

1.) Determine if the following situations are a mass or a weight thing!

Mass?	Weight?	Situation
X		It hurts more to get hit in the stomach with a bowling ball than a lacrosse ball when they're at the same speed.
X		It's harder to push a medicine ball across the floor than it is to push a soccer ball across the floor.
	X	It's hard to hold your entire body up with just one hand.
	X	The propeller of a helicopter must be spinning for the helicopter to continue being above the ground.

2.) Which dot patterns indicate a net force of zero? Which dot patterns indicate a net force that is not zero?

a) 

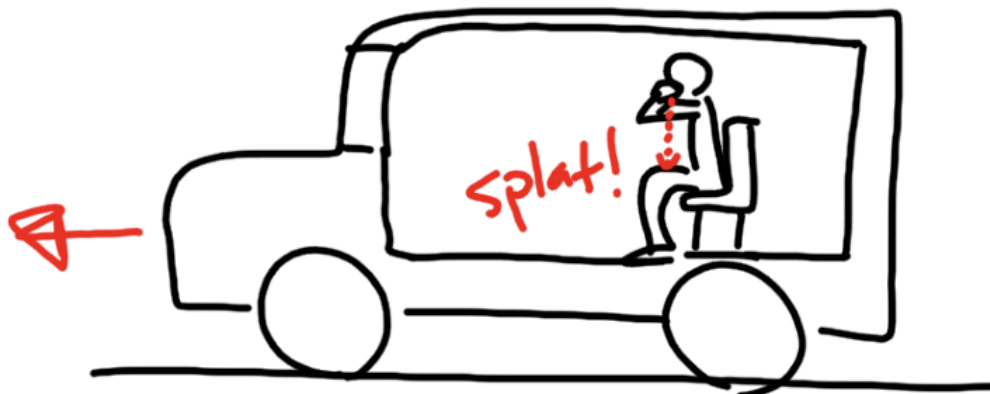
b) 

c) 

d) 

Dot Patterns "a" and "d" indicate no net force because they represent constant speed. Dot Patterns "b" and "c" indicate a net force because they represent acceleration!

3.) While driving in a car at a constant speed, you drop your Wawa hoagie on the floor. From your point of view it drops straight down. What would its path look like from a pedestrian on the street?



Due to inertia, the hoagie will retain its constant speed, so from the pedestrians point of view the path would look like this.



4.) When a car gets rear-ended, people in the vehicle can end up with neck injuries. You might want to say that their head jerked backwards, but what really happens? (1st law: Objects want to retain their state of motion unless a net force is applied.)

It's not so much that their head jerked backwards, it's that their body got jerked forwards and their head was left behind. Remember, objects that are already at rest want to remain at rest. Their head wasn't moving so when they got rear-ended, that force from the seat pushed their body forward, but if they don't have a headrest, their head will not move forward, it will stay where it is. The head doesn't jerk backwards, the body jerks forwards and the head doesn't. **MAKE SURE YOUR HEADREST IS UP WHEN DRIVING!**

5.) Look at the "Seatbelt vs No Seatbelt" video.

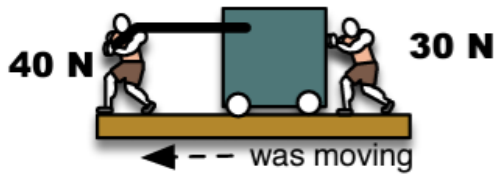
a.) When the car crashes, what happens to the unbelted dummy? How does the 1st law relate here?

The dummy was moving with the car. When the car abruptly stopped, the dummy didn't stop. This relates to the first law because the dummy wants to continue moving at the same speed it was moving before it crashed, and this is why the dummy flew forward and through the windshield.

b.) In terms of the 1st law, what is the role of the seatbelt?

The seatbelt provides that force you need to stop your motion before you fly through the windshield. The seatbelt slows your body while the airbag will slow your head. **WEAR YOUR SEATBELT!**

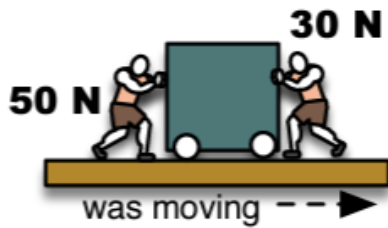
6.) For the following situations, determine the net force, and if the object will speed up, slow down, be stationary, or move with a constant speed.



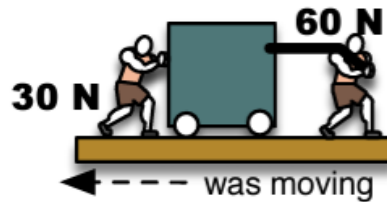
Net force is 70N and it's speeding up!



