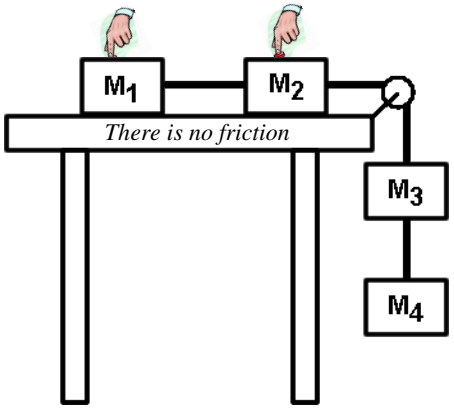
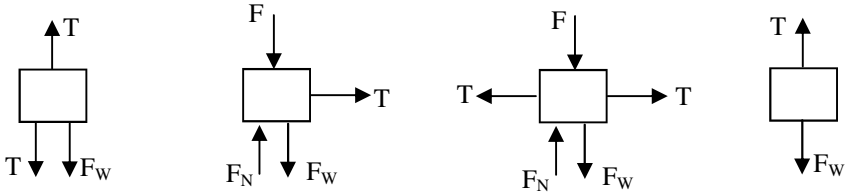
Due Thurs., Oct 20

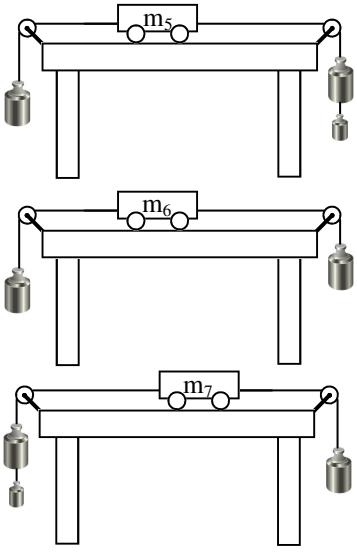
2011 PreAP Forces 3



1. Four masses are connected by ropes.
   A. Since they are not on the table, which force cannot be acting on m_3 and m_4?

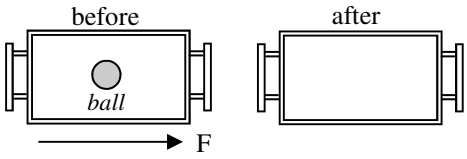
   B. * Below are the force diagrams for the masses. Label them as m_1, m_2, m_3 or m_4.



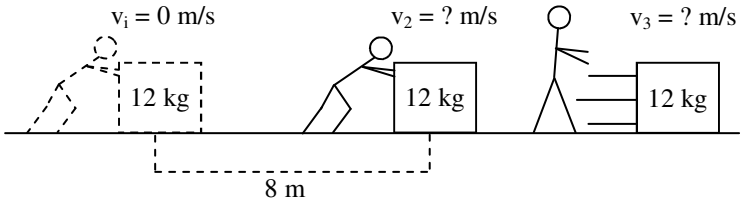


2. Use the three diagrams at the left to answer the following.

A.	____ Which could be at rest?	G.	_____Could be changing direction.
B.	____ Acceleration is negative.	H.	_____Has unbalanced forces.
C.	____ Acceleration is positive.	I.	_____V could = 0 m/s.
D.	____ Has a net force of 0 N.	J.	_____Could be a constant speed.
E.	____ Has a net force (Fnet ≠0)	K.	_____Could be slowing down to the left.
F.	____ Has balanced forces.	L.	_____Could be slowing down to the right.



3. A force quickly pushes a cart to the right. Draw where the ball ends up.



4. Slim Jim pushes on a 12 kg object for 10 seconds. It moves 8 m to the right while he is pushing it.
   A. * Below the picture use the kinematic equations to calculate the acceleration of the mass.

   B. Now, use F = ma to calculate the magnitude of Slim Jim's force.

   C. If the surface is frictionless, how does v_3 compare to v_2?

   D. If the surface has friction, how does v_3 compare to v_2?

There are two major categories of forces: contact forces (when objects are actually touching) and field forces (forces that act at a distance and don't need to be touching).

5. Contact or Field force?

A.	____ Tension	C.	____ Can cause accelerations	E.	____ * Electrostatic force
B.	____ Normal force	D.	____ Gravity		(*like a balloon rubbed on hair*)

Why this matters: Newton's Third Law: "For every force there is an equal and opposite force." But this opposite force must be of the same type: contact forces oppose contact forces; field forces oppose field forces.

6. A box is sitting on a table.
   A. What force opposes the normal force pushing up on the box?
   B. What force opposes the force of weight pulling down on the box?

1B) First diagram must be mass 3, since it has no normal force and has tension pulling up and down.
4A) You have v_i, t, and x, so a = 0.16 m/s^2
5E) Field force. A charged balloon can cause your hair to stand up, even though it is no touching your hair.