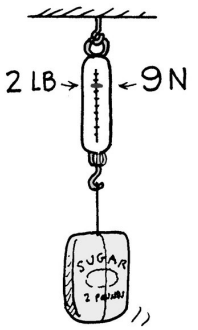
Equilibrium & Tension

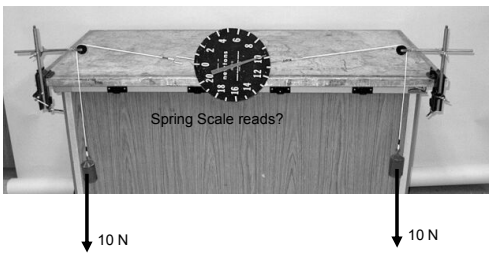
Spring Scale



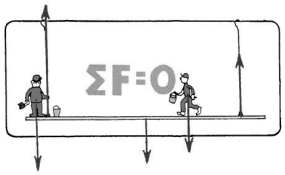
- Magnitude of downward force exerted by string on scale = 9 N
- Magnitude of upward force on scale by hook = 9 N
- Note that spring scale reads 9 N

Tension

- Tension: Stretching Force



Equilibrium



- What happens to the upward forces as the painter moves closer to the left?

Tension

- The rope supports a lantern that weighs 50 N.
- Is the tension in the rope less then, equal to, or more than 50 N? Defend your answer.

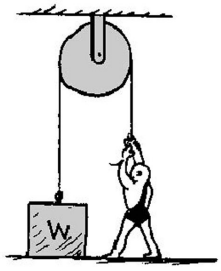
Tension

- The rope is repositioned as shown, and still supports the 50-N lantern.
- Is the tension in the rope less then, equal to, or more than 50 N? Defend your answer.

Tension

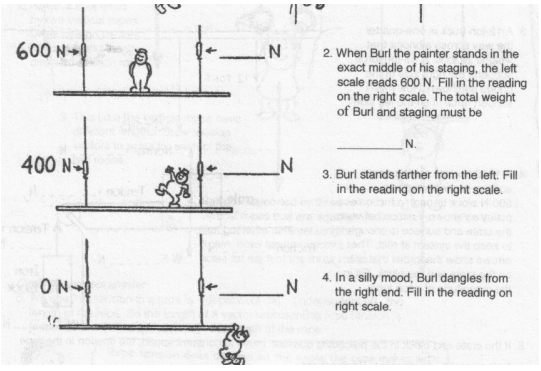
- If the painter weighs 60 N, what is the tension in the rope in each case?

Single Pulley

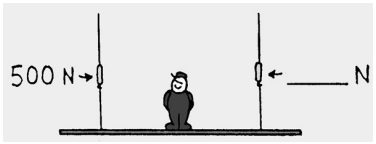


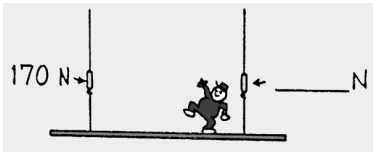
- What is the limit to W?
- Brick layer's Tale

Burl the Painter

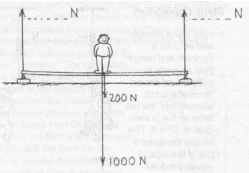


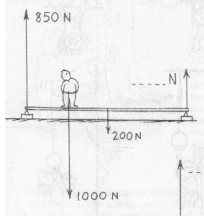
Burl





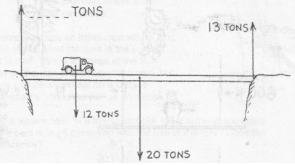
1. Manuel weighs 1000 N and stands in the middle of a board that weighs 200 N. The ends of the board rest on bathroom scales. (We can assume the weight of the board acts at its center.) Fill in the correct weight reading on each scale.





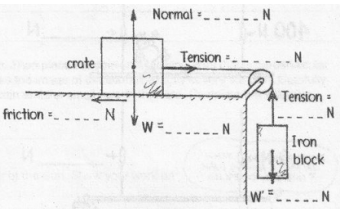
2. When Manuel moves to the left as shown, the scale closest to him reads 850 N. Fill in the weight for the far scale.

3. A 12-ton truck is one-quarter the way across a bridge that weighs 20 tons. A 13-ton force supports the right side of the bridge as shown. How much support force is on the left side?



More Equilibrium

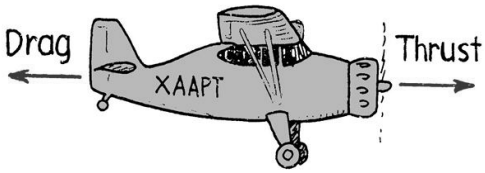
4. A 1000-N crate resting on a surface is connected to a 500-N block through a frictionless pulley as shown. Friction between the crate and surface is enough to keep the system at rest. The arrows show the forces that act on the crate and the block. Fill in the magnitude of each force.



5. If the crate and block in the preceding question move at constant speed, the tension in the rope [is the same] [increases] [decreases].

The sliding system is then in [static equilibrium] [dynamic equilibrium].

Plane Forces



- Which is bigger? Thrust or Drag?