

Ups and Downs of Population and Regions

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Grade Level 5
Duration 1-2 class periods

(adapted from original lesson by John Daly, Wayland, MA)

National Standards
<p>GEOGRAPHY Element 1: The World in Spatial Terms 1. How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information 3. How to analyze the spatial organization of people, places, and environments on Earth's surface. Element 2: Places and Regions 4. The physical and human characteristics of places Element 4: Human Systems 9. The characteristics, distribution and migration of human populations on Earth's surface Element 6: The Uses of Geography 18. How to apply geography to interpret the present and plan for the future</p>

AZ Standards
<p>Mathematics Number and Operations in Base Ten 5.NBT.B.6 Apply and extend understanding of division to find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors. Geometry 5.G.A.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane and interpret coordinate values of points in the context of the situation. Standards for Mathematical Practice 5.MP.2 Reason abstractly and quantitatively. 5.MP.4 Model with mathematics.</p>

Arizona Social Science Standards
<p>GEOGRAPHY The use of geographic representations and tools help individuals understand their world. 5.G1.1 Use and construct maps and graphs to represent changes in the United States. Key concepts include but are not limited to physical and human features of the United States, the regions of the United States and their characteristics, geographic location of major events, the growth of the United States through territorial expansion, demographic changes, and the states and their capitals</p>

Overview

Math manipulatives (or Legos) help the kinesthetic learner to understand geographic concepts and see spatial patterns. This lesson will help students formulate a mental map of U.S. regions in terms of population density and elevation of land.

Purpose

In this lesson, students will learn how the elevation of land can directly relate to the population density of the region. Students will also practice the math skills of division and creating double-bar graphs.

Materials

- Several thousand math blocks or Legos bricks that will be divided into small plastic bags. Each bag should contain 100 Legos, unifix cubes, centimeter cubes, or base ten cubes: 50 each of TWO colors. Each bag will be enough for one student or a group of students as the teacher decides.
- Small re-sealable plastic bags
- If using Legos bricks, green Lego base material cut into 10 inch by 1 1/8 inch strips glued to Masonite board for stability and durability is desirable
- Colored pencils, crayons, or markers
- Comparing U.S. Elevation to Population Density (reflecting 2010 data) worksheet and Answer Key
- Scoring Guide for Ups and Downs Lesson

Ups and Downs of Population and Region

- Ups and Downs of Population and Regions map (labeled)
- Ups and Downs of Population and Regions map (no labels) for assessment
- Physical Regions of the United States map
- Physical map of U.S. without region names
- Grid for Student Graphing and Answer Key
- Calculators for students needing adaptations
- Projection device

Objectives

The student will be able to:

1. Create a double bar graph of geographic concepts.
2. Practice division of whole numbers.
3. Analyze data that shows elevation of land as it relates to population density.

Procedures

Prerequisite math skills: the ability to graph, complete long division problems, and round off numbers to the 100th place.

Prerequisite geography skills: knowledge of vocabulary words: elevation, sparse, dense, and population density, and some familiarity with the physical regions of the U.S.

Please Note: Because some states lie within several regions, estimates on elevation and population density have been made.

SESSION ONE

1. Introduce the lesson with a mental mapping exercise. Project the Physical Regions of the United States and explain that the darker the gray, the higher the elevation.
2. Tell them to raise their right arm to shoulder level (straight out from the side of the body). Tell them their arm is at sea level—the eastern shore of the United States. Explain that they will be moving their arm from its position at the right of the body to their left as we trace in the air (from east to west) across the U.S. according to how high above sea level they think this region will be. Have students begin with the **Atlantic Coastal Plain**. Is it sea level or higher? Next, say **Appalachian Mountains**. Have students move their arms to the west and raise it as high as they think the Appalachian region will be. After that, have students move their arms west for the **Mississippi River/Great Lakes** region. Students should move their arms up or down for the elevation

of this region. Continue to have the students move their arms to the west and estimate the elevation of the: **Great Plains, Rocky Mountains and Plateaus, Great Basin, Sierra Nevada and Cascade Mountains, and Pacific Coast.**

3. Next explain the idea behind this lesson. Students just estimated the elevation of the physical regions of the U.S. Now they are going to analyze data and discover how elevation relates to population density.
4. Review what population density means: the AVERAGE number of people living in a square mile. Have the students estimate the population density for their region of the country.
5. Distribute the Comparing U.S. Elevation to Population Density worksheet. Model how to round off the figures so everyone has the same answers.
6. Have the students work in groups or individually to complete the math problems for U.S. Elevation and Population Density. Have them check their work by projecting the answers. Gather their papers and record their scores.

SESSION TWO

Prior to this session, have Legos counted out and bagged.

1. Distribute bags of the Legos (and their bases) or the math linking blocks, the Grid for Student Graphing, and colored pencils or markers. Pass back their corrected papers from SESSION ONE.
2. Have the students select which of the 2 colored blocks will be elevation and which will be population density. Model for them how to stack the first double-bar graph. Teacher should choose whether to begin at the west with Pacific Coast or begin on the right with the Atlantic Coastal Plain, but the regions must be kept in order from west to east.
Pacific Coast = 2 blocks for elevation
6 blocks for population density
Sierra Nevada/Cascade Mountains =
7 blocks for elevation
1 block for population density

Continue until all regions are displayed. (Note: There will be blocks left over of one of the colors.)

3. Now have the students use the Grid for Student Graphing to create the same double-bar graph that the manipulatives are showing. Be sure to remind them that the graph needs a title. The class could brainstorm a good title, or the teacher can print the title on the whiteboard: Comparing U.S. Elevation to Population Density. Have the students label the vertical axes according to the directions. (0-24). Have students label the horizontal axis (Pacific Coast to Atlantic Coastal Plain).

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4. When the students are done graphing, they should separate the blocks or Legos and return them to the bags. All materials should be gathered and returned to the teacher.

5. Students should complete the questions at the bottom of the worksheet. This can be done as homework.

6. Have the students share answers on the worksheet to reinforce geography concepts.

Assessment

Geography and Mathematics

The Comparing U.S. Elevation to Population Density worksheet can be graded for comprehension of geography knowledge and mathematics skills. Each question will equal 1 point except for the “Why do you think so?” questions. These can be worth more points. Mastery is considered 80% or higher.

The Grid for Student Graphing can be graded for math (32 points), title (10 points), correctly labeled regions (8 points), key to the colors on the graph (10 points), general neatness (14 points) and correct spelling (10). The final 16 points will come from the worksheet division problems. Mastery is considered 80% or higher.

Extensions

Ask what other concepts could be graphed that would show the relationship to either elevation

(number of animal species, amount of mining, number of trees) or population density (number of cars, number of economic activities, number of schools). Have students complete another double-bar graph.

Students can read the “land section” in the National Geographic Society Reading Expeditions Series: *Travels Across America* (all five titles: *The West*, *The Southeast*, *The Southwest*, *The Midwest*, and *the Northeast*) or use the internet to create a summary of what are some of the physical features of these regions.

After studying the Physical Regions of the United States map, students can label a map of the U.S with the names of the eight regions used in the lesson as a quiz.

Technology standards can be applied if the computer is used to do the graphing.

Sources

Adapted from original lesson by John Daly Wayland Middle School, Wayland, MA

["Annual Estimates of the Population for the United States, Regions, States, and Puerto Rico: April 1, 2010 to July 1, 2013" \(CSV\)](#). 2013 Population Estimates. [United States Census Bureau](#), Population Division. December 2013. Retrieved April 24, 2014