Spinal Fitness

Physics Demonstration of Equilibrium of Torque and Equilibrium of Translation

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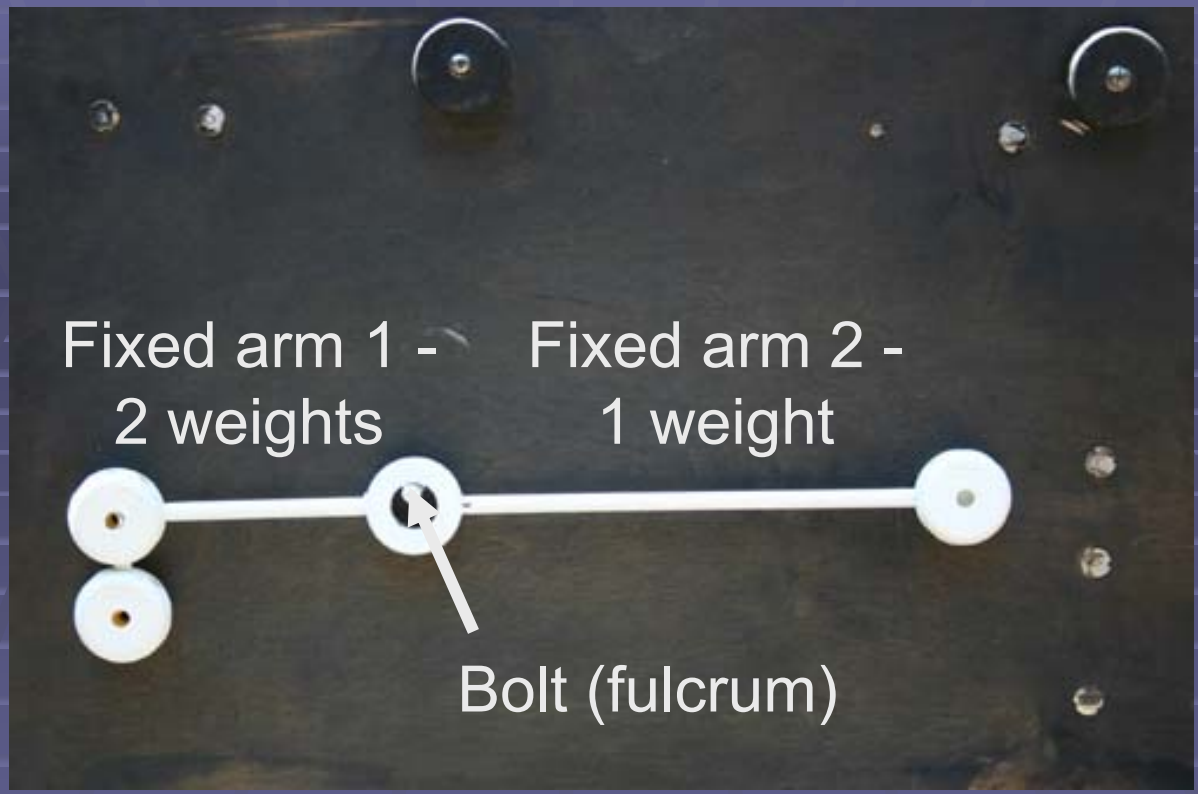
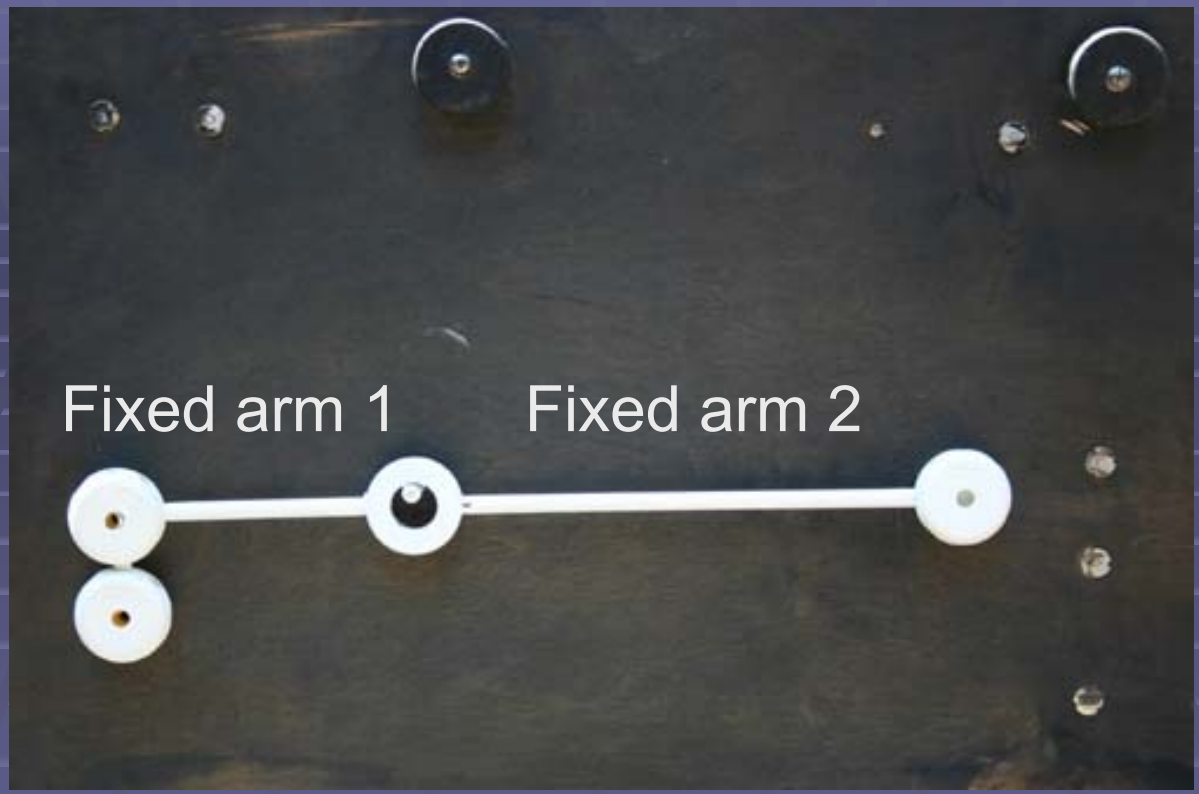
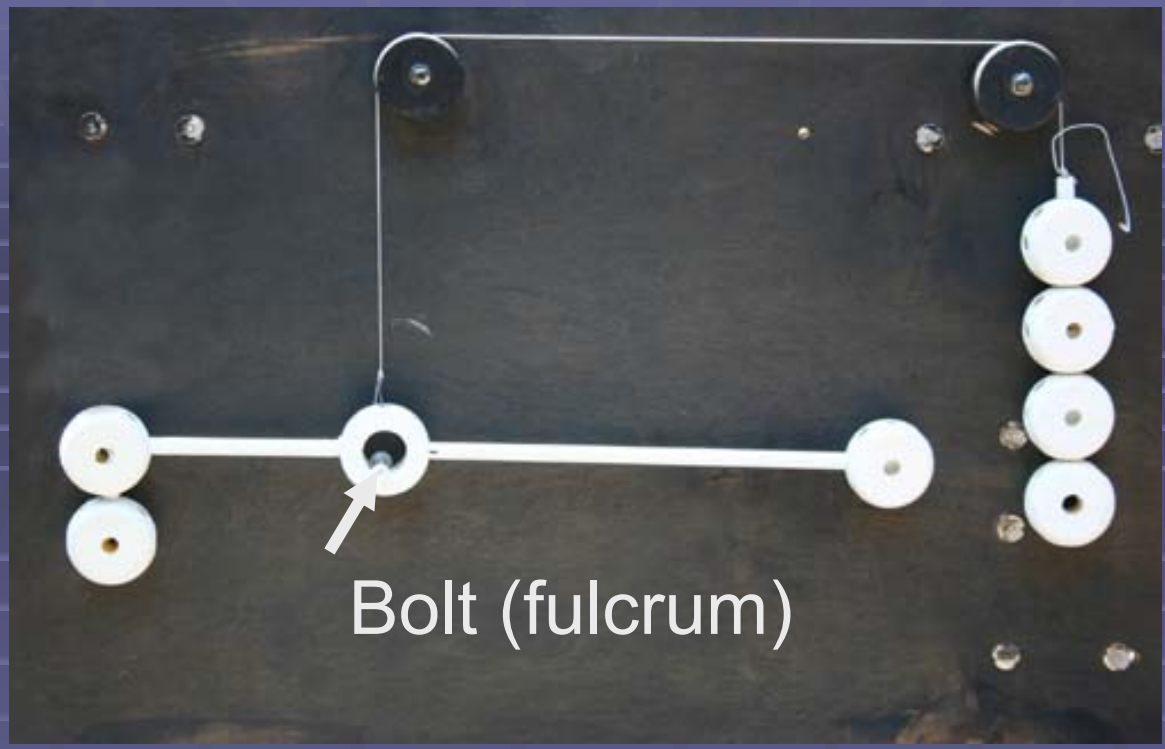


Since fixed arm 2 is twice the length of fixed arm 1 it only requires ½ the weight to equalize any rotation and keep the two sides balanced about the fulcrum. This demonstrates Equilibrium of Torque in action.



Notice that the weight of fixed arm 1 and 2 are causing the system to sit on the fulcrum. The combined force of the two weights would cause the system to translate downward, but this is stopped at the fulcrum. The fulcrum is supplying enough force to stop the force of downward translation.

The next question: How much force must the fulcrum supply?



Notice now at the fulcrum. In our previous example, the fulcrum was resting on the bolt, now it has moved upward off the fulcrum. Notice the weights to the right. This is the amount of force that was actually required to oppose the translation force and thereby satisfy the Equilibrium of Translation. This principle must be satisfied by all lever systems.