

Newton's 1st law Part 2 CFU:

Types of Forces:

1. Complete the following table showing the relationship between mass and weight.

Object	Mass (kg)	Weight (N)
Melon	1 kg	
Apple		0.98 N
Pat Eatladee	25 kg	
Fred		980 N

2. Different masses are hung on a spring scale calibrated in Newtons.

- a. The force exerted by gravity on 1 kg = 9.8 N.
- b. The force exerted by gravity on 5 kg = _____ N.
- c. The force exerted by gravity on _____ kg = 98 N.
- d. The force exerted by gravity on 70 kg = _____ N.




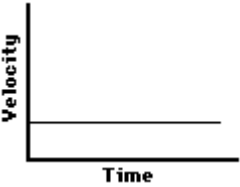
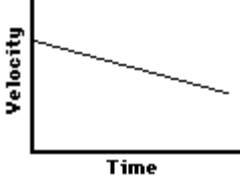

3. When a person diets, is their goal to lose mass or to lose weight? Explain

Free Body Diagrams

1. A flying squirrel is gliding (no *wing flaps*) from a tree to the ground at constant velocity. Consider air resistance. Diagram the forces acting on the squirrel. A rightward force is applied to a book in order to move it across a desk with a rightward acceleration. Consider frictional forces. Neglect air resistance. Diagram the forces acting on the book.
2. A rightward force is applied to a book in order to move it across a desk at constant velocity. Consider frictional forces. Neglect air resistance. Diagram the forces acting on the book.
3. A college student rests a backpack upon his shoulder. The pack is suspended motionless by one strap from one shoulder. Diagram the vertical forces acting on the backpack.
4. A skydiver is descending with a constant velocity. Consider air resistance. Diagram the forces acting upon the skydiver.
5. A force is applied to the right to drag a sled across loosely-packed snow with a rightward acceleration. Diagram the forces acting upon the sled.
6. A football is moving upwards towards its peak after having been *booted* by the punter. Diagram the forces acting upon the football as it rises upward towards its peak.
7. A car is coasting to the right and slowing down. Diagram the forces acting upon the car.

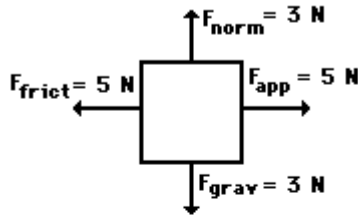
Determining Net Force

Combine your understanding of acceleration and the newly acquired knowledge that a net force causes an acceleration to determine whether or not a net force exists in the following situations.

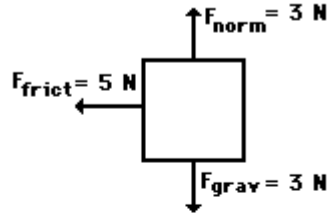
Description of Motion	Net Force: Yes or No?
..... 	
..... 	
..... 	
	
	
	

1. Free-body diagrams for four situations are shown below. For each situation, determine the net force acting upon the object.

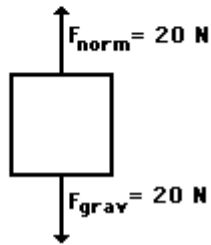
Situation A



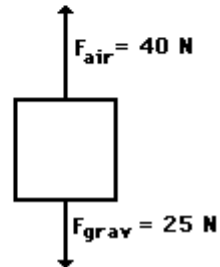
Situation B



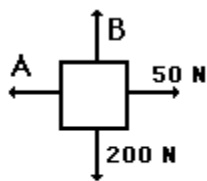
Situation C



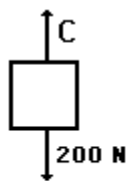
Situation D



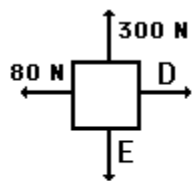
2. Free-body diagrams for four situations are shown below. The net force is known for each situation. However, the magnitudes of a few of the individual forces are not known. Analyze each situation individually and determine the magnitude of the unknown forces.



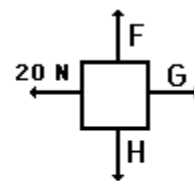
$F_{net} = 0 \text{ N}$



$F_{net} = 900 \text{ N, up}$



$F_{net} = 60 \text{ N, left}$



$F_{net} = 30 \text{ N, right}$

