

<i>Representing World Population: Where in the world are all of the people??</i>		
Description	Instructor Notes	Slides/Handouts/Files
<p>This activity engages students in comparing the population of different regions of the world using percentages, bar graphs, double bar graphs, and circle graphs.</p>	<p>Part 1: Estimated vs. Actual Population Give each pair of students a world map and 50 chips (25 of each color). Have student work in pairs to place one color of chips on the different regions of the world to represent their ideas of the distribution of world population.</p> <p>In this activity, the world is portioned into the following six regions (as used in Hersh & Peterson, 2005):</p> <ul style="list-style-type: none"> • Africa • Asia • Oceania • Europe • US and Canada • Latin America (including Mexico) <p>Have students list the regions into LIST 7 and their population estimates into List 8. [Note that L7-L10 will allow students to enter a NAME for the list.]</p> <p>Have students create a bar graph for their estimated population data.</p> <p>Give students the actual population data (in number of chips) for each region, and have them enter this data into their chart and place the chips on their map (using the other color of chips). (See World Population Data, p. 6 of the Instructor Notes.)</p>	<p>Student Activity Sheet</p> <p>Calculator Support Sheet</p> <p>Materials: Each group needs:</p> <ul style="list-style-type: none"> • World Map (p. 7) • 25 chip of one color • 25 chips of another color • 25 pennies

Instructor Notes (con't)

Ask students to determine the number of people for each region, enter this data into their chart.

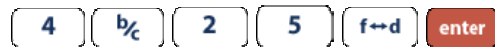
Students might do this by:



1. Using proportional reasoning strategies to ‘scale up’ from 25 chips to 6.5 billion people. The scale factor is 2.6×10^8 , or 260 million. Students could then multiply the number of chips for each region by 2.6×10^8 . For example, for Africa, students would enter:



The result will display as a number if MODE is set to NORMAL or in scientific notation if MODE is set to SCI.

2. Determining the percent of chips in each region, and multiplying this percent (or decimal) by 6.5 billion. Students could set up a fraction for the number of chips in each region out of the 25 total chips, and change the fraction into a decimal. For example, for Africa students could enter:



[Note: you can use   to select .16 and use it for the next part of the problem, or you can type in .16 as shown below.]

To multiply by 6.5 billion using scientific notation, students would enter:



As students complete their charts, circulate and ask students questions to prompt them to consider whether their calculations and results make sense:

- Why do we enter 6.5 EE 9 to multiply by 6.5 billion?
- Can you write the result in scientific notation?
- Does the result for (any region) make sense? How do you know?
- About how many more people live in (one region) than in (another region)?
- About how many times as many people live in (one region) than in (another region)?

Have students create a double bar graph of the estimated vs actual data.

Ask students:

- Were there any difference between your estimates and the actual data that that surprised you?
- Are there differences between regions that surprise you?
- Which visual comparison do you prefer, the chips and map or the bar graph? Why?
- What connections do you see between the different representations?
- What information does the TRACE function provide?
- If you want to determine (or estimate) how many more people live in one region than other, would you use the numeric data or the graph? Why?
- If you want to determine (or estimate) how many times as many people live in one region than other, would you use the numeric data or the graph? Why?
- If you wanted to make comparisons between different regions, would you use the numeric data or the graph? Why?
- If you wanted to make comparisons between your estimates and the actual populations, would you use the numeric data or the graph? Why?

Part 2: COMPARING THE REGIONS:

Have students create a circle graph for the actual population data.

[Note: You might choose to have one student display the circle graph using NUMBER and the other using PERCENT.]

Ask Students:

What is similar/different about the circle graphs created when you entered NUMBER and PERCENT?

What do the values 4, 15, 0, 3, 1, 2 indicate in the NUMBER circle graph?

What do the values 16, 60, 0, 12, 4, 8 indicate in the PERCENT circle graph?

Imagine lining up 100 people to represent world population. How many people would be needed to represent the population of each region?

Why is region 2 the largest section of the circle graph? What does that represent?

Why is the number 3 on a line?

Why does each graph have 3:0 in the list, while the other values are different?

Have one partner keep the circle graph on their calculator display.
Have the other partner display only the bar graph for the actual population, POP2.

Ask students:

How can you tell which region is which?

What happens when you use TRACE on the bar graph?

What happens when you use TRACE on the circle graph?

What connections do you see between the circle graph and the bar graph?

Make 2 statements or comparisons about the populations of the different regions based on the bar graph.

Make 2 statements or comparisons about the populations of the different regions based on the circle graphs.

What are some conclusions about world population? What surprised you?

You may want to ask students to sketch the bar graph and circle graph of actual world population for later use.

Participant Discussion

This activity is adapted from: Hersh, S. & Peterson, B. (2005). Poverty and World Wealth. In E. Gutstein & B. Peterson, *Rethinking Mathematics: Teaching Social Justice by the Numbers*, p. 64-67. Milwaukee, WI: Rethinking Schools Publications. Available at: <http://www.rethinkingschools.org/publication/math/>

Mathematical Ideas in the Activity:

- Finding the percent of a quantity
- Changing a fraction to a decimal or percent
- Large numbers and Scientific Notation
- Bar Graphs
- Double bar graphs
- Circle Graphs

Teacher Notes:

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World Population Data:

Region	# of chips (out of 25)	Population in Millions*	Estimated % of World Population*
Africa	4	1,040 (906)	16 (14.0)
Asia	15	3,900 (3,905)	60 (60.4)
Oceania	0	0 (33)	0 (0.5)
Europe	3	780 (728)	12 (11.3)
US and Canada	1	260 (331)	4 (5.1)
Latin America	2	520 (561)	8 (8.7)
Total	25	6.5 million (6.465 million)	100.0

Source: Hersh, S. & Peterson, B. (2005). Poverty and World Wealth. In E. Gutstein & B. Peterson, *Rethinking Mathematics: Teaching Social Justice by the Numbers*, p. 67. Authors cite the source of their data as: UN Population Division, July 2005, www.un.org/esa/population.

You may want to adapt the values in the chart to reflect a more current estimate of world population or percentage of the population per region.

*Values provided are based on an estimated world population of 6.5 million and the region's portion of the 25 chips. Population data from Hersh & Peterson (2005) for July 2005 are provided in parenthesis.



Source: <http://www.mapsofworld.com/world-political-map.htm>

The website offers a printable version of the map.

This is the same map shown on the Student Activity sheet.