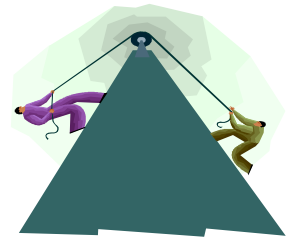


Pulleys: Do they Really Help? -- Take the Pulley Challenge --



A pulley is a type of machine that makes it easier to lift something. Like all of the simple machines they allow you to exert a force greater than you can by only using your muscles. You may have had very little experience using pulley systems thus far. This lab will introduce you to their benefit and is also designed to get you thinking. You may ask for hints or suggestions any time you are feeling stuck and are losing motivation to solve the challenges.

GOAL:

Your goal is to lift and hold a classmate or me a couple of feet off the ground using one hand. First, however, you will need to solve the following series of challenges in the order listed below. Only then will you be given the materials and opportunity to try and lift me or your classmate. Please work with a partner.

CHALLENGES:

**** Please solve the following four (4) challenges in the order listed below.
Good luck and remember to have fun!!! ****

1. Prove if using only **one pulley** to lift something requires more, less, or no more force than lifting it without a pulley. *Sketch a picture of your proof (your set-up).*
2. Use only one pulley to lift the same object as in #1 above while using **a lot less effort** than you did during Challenge #1. *Sketch a picture of your solution.*
3. Use **five pulleys** to lift the same object while using **a lot less force** than you did during Challenge #2. Design your pulley system so that you pull down in order to lift up the weight. *Sketch a picture of your solution.*
4. Create a diagram illustrating how you plan to lift and hold me, or a classmate, 2-3 feet off the ground for one minute using one hand and the materials listed below. Show me as soon as you think you have a diagram that you think will work.
 - 5 or 7 pulleys
 - One long rope
 - I will provide a harness on which you can attach someone and a location to hang a chain or nylon webbing.
5. After I approve your diagram, ask me for the next series of pulley challenges. After everyone has completed Challenge #4 we will test your ideas.

MATERIALS LIST:

Weight (500g or 1000g)
Spring scale
6 feet of string
2 double pulleys
2 single pulleys
2 paperclip hooks
pole and clamp at lab station