Physics

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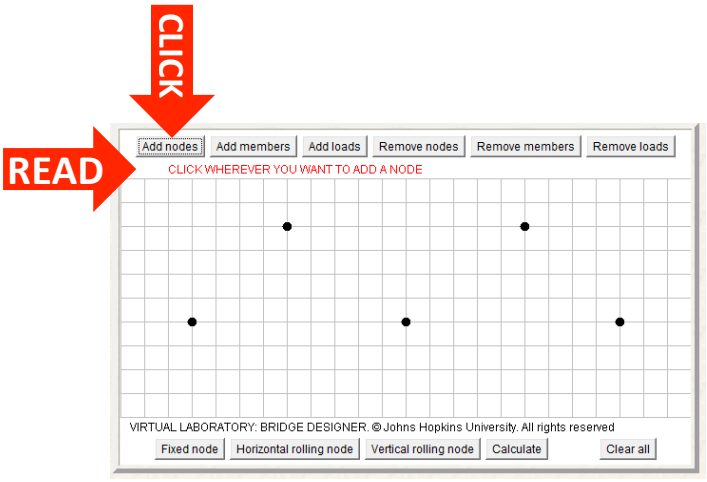
Bridge Simulation

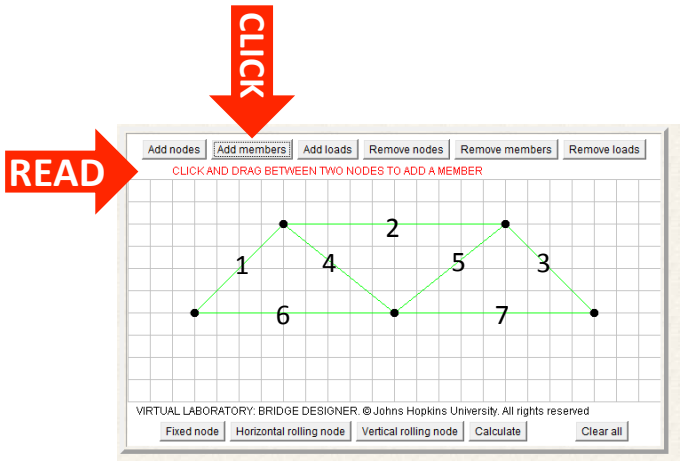
Directions

Step #1 – Find a simple drawing of a warren truss bridge. (*See bridge FBD worksheet.*)

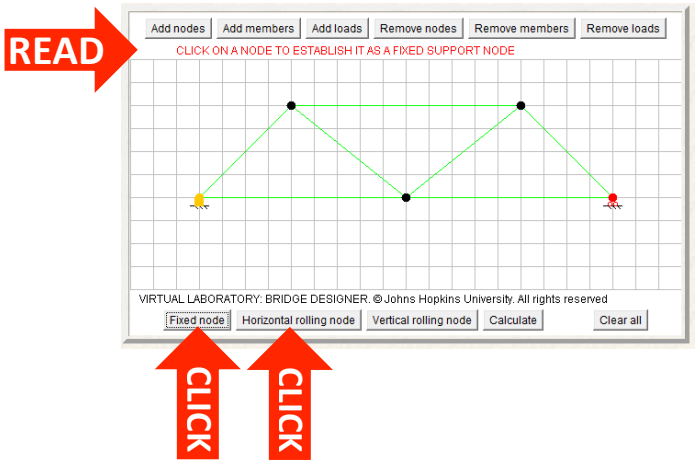
Step #2 – Using your drawing, add Nodes. Nodes are corners or where 2 or more structural members come together.
There are 5 nodes in the picture below.



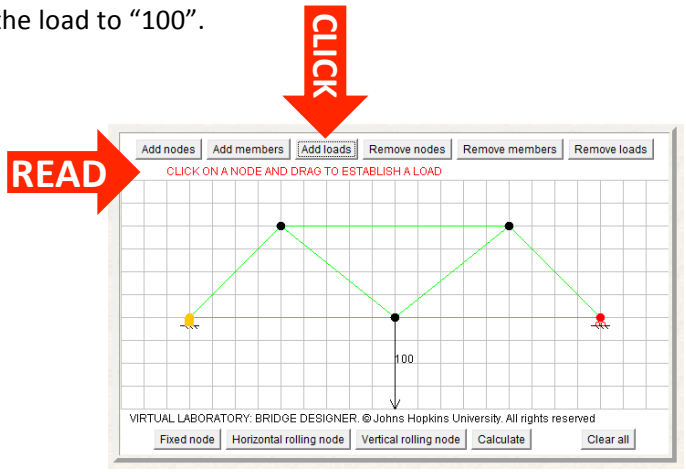
Step #3 – Add Members. Members are the structural supports.
There are 7 members in the picture below. (*Members are numbered*)
Draw each member from node-to-node.



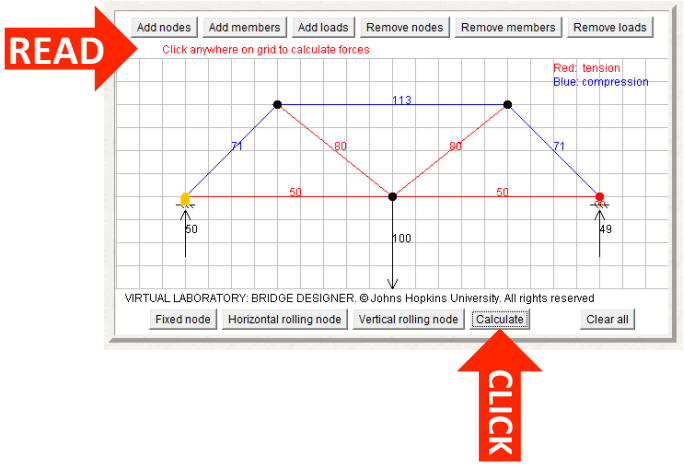
Step #4 – Fixed and Rolling Nodes. Make the bottom left node a FIXED NODE.
Make the bottom right a HORIZONTAL ROLLING NODE.



Step #5 – Add a Load. The load is the weight supported by the bridge.
Add the load to the center most node along the bottom of the bridge.
Set the load to "100".



Step #6 – Calculate tension and compression forces. The numerical values are a percentage of the load (if the load = 100).



Step #7 – Draw a full-size side profile of your bridge on an 8.5" x 11" piece of paper.
You do NOT have to use a warren truss design.
Set a scale; one square on the simulation = _____ cm
Input your scaled bridge design. (*Repeats steps #2 – 5.*)
Tweak your design until you are satisfied with the force analysis.