

## Static Equilibrium Project

- Your final product can be a poster, powerpoint presentation, video recording, or a booklet.
- You will work with at least 1 and no more than 3 other students.
- Your group will turn in one final product.

Create an original scenario that includes all of the following:

- At least 4 forces + the force a hinge exerts.
- Out of the 4 forces at least one of them must be the force of tension.
- Use your scenario for two different questions:
  - Question #1: the force of tension and the force(s) exerted by the hinge are unknown, your solution must show to find all of them.
  - Questions #2 The mass of the beam or the mass of the load are unknown, your solution must show how to determine the mass.
- Ensure that your project includes a large, labeled diagram that is drawn with the help of a ruler.
- To earn L3 (proficient) your final product must include the following:

Item	Completed
Definition of a static equilibrium.	
Definition of torque, net force, net torque, rotational equilibrium, line of action, lever arm, and translational equilibrium.	
A labeled diagram of an original scenario without lines of action and lever arms.	
A labeled diagram of the original scenario with clearly drawn lines of action and lever arms.	
Calculations that show the vertical net force.	
Calculations that show the horizontal net force.	
Calculations that show the net torque.	
A full solution of Question #1.	
A full solution of Question #2.	
References if you used materials and sources other than your notes and a textbook.	
Names of students who worked on the project.	

- To earn L4 (extending) your final project must show creativity and a full solution of an additional question. Alternatively, you can use a scenario that is based on a real life set up – you will have to gather/estimate measurements, have a photograph of the scenario as well as a sketch.