

Water Coverage: Using Circle Graphs to Understand the Earth

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Grade Level 7
Duration 1 class period

National Standards

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
2. How to use mental maps (a person's internalized picture of a part of Earth's surface) to organize information about people places, and environments in a spatial context
3. How to analyze the spatial organization of people, places, and environments on Earth's surface

Element 3: Physical Systems

8. The characteristics and distribution of ecosystems and biomes on Earth's surface

AZ Standards

MATHEMATICS

Geometry

7.G.A.2 Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.

Statistics and Probability

7.SP.A.1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.

7.SP.A.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.

Standards for Mathematical Practice

- 7.MP.4 Model with mathematics.
- 7.MP.5 Use appropriate tools strategically.

Arizona Social Science Standards

GEOGRAPHY

The use of geographic representations and tools helps individuals understand their world.

7.G1.1 Use and construct maps and other geographic representations to explain the spatial patterns of cultural and environmental characteristics.

Overview

How much of the Earth's surface is covered by water? Can we determine this percentage by conducting an experiment?

Purpose

In this lesson, students will discover the numerical relationship between water and land on the Earth's

surface by conducting an experiment and then creating graphs to display these statistics.

Materials

- An inflatable globe and/or mounted globe that spins
- Drawing paper
- Protractors
- Calculators

Water Coverage

- Colored markers/pencils (optional)

Objectives

The student will be able to:

- generate statistics through a repeated experiment.
- construct a circle graph using a compass and protractor.
- interpret geographic information.

Procedures

Prerequisite Knowledge: Students know how to use a compass and protractor and calculate percentages.

1. Ask students to estimate the percentage of the earth's surface that is covered by water.
2. Hold up the globe (inflatable or mounted). Tell them to change their estimate if they wish.
3. Explain that this lesson will gather data from random samples that will be compared to the known figure of land (30%) to water (70%) of the Earth's surface. Begin by tossing the globe to ten students and recording on a T - Chart if the right thumb landed on land or water.
4. After the first ten samples are recorded, find the percentage of the earth covered in water according to the T - Chart made. (Divide the number of tallies for water by the total number of tallies.) Compare this number to the known figure of 70%.
5. Discuss that the more data that is collected, the more accurate the outcome. Repeat the experiment tossing the globe for 20 or 30 tallies, depending on how much time you have.
6. Find the percentage for land and for water.
7. Again, compare findings to the actual amount: 70%. Now discuss types of graphs that could be constructed to show this percentage.
8. Review circle graphs and use of protractors and compasses. Find the number of degrees in the angles in the circle by multiplying the percentage by 360 (degrees).
9. Distribute drawing paper and colored markers of pencils (optional). Instruct students to use the compass and protractor to draw an accurate circle graphs showing the percentage of land and water on the Earth's surface.
10. Share the grading rubric so students know how their work will be graded.

Note: If you do not have an inflatable globe you can use a mounted globe that spins. Have four students stand around it, spin the globe, and they stop the globe with their index fingers. Record the results and repeat until you have 20-30 tallies.

Assessment

Geography and Mathematics

The circle graphs can be graded. Use the following rubric. Mastery will be considered a score of 3 or higher.

4 – Accurate use of compass and protractor in making graph for degrees and angles. Graph titled appropriately. Sections of graph labeled with correct percentage for land and water.

3 – Degrees of angles are off by more than 5 (degrees). Graph has a title. Sections of graph labeled with correct percentages for land and water is accurate.

2 – Degrees of angles are off by more than 10 (degrees). Graph has a title. Sections of graph not labeled or have incorrect percentages.

1 – Graph has no title. Degrees of angles are off by more than 10 (degrees). Sections of graph not labeled or have incorrect percentages.

0 – No attempt made

Extensions

Have students research one of the following and create a poster board, PowerPoint, or any other sort of project.

- How cultures use water in ceremonies.
- Effects water has on our lives and the choices that are made regarding usage.
- If there is more salt water in the future due to climate change, what will be the consequences to land areas?

Sources

Inflatable globes range in price on Amazon from \$9.00 to less than \$3.00/globe. Mounted globes are \$50 and higher.

Check with your local geographical alliance and see if they will give you an inflatable globe. In Arizona, contact azga@asu.edu