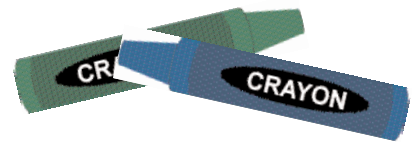


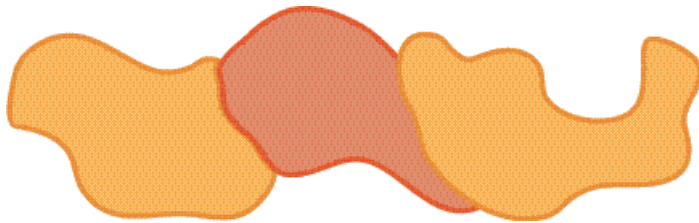
Coloring Maps

by Terry McCabe



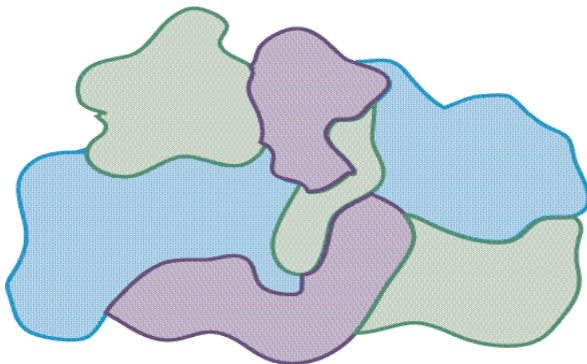
Coloring maps can be fun! You might think that the bigger your box of crayons, the better prepared you are to color a map. But suppose you want to color a map using the fewest colors possible so that no two countries with a common border are colored the same. We also assume that each country has at least one border with another country and there are no islands of countries. What is the smallest number of colors guaranteed to color such a map? This is a famous old problem.

Let's start by drawing a map with three countries (below) that can be colored with just 2 colors. Take another piece of paper and try drawing maps with 4 and 5 countries that require only 2 colors. Do you see a pattern in what a map must be like to require only 2 colors?



Your countries can be rectangular, but if they are, the map may not look realistic.

Now let's draw some maps that require exactly three colors. Draw such maps with 3, 4, 5, 6, 7 and 8 countries respectively. Is there some common feature that each of the maps in this group must have?



For many years, mathematicians believed that any map could be colored using only 4 colors. Proving this was called the "Four Color Problem". Draw some

maps that require 4 colors. What is the fewest number of countries a map requiring 4 colors can have?

The answer to the last question is 4 countries. Did you draw such a map? If not, try to draw one now.

Draw your favorite "Hard to color Map" that requires at least 4 colors to color here! How many countries does it have?

In order to see why it was believed that 4 colors was enough, try drawing some maps that require 5 colors. It is a very interesting activity. But please do not spend more than a week or more than a pack of paper on this task.

A group of mathematicians showed in the 1980's that 4 colors is always enough! Using computers to check thousands of possibilities, they showed that no map, no matter how complicated, requires more than four colors. This solved the famous "Four Color Problem" which had baffled mapmakers for centuries.