

Math with a Map: Physical Characteristics of the United States

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Grade Level	1-2
Duration	2 class periods

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 2: Places and Regions

4. The physical and human characteristics of places
5. People create regions to interpret Earth's complexity

AZ Standards

MATHEMATICS

Operations and Algebraic Thinking

- 1.OA.A.1. Use addition and subtraction within 20 to solve word problems with unknowns in all positions (e.g., by using objects, drawings, and/or equations with a symbol for the unknown number to represent the problem).
- 1.OA.A.2. Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.
- 2.OA.A.1. Use addition and subtraction within 100 to solve one-step word problems. Use addition to solve two-step word problems using single-digit addends. Represent a word problem as an equation with a symbol for the unknown.

Number and Operations in Base Ten

- 2.NBT.5. Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

Arizona Social Science Standards

GEOGRAPHY

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

- 1.G1.1 Use, explore and construct maps, graphs, and other geographical representations to support content focus. Key concepts include but are not limited to physical features (rivers, lakes, mountains, landforms, desert) and human features (dams, cities, parks, hospitals, schools, railroad tracks, farms, factories, houses).
- 2.G1.1 Use and construct maps, graphs, and other geographic representations of familiar and unfamiliar places in the world; and locate physical and human features. Key physical features include but are not limited to seven continents, oceans, lakes, rivers, mountain ranges, coasts, seas, and deserts. Key human features include but are not limited to equator, hemispheres, North and South Pole, cities, states, countries, regions, and landmarks

Overview

Understanding the array of physical features of the United States helps students make sense of stories they read and places they can visit.

Purpose

In this lesson, students will identify some of the major physical (natural) characteristics of the United

States including mountains, lakes, rivers, oceans and forests.

Materials

- Math with a Map: The United States map and Teacher's Key
http://geoalliance.asu.edu/sites/default/files/maps/US_math.pdf and

Math with a Map

http://geoalliance.asu.edu/sites/default/files/maps/US_math_key.pdf

- Markers in brown, green, blue, and red
- Crayons in brown, green, blue, and red
- Group 1-6 questions
- Map Scoring Guide

Objectives

The student will be able to:

1. Identify some of the major physical (natural) characteristics of the United States including mountains, lakes, rivers, oceans and forests.
2. Identify where a human activity is likely to occur based on the natural characteristics on the map.
3. Solve word problems using the appropriate operation.
4. Create a map with symbols and a legend.

Procedures

Students should have experience with simple classroom or school map in which a map key/legend is used.

SESSION ONE

1. Begin the lesson by projecting the Math with a Map: The United States map (student version). http://geoalliance.asu.edu/sites/default/files/maps/US_math.pdf
2. Briefly discuss where the students' state is located or have a student point out where his/her state is located. Ask if they can identify any other landforms or water bodies on the map.
3. Distribute copies of the same map to students and brown, green, blue, and red crayons.
4. Tell them that there are some interesting natural characteristics of the United States that they will be adding to their maps.
5. Begin the guided mapping by explaining that we use symbols on a map. Sometimes we use small pictures or icons to stand for something much larger. Draw a few icons/images (restroom, no smoking, trash, etc.) so they understand.
6. Ask the students if they have ever seen or been to the mountains. Next ask them what sorts of activities people do in the mountains. List these on the board. The list should include at least skiing, hiking, and camping.
7. Using a triangle shape, add the Rocky and Appalachian Mountains to the map and have the students do the same.
8. Next go down to the bottom and explain the map key. Explain that a map key helps us remember what our symbols stand for on the map. Add the

symbol for "mountains" to the map key in brown marker. Ask the children to do the same.

9. Next talk about trees as a natural resource. Have children discuss the things that are made from trees. List their responses.

10. Then add 10 symbols for forests in the correct places on the map in green. Have children add 10 forest symbols to their maps in green crayon.

11. Then add the forest symbol to the map key.

12. Follow the same procedure to add each water feature (rivers, Great Lakes, and oceans), one at a time to the map and map key, using blue for the bodies of water. They will need their maps for the second session.

SESSION TWO

1. Divide students into six groups. Give each group their question sheet.

2. Instruct groups to put a red "X" in the area on their map that corresponds to where a given human activity would take place. Refer to the first question on each of the student handouts. For example: the question on the first handout states: "You are going hiking in a forest. Put a red X on your map in the place where you can do this." Each of the handouts has a different question. Groups are expected to answer only one question—the one at the top of their sheet.

3. Then instruct students to solve the math questions in their groups.

4. After groups have solved and recorded their answers to the word problems, collect the maps and group question sheets.

Assessment

Geography

The Math with a Map: The United States map (student version) can be graded using the Map Scoring Guide. There are assigned points to each portion of the map activity. Mastery will be considered 80 points or higher.

Mathematics

Each group question sheet has 4 math problems to solve. Mastery will be considered 3 of the 4 problems are solved correctly.

Extensions

Two National Geographic books are excellent as either an introduction or extension to this lesson:

- *The Key to Maps* by Harley Chan. ISBN# 0-7922-8745-2.

Math with a Map

Sources

Problem types for this math lesson were adapted from Cognitively Guided Instruction skeleton

problems and from: Urban Systematic Initiative Professional Development Manual supported in part by a National Science Foundation Grant under Grant Number MDR-8955346 and MDR-8550236.