

Map Coloring

Grade Levels

This activity is intended for all grades, K–12.

Objectives and Topics

This lesson can be adapted to a variety of grade levels. Paired with elementary school geography, this could be an exploration of how to use rules and find patterns. In higher grades, this could be a shorter lesson with high school students, placing a stronger emphasis on the math – in particular, finding counterexamples to disprove a claim. This lesson makes connections to critical thinking, problem solving, and verification/proofs. Students will use logic and coloring to find the solution to a simple but elusive graph theory problem.

Introduction

The maximum number of colors needed to color a map was an unresolved mathematical problem for quite some time, beginning in the 18th century. Computers established the first proof for the maximum number of colors needed to color a map in 1976.

Materials and Resources

- Map Coloring Handout
- Colored Pencils or Markers

Formal Statement of the Problem

Is there a limit on the number of colors necessary to color a map such that no adjacent areas are the same color?

Handout

Work progressively through the handout, eventually finding what the maximum number of colors we need for any two dimensional map is. It helps to bring the class together after students complete each page of the handout in order to discuss the findings.

