**Student Activity Guide: County Road Paving** Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Unit 2 Lesson 9

<create your content>

Problem Statement

You are a county commissioner and the problem is that many of the towns in your county are not connected by paved roads.  The map shows current dirt roads that connect the towns that you could decide to pave.  Rather than distance, the map shows the cost for paving the road between two towns (in millions of dollars) - the cost is related more to circumstances of the terrain rather than distance.  

Your job is to decide which roads to pave so that:  
     1) It is possible to drive a paved road between any two towns in the county (no matter how convoluted the route).   
     2) The paving costs the county the least amount of money.

Here are examples:  
  
**BEFORE**  
  
![roads before paving](resources/MST-Before.png =350x)   
  
A**FTER**  
    Every town has a path to it.  
    There is a total cost for all of the paving...is it the lowest cost possible?  
  
![roads after paving](resources/MST-After.png =350x)

* The goal is to try to develop an algorithm for finding the lowest cost paving for \*any possible map\*.
  + Partners should talk about the process they use.
  + When you select a path to pave, why are you choosing it?
  + Can you communicate an algorithm in writing that will always select the lowest-cost paving?
* NOTE: the algorithm should describe a way to process/visit/select/de-select individual Nodes and Edges in the graph.
* Write your algorithm in their journals.