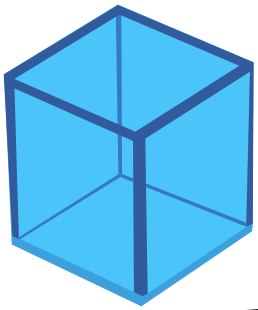
Problem of the Week
Problem B

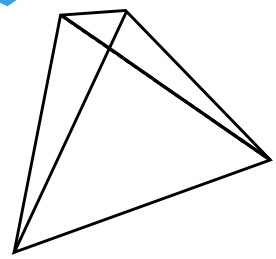
Edges With Nothing in Common

A famous problem, only recently solved, is the "Four Colour Problem", which asks whether any map can be coloured with at most four distinct colours so that no two countries with a commom boundary are the same colour. Here are some similar questions in three dimensions.

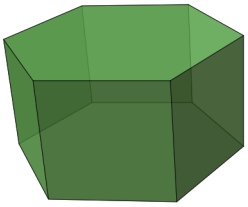
a) The surface of a cube is to be painted so that no two adjacent faces (i.e., faces which have an edge in common) are the same colour. What is the minimum number of different colours required to paint the six faces of the cube so as to satisfy this rule? Explain your reasoning.



b) What is the answer to this question for the surface of a tetrahedron, which has four faces? Explain your reasoning.



c) What is the answer to this question for a hexagonal prism, which has eight faces? Explain your reasoning.



d) Do you find anything puzzling in your answers to these questions?

Check out other CEMC resources here:
`http://cemc.uwaterloo.ca/resources/resources.html`

Strand: Geometry and Spatial Sense