**P12**

**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.