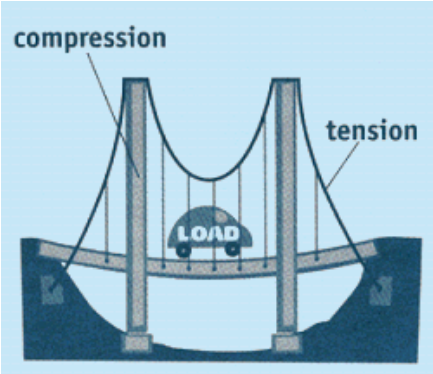
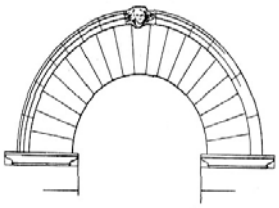
May the FORCE be with you



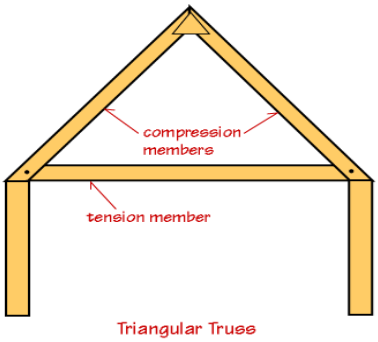
Load creates two major forces that act on the parts of a bridge. One force, called ***compression***, pushes on, or squeezes, bridge parts. The other force, called ***tension***, pulls on, or stretches, them. For a bridge to do its work, each part of the bridge must stand up to all the pushes and pulls that act on it every day.

"An arch consists of two weaknesses which, leaning on each other, become a strength." Leonardo da Vinci



An arch's beauty comes from its graceful curve. Its strength comes from how this curve carries weight (load) outward in both directions. You see, its two weaknesses are the arch's two halves, but when leaned against each other at the top stone, or keystone, they become strong by the force of ***compression***. Since everything is pushing and being pushed at the same time, all the parts of an arch are ***compressed*** (squeezed.)

Stone is super strong when it is compressed, but it's weak when it is pulled, or under ***tension***. So ancient builders figured they could span longer distances using stone arches instead of stone beams (which are both pushed and pulled.)



Some parts of a truss bridge are squeezed (under ***compression***), some are stretched (put under ***tension***), and some are under both forces. In general, the top of a truss is compressed, and the bottom is tensed. The pieces in between may be under just one or both forces.