Making Picture Graphs: Data Analysis and Probability

ELEMENTARY MATH WITH TI   **TEACHER NOTES**

ⓘ Overview

Students will use calculators to make picture graphs with symbols that represent more than one piece of data.

Grade Levels: 1–2

◎ Concepts

- Whole numbers

- Multiplication

- Patterns

- Graphing

- Addition

☆ Materials

- ▦ TI-10 calculators
  Note: the TI-15 Explorer™ calculator can be used in place of the TI-10 for this activity.

- *These Are My Pets*

  Mayer, Mercer (New York, NY: Golden Books, 1988)

- *When I Get Bigger*

  Mayer, Mercer (New York, NY: Golden Books, 1983)

- Colored chips or linking cubes

- 3- x 5-inch note cards

- Student activity sheet

- Pencils or markers

✓ Assessment

Throughout the activity, questions are included for formative assessment. Student work should be used as a check for understanding. Have the students use the colored chips along with the TI-10 to complete the activity.

Modified from Making Picture Graphs, from Uncovering Math with Manipulatives and the TI-10

Introduction

The *Reading Picture Graphs* activity should be completed before beginning this activity.

1. Have students work as a whole class to brainstorm a list of things they would like to know about other people. Some books that might stimulate ideas are *These Are My Pets* and *When I Get Bigger*.

2. Have students work in groups of four to choose one characteristic about which to collect data. Then have them design a question for collecting the data. Students should:

    a. Include three possible answers to the question from which respondents may choose.

    b. Ask the question orally, or record it on a 3- by 5-inch card for respondents to read.

    c. Present the question and possible answers to other students for their responses.

    d. Record and tally the responses on their activity sheets.

    Note: Encourage students to be creative in designing their question cards.

3. Have each student in the small groups collect at least 20 pieces of data so that each group has a total of 80 pieces of data. Have students represent the data with colored chips or linking cubes.

4. Discuss putting the data in groups of 5, 8, 10, or 20 and the effect that each grouping might have on the look of the graph.

    Note: Students might even experiment by grouping the chips or cubes they used to represent their data.

5. Then have students use the Opl key to experiment with grouping data.

    Example: To explore with groups of 5, have students:

    a. Enter Opl + 5 Opl 0 to prepare the calculator to count by 5s.

    b. Enter Opl to count the first group of 5. The counter **1** and the result **5** are displayed on the bottom line of the display.

    c. Stack five chips or cubes together to represent the first picture in that category on the graph.

    d. Press Opl again to count the second group of 5. The counter **2** and the result **10** are displayed.

    e.   Stack a second group of five chips or cubes to represent the second picture in that category on the graph.

   f. Continue the process until the data for that category is exhausted (all the chips or cubes are used).

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6.   Have students record their data on the picture graph template on their recording sheets, using pictures to represent the group size they chose.

Using the Calculator

- *How can you use the scroll feature, ⬭⬭, to explore patterns on the calculator?*


Collecting and Organizing Data

While students are using the Opl function and their counters to group the data for the picture graph, ask questions such as:

Questions for Students:

- ❖ *What do the chips or cubes you are using represent?*

- ❖ *How did you decide to group your data? Why did you decide to group it that way?*

- ❖ *How are you recording these groups on the picture graph?*

- ❖ *What are you going to do when you don't have enough counters left to make another group?*

- ❖ *How are you going to record the leftovers on the picture graph?*

- ❖ *What patterns, if any, are you finding when you group your data?*

Using the Calculator

- *How can you use the calculator to help you group the data?*

- *How can you use Opl the calculator to help you group the data? How do you decide what to enter as the constant in Opl ?*

- *How can you use addition with Opl to group your data?*

- *How can you use addition with Opl to group your data? Where do you start?*

- *How can you use ÷ on the TI-10 to help you group and record the data?*

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Analyzing Data and Drawing Conclusions

After students have read their graphs, have them discuss the graphs as a whole group.
Ask questions such as:

Questions for Students:

❖ *What do the pictures on the graph tell you?*

❖ *What kinds of decisions did your group have to make when designing the picture graph?*

❖ *What did your group decide to do with the leftover data after it was grouped? Why did you group decide that?*

❖ *What is a question that could be answered by this graph?*

❖ *What is a question that could not be answered by this graph?*

❖ *Why do you think the designers of this graph chose each of their pictures to stand for _____ number of _____?*

❖ *What are the advantages of having a picture represent more than one piece of data?*

❖ *What are the disadvantages of having a picture represent more than one piece of data?*

🖩 **Using the Calculator**

• *How did you use* Opl *to make the graph?*

• *How could you use* ÷ *on the TI-10 to make the graph?*

• *When you use the* ÷ *key, what does the first number represent? What does the number after the **r** represent?*

• *How did the colored chips or cubes connect to the display you saw on your calculator?*

• *How did the data you collected connect to the displays you saw on your calculator?*

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Continuing the Investigation

Have students:

- Change the number of people each picture represents to see the differences in the two graphs. Ask: *Will you have more, fewer, or about the same number of pictures? How did the change affect your leftover answers from the first graph?*

- Work with the other groups who chose the same category to pool all their data and make a picture graph.

- Brainstorm ways to use the information in their picture graphs, and if possible, implement these ideas for use.

  Example: Compose a letter to the food services director presenting data about students' favorite foods.

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SOLUTIONS

Student Activity

Name _____

Date _____

🎯 **Focus:** Collect data and use it to make a picture graph.

Making Picture Graphs

Collecting and Organizing Data

Question:
Sample answers:
What is your favorite pet?
Possible answers (categories):
a. cats
b. birds
c. dogs

Category	Number of People
a	25
b	5
c	15

Graph Title _____ Favorite Pets _____

Cats	Student-designed pictures used to represent groups of 5
Birds	
Dogs	

Each _____ (picture) represents ___5__ pieces of data.

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