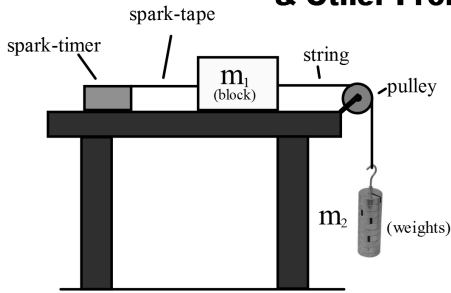


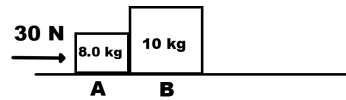
Fletcher's Trolley

& Other Problems



Review:

Two boxes, A and B, are positioned next to each other on a horizontal, frictionless surface. An applied force acting on box A causes B to accelerate to the right. Calculate the force of box A on box B.

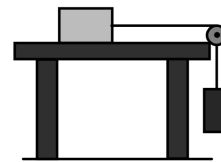


Who was Fletcher???



I don't know, but I like to think he was a Physicist just like us who had a passion for cool physics problems like...

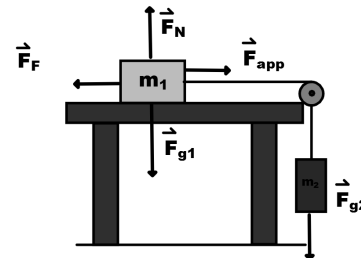
Fletcher's Trolley Conceptual Example



Imagine a block of mass m_1 attached to a weight of mass m_2 by a pulley system.

The first block slides on a table which can experience friction.

What does the free body diagram for this situation look like?

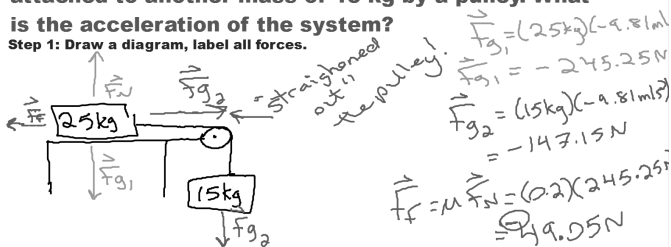


Where:

$$\vec{F}_{app} = -\vec{F}_{g2}$$

ex) In a Fletcher's trolley experiment, a block of mass 25 kg rests on a table ($\mu = 0.20$). The block is attached to another mass of 15 kg by a pulley. What is the acceleration of the system?

Step 1: Draw a diagram, label all forces.



Step 2: Calculate the forces of gravity, the normal force, the frictional force and the applied force.

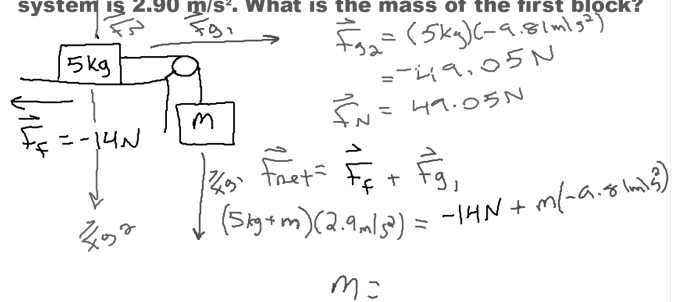
$$\vec{F}_{net} = \vec{F}_{g2} + \vec{F}_f$$

$$(40\text{kg}) \vec{a} = (147.15\text{N}) + (-49.05\text{N})$$

$$\vec{a} = 2.5\text{m/s}^2$$

Step 3: Determine the total force acting on the block. Find acceleration by using the mass of the system (the total of both masses).

ex) In a Fletcher's Trolley experiment, the second block has a mass of 5.00 kg. The force of friction acting on the second block is 14.0 N and the acceleration of the system is 2.90 m/s². What is the mass of the first block?



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Practice Problems

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2. Unit Assignment

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