Population Density: Whew, That’s Close!

Students learn the concept of population density using a hands-on approach as they realize the wide variety of population densities around the world.

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<th>Author</th>
<th>Michael E. Baron</th>
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<td>Grade Level</td>
<td>6-8</td>
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<tr>
<td>Duration</td>
<td>1-2 class periods</td>
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Adapted from Exemplary Practices Series, Geography Education Center on Evaluation, Development, and Research, Phi Delta Kappa

### National Geography Standards

**ELEMENT 4**

**Human Systems**

9. the characteristics, distribution, and migration of human populations on Earth’s surface

### Arizona Geography Strand 4

**CONCEPT 1** World in Spatial Terms

**Grade 6, 7, and 8**

PO 1 Construct maps, charts and graphs to display geographic information

### Arizona Math Standard

**STRAND 1** Number Sense and Operations

**CONCEPT 2** Numerical Operations

**GRADE 6**

PO 2 Multiply multi-digit decimals through thousandths.

**STRAND 2** Data Analysis, Probability, and Discrete Math

**CONCEPT 1** Data Analysis

**GRADE 6**

PO 1 Solve problems by selecting, constructing, and interpreting displays of data, including histograms and stem-and-leaf plots.

**GRADE 7**

PO 1 Solve problems by selecting, constructing, and interpreting displays of data, including histograms and stem-and-leaf plots.

**GRADE 8**

PO 2 Make inferences by comparing the same summary statistic for two or more data sets.

### Overview

One of the crucial differences in the way people live is reflected in their population density. Different population densities offer opportunities, create problems, and call for creative responses to various challenges.

### Purpose

This activity is primarily designed to graphically show students the wide variety of population densities around the world.

Secondarily, it shows the wide variety of sizes of countries and populations and points out locations of selected countries. In doing so, it deals with the themes of place and location. In its extensions, it also deals with the theme of human-environment interaction.

### Materials

- Population Density Student Information Sheet
- Population Density Classification Sheet
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- 27 Cuisenaire rods and 10 single Cuisenaire cubes per group (or, Population Squares Handout)
- LAND AREA SQUARES Grid
- POPULATION SQUARES Grid
- World map
- Scissors (1 per group)
- 3 colored pencils per group
- Meter or yardstick and masking tape
- Teacher Resource Sheet
- Student Assessment for Geography

Objectives
Students will be able to:

1. Understand the concept of population density.

2. Classify population density as high, medium or low.

3. Locate selected countries on a world map.

4. Formulate ideas about the ramifications of differences in population densities.

Procedures

1. Introduce the concept of population density. Demonstrate by marking off a one meter square on the floor and have one student stand in it. Then have 10 students stand in it. Explain that this shows the difference between low and high-density areas.

2. Referring to the Population Density Student Information Sheet, students should cut out the 10 by 10 grid (100 squares total) from the Land Area Grid. This represents the United States. Use the Cuisenaire rods and cubes to represent the population of the United States (263 million) with one cube equalling 1 million people. Or, students can cut out and arrange 286 squares from their Population Grid evenly on the Land Area Grid. Again, each square represents 1 million people. If using the handout for population, it is recommended that students leave these population squares in “sticks” of ten for ease in counting.

3. Students decide how to classify the United States as being high, medium, or low population density. They should put the name in the appropriate column of the Student Classification Sheet.

4. Students proceed to the next country, Brazil, and refer to the Population Density Student Information Sheet. Because Brazil will be represented by 93 land area squares, cut off 7 squares from the Land Area grid and place only 158 population squares on the land grid. They then decide how they would classify Brazil’s population density and enter its name in the appropriate column.

5. Repeat these steps through the remainder of the countries. The countries are arranged so that the students will always be removing squares from their Land Area grids and then placing the appropriate number of their population squares the remaining spaces.

6. When they are done with all 20 countries, their Student Classification Sheet will be filled with a total of 20 countries in 3 groups.

7. Students should pick one color to represent all of the countries of the high population density countries. They should then find the location of each country and color it. Repeat this step with a different color for each of the other population density groups.

8. Have a class discussion. Discuss with students as to why different countries have different population densities. Discuss what opportunities might exist in a low-density country that might not exist in a high-density country and vice versa. Also, discuss what problems or challenges might exist in one density but not in one of the other densities.
9. Have students speculate on how houses or dwelling sizes might differ. Speculate further on farm size, parks and open spaces, and transportation.

**Assessment**

There are 2 assessments.

1. Math: Collect and discuss with the class the entries on the classification sheet. Because there are multiple valid ways of classifying the densities, grade holistically and mark down only those answers wildly at variance with class results.

2. Geography: Students should complete the Student Assessment for Geography (6 points) and locate the 20 countries on the world map. Mastery is considered 21 points or higher.

**Extensions**

1. Use the provided extensions information to look at the population densities of countries larger than the United States (need to add Land Area Squares to the basic 10 by 10 grid) or look at countries much smaller than the United States.

2. Generalize about areas with either high or low densities. For example, the Sahara and Sahel countries are generally lower population density. Why? Where are they?

3. Examine any correlation between density and climate. Is there an optimum climate for high population density?

4. Look at population densities of cities instead of entire countries. For example, densities of some selected cities are:
   - Hong Kong 247,501 people per square mile
   - Lagos, Nigeria 142,821 people per square mile
   - Dhaka, Bangladesh 138,108 people per square mile
   - Jakarta, Indonesia 130,026 people per square mile
   - Bombay, India 127,461 people per square mile

   Compare these cities to the densest city in the U.S., New York City, which has a more modest 11,480 people per square mile.

5. Investigate the population density of students’ own town. For instance, Flagstaff has approximately 635 people per square mile, a rate exceeded by a number of countries. To determine density, divide the population by the number of square miles. This data is readily available your local city planning department.

6. Explore how the concept of population density might be inaccurate or misleading, e.g., that it is an average over an entire country of the high, medium, and low population density areas of the country.

7. Consider the densities of the following countries:
   **High Density:**
   - Monaco 42,847 people per square mile (.73 sq. mi.)
   - Singapore 12,161 people per square mile
   - Vatican City 4,829 people per square mile (.17 sq. mi.)
   - Malta 3,279 people per square mile

   **Low Density:**
   - Mongolia 3.8 people per square mile
   - Namibia 4.71 people per square mile
   - Mauritania 5.7 people per square mile

   The overall population density of the entire planet is estimated to be 28.5 people per square mile.
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Sources

1996 Information Please Almanac