

# Paint My Counties: Mapcoloring the Counties of AZ

Students learn the counties of Arizona and writing and math too!

Adapted from Rutgers Discrete Math

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<b>Grade Level</b>	4
<b>Duration</b>	2 class periods

## National Geography Standards

### ESSENTIAL ELEMENT: THE WORLD IN SPATIAL TERMS

1. How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information.

## Arizona Geography Standards

### CONCEPT ONE: THE WORLD IN SPATIAL TERMS

**PO 1.** Use different types of maps to solve problems.

**PO 7.** Locate physical and human features in Arizona using maps, illustrations, or images.

## Other Standards

### SOCIAL STUDIES STANDARD:

#### CIVICS/GOVERNMENT

#### CONCEPT 4: RIGHTS

#### RESPONSIBILITIES, AND ROLES OF CITIZENSHIP

**PO 1.** Discuss ways an individual can contribute to a school or community.

**PO 3.** Describe the importance of citizens being actively involved in the democratic process (e.g., voting, campaigning, civil and community service, volunteering, jury duty).

### ARIZONA COLLEGE & CAREER READY STANDARDS

#### WRITING

#### TEXT TYPES AND PURPOSES

**4.W.1** Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

#### PRODUCTION AND DISTRIBUTION OF WRITING

**4.W.4** Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience.

#### SPEAKING AND LISTENING

#### PRESENTATION OF KNOWLEDGE AND IDEAS

**4.SL.4** Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive facts to support main ideas or themes; speak clearly at an understandable pace.

### MATHEMATICS STANDARD

#### MEASUREMENT AND DATA

**4.MD.A.2** Use the four operations to solve word problems and problems in real-world context involving distances, intervals of time, liquid volumes, masses

of objects, and money, including decimals and problems involving fractions with like denominators, and problems that require expressing measurements given in a larger unit in terms of a smaller unit.

## Overview

In 1983, Arizona went from 14 counties to 15 with the addition of La Paz County. Mapcoloring is connected to graph theory in mathematics. Combining these geography facts with math skills gives students a chance to use logic to learn the counties.

## Purpose

Students will become familiar with the 15 Arizona counties while engaging in a problem-solving math activity.

## Materials

- Labeled map of Arizona Counties (4 maps on one page)
- Labeled map of Arizona Counties
- Colored markers, pencils or crayons
- Unlabeled map of Arizona Counties (4 maps on one page)

## Objectives

The student will be able to:

- identify the 15 counties of Arizona.
- present a persuasive argument to the class.
- use logic to solve a math problem.

## Procedures

### SESSION ONE

1. *Set: How many counties are there in Arizona?* Distribute the unlabeled map of Arizona Counties (all four maps) to each student. Ask the students to locate and name the 15 counties of Arizona as a pretest.

2. Project the labeled version of the map on a projector or document camera. Have students correctly label their pretest map. This will be their study sheet.

3. Issue a challenge to the students. A. They are to color their maps using the least amount of colors possible. B. They should not have any counties that are the same color that border or touch one another. C. They are to use their practice maps (3 that are not labeled) to do this. D. They may work as individuals, pairs, or as a team. E. Encourage them to say the counties as much as possible.

Note: (Students should find that only 4 colors are needed.)

F. Give them the scenario: *"Your school Student Council wants to purchase paints to paint the state of Arizona and its counties on the school grounds. In order to save money, it wants to purchase as few colors as possible. You may not have any counties be the same color that border or touch one another along the side.*

*The paint (one bucket per county) prices are: \$3.00 for one color, \$6.00 for second color, \$9.00 for third color, \$12.00 for fourth color, for \$15.00 fifth color, and \$18.00 for sixth color*

*You may choose the colors.*

*The lowest cost wins the contract. How low can you go?"*

### SESSION TWO

1. Students review and/or finish their maps made during the previous session.

2. When they have completed their calculations, they are to write a contract stating the numbers of colors needed and cost of each county's paint. They should write at least one paragraph to persuade the student council why they should use their services.

3. Students should present their map designs, contract information, and paragraph to the class.

4. The class will vote on which design to suggest to the student council. Discuss how the class has

contributed to their school and how voting was important to making a decision.

## Assessment

Use the Six-Trait Writing Rubric to assess the group's paragraph focusing on Ideas/Content and the group's presentation focusing on Voice. Each member of the group should contribute and therefore earn the same grade. Mastery will be 4 or higher on the rubric.

Give each student a blank map of Arizona and have he/she write the name of each county in its correct location. Mastery will be seen as labeling at least 12 counties correctly.

## Extensions

Students could color a map of the 48 contiguous states of the United States in the same manner as the logic problem.

<http://geoalliance.asu.edu/sites/default/files/maps/US-NAMES.pdf>

Students could choose another state and mapcolor its counties.

Make or order templates from various sources and make your school a playground map. Some sources are:

<https://peacefulplaygrounds.com/product/catalog/u-s-playgroundmap-stencil/>

<http://www.worldmapsonline.com/map-stencils.htm>

[https://kaboom.org/resources/enhancement\\_projects/how\\_paint\\_us\\_and\\_world\\_maps](https://kaboom.org/resources/enhancement_projects/how_paint_us_and_world_maps)

## Sources

Francis, Richard. The Mathematician's Coloring Book. ISBN 08892652.