**Networks and Graphs Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_**

**VII.C Student Activity Sheet 10: Coloring Maps and Scheduling**

Creating Graphs from Maps

**1.** Revisit the map coloring exercises from Student Activity Sheet 9 in terms of graphs. For example, Map I can be represented by the following graph. The graph should include a vertex for each country (or region) in your map. If two countries share a border and need to be colored differently, the graph shows an edge between the vertices that represent them. After studying the relationship between Map I and the graph for Map I, create a graph that represents Map II.

After studying the relationship between Map 1 and the graph for Map I, create a graph that represents Map II.

|  |  |
| --- | --- |
|  |  |
|  |  |

Now, try to create a graph that represents each Map below.

|  |  |
| --- | --- |
| **Map** | **Graph Representation** |
|  |  |
| Red  Yellow  Blue  Green  Blue |  |
| Blue  Yellow  Green  Red |  |
|  |  |
| [http://www.aass.oru.se/~sci/aicourse/map.gif](http://www.google.com/url?sa=i&rct=j&q=&esrc=s&frm=1&source=images&cd=&cad=rja&uact=8&docid=D8kzwzE2rmuiVM&tbnid=e92zJv_WoV2XcM:&ved=0CAYQjRw&url=http://www.alternatievewiskunde.nl/fcp/index.htm&ei=6eAtU7myMIjCrQHr4YH4AQ&bvm=bv.62922401,d.aWM&psig=AFQjCNGgzhADTP6wSfceBA_zq-IbM2rwiQ&ust=1395601964879571) |  |
|  |  |

**2.** Restate the Map Coloring problem from Student Activity Sheet 9 in terms of a Graph

Coloring problem.

*Map Coloring Problem:*

*“You are the publisher of a new edition of the world atlas. As you prepare the different*

*maps for printing, you need to make sure that countries adjacent to each other (sharing a common border) are given different colors”*

*Restated as a Graph Coloring Problem:*

**3.** Create a graph that **requires** three colors.

**4.** Create a graph that **could be** colored with two colors.

**5.** What types of graphs can always be colored with two colors?