Net force is zero and it's stationary

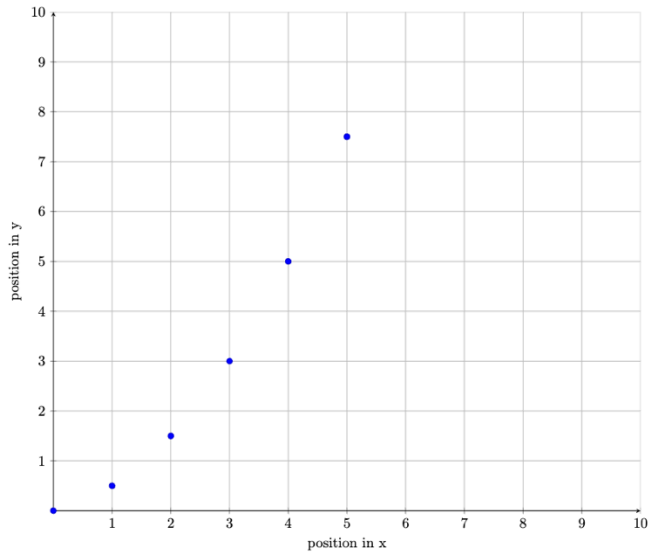


Net force is 20N and it's speeding up!

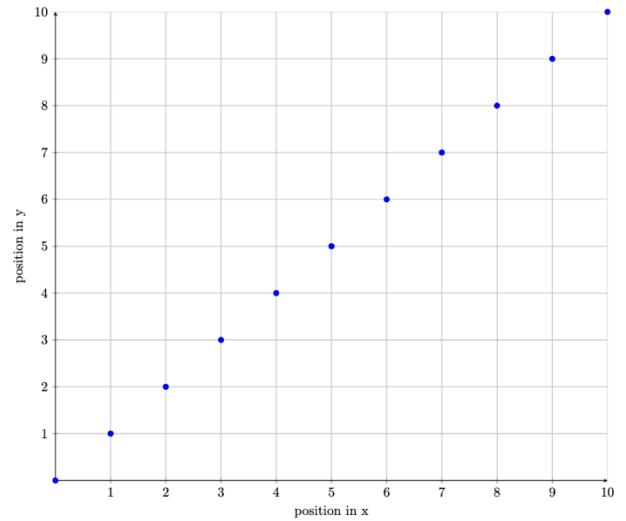


Net force is 90N and it's slowing down

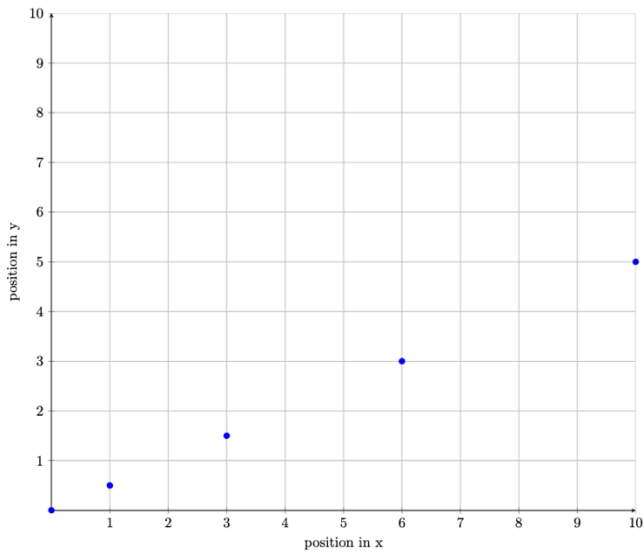
7.) Which direction(s) are experiencing an acceleration in the following scenarios?



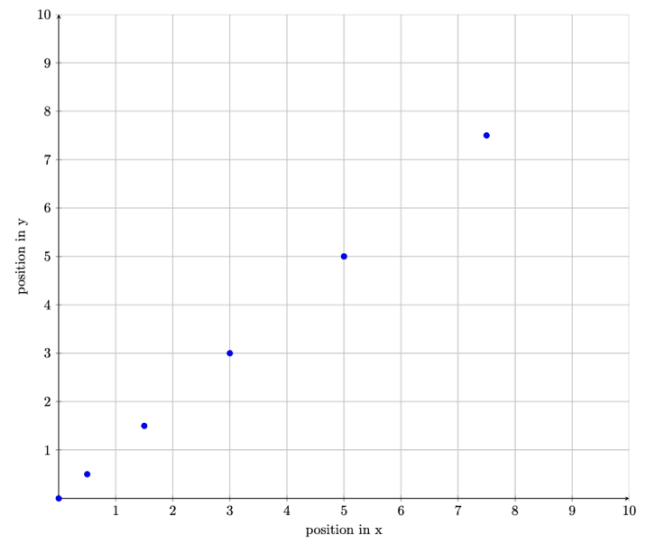
x-direction
y-direction
Both x and y
Neither



x-direction
y-direction
Both x and y
Neither



x-direction
y-direction
Both x and y
Neither



x-direction
y-direction
Both x and y
Neither