to compare the amounts of money you would pay for tax on various items in each city.

3. Have students make conjectures about percent based on the patterns they observe. Students can then use manipulatives to verify their conjectures.


Examples:


- Students may observe that for every item, 10% of its price is twice as much as 5% of its price.
- Students may observe that it is easy to estimate 10% of a whole number by using place value and looking at the digits to the right of the ones place.

Collecting and Organizing Data

To guide students in organizing their data to bring out patterns, ask questions such as:

- *How could you organize your data to compare the 5% tax rate to the 10% tax rate?*
- *Why would it be useful to keep 5% in the left-hand column of one table all the way down and just change the total quantity?*

 When a student enters a 6% , the TI-15 displays **6%**. Then, when the student presses Enter , the display changes to **6%= 0.06** to show that 6% is another way to write 0.06 or 6/100.

 You will need to show students how to use multiplication on the TI-15 to express the percent of a given quantity. For example, to show 10% of \$20:

1. Enter **10**.
2. Press $\%$ \times .
3. Enter **20**; press Enter .

Students can verify the calculator display of **2** by using manipulatives to show 10% of \$20 = \$2.

Patterns in Percent (Continued)

- *How can you make a similar table for 10% to compare your data?*
- *What do you think would happen if you order the total quantity amounts from least to greatest?*
- *How else might you organize your data to compare the two tax rates and find patterns in the percents?*

Analyzing Data and Drawing Conclusions

To focus students' attention on looking for patterns in their data, ask questions such as:

- *How are the percentages (amounts of tax) in your 5% table like the amounts in the 10% table?*
- *How does 5% of a \$20 item compare to 5% of a \$10 item?*
- *How does 10% of a \$20 item compare to 10% of a \$10 item?*
- *How does 10% of the cost of an item compare to the total cost of the item?*
- *What conjectures can you make about finding 10% of a number?*
- *What conjectures can you make about finding 5% of a number?*
- *How can you use manipulatives to test your conjectures?*

Continuing the Investigation

Students can create other percent scenarios to investigate patterns in percents. For example, ask students:

- *What happens if you increase the sales tax by one percentage point each day?*
- *How does the tax on a \$20 item change each day?*
- *How does the tax on a \$40 item change each day?*
- *How do the taxes on the 2 items compare?*

Patterns in Percent

Name _____

Date _____



Collecting and Organizing Data

Use your calculator to collect data about percent, organize it in the table below, and then look for patterns.

Cost of Item	Amount of Tax in Metropolis West Tax Rate: ____%	Amount of Tax in Metropolis East Tax Rate: ____%

Patterns in Percent

Name _____

Date _____



Analyzing Data and Drawing Conclusions

1. What patterns do you see in your tables?

2. What conjectures can you make from these patterns?

3. Repeat the activity with a different percent in the left column and compare your results.

4. Repeat the activity, changing the percents in the left column while keeping the total quantity constant. Now what patterns do you see? What conjectures can you make?
