Forces, FBD and Net Force

AHS Physics

What's a Force?

A force is a push or a pull on an object.

Measured in Newtons (N) and is a vector.

2 Types:

- Contact Force
- At-a-Distance Forces

The Big 7 Forces

Friction Force

- Force exerted when an object moves across it
- Often is opposite of movement

Tension

- Transmitted through a rope, string, etc.
- Pulls equally on the object opposite the rope

Normal Force

- Support force
- Object must be on another object
- Perpendicular to the surface of an object

Air Resistance

- Acts on objects traveling through air
- Often opposite of the motion

Applied Force

- Force applied to an object by a person or another object

Spring Force

- Force exerted by a compressed or stretched spring

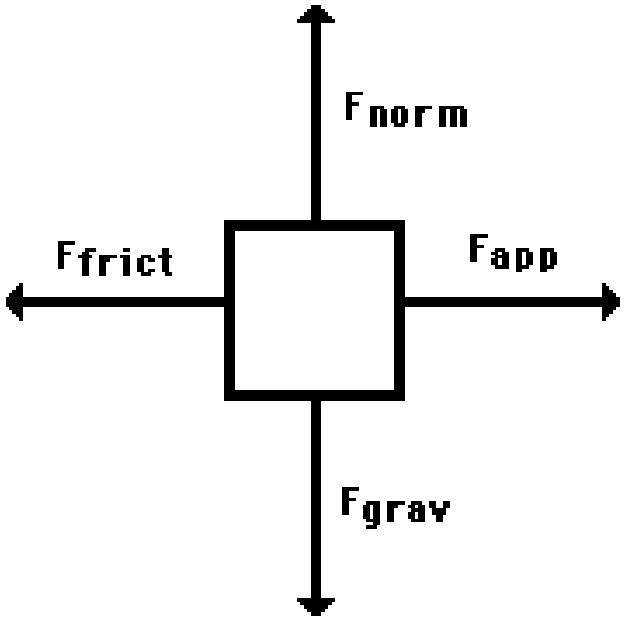
Gravity

- The force that attracts object
- Always present, always down
- At a Distance Force

Free Body Diagram

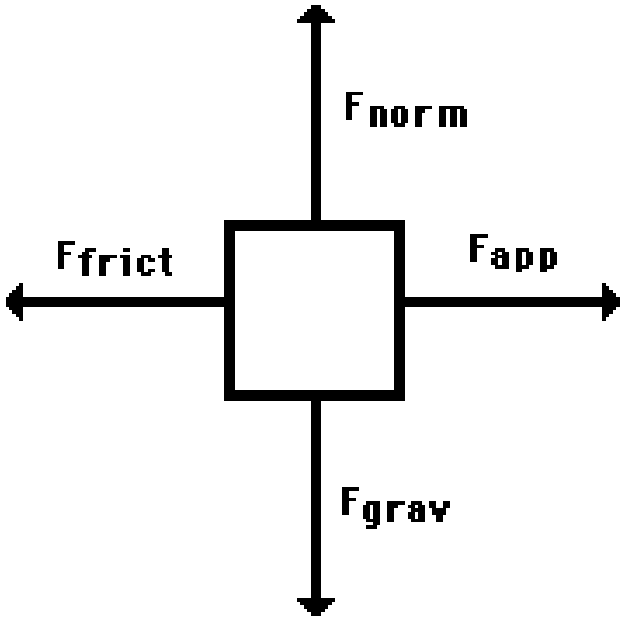
-Vector Diagram that shows all the forces acting on an object

-Needs to include all forces acting on an object



Free Body Diagram Instructions

1) Create a box for the object
2) Go through each of the forces- is it present? (Gravity is always present, down)
3) If present, create an arrow and direction to represent.



Free Body Diagram Practice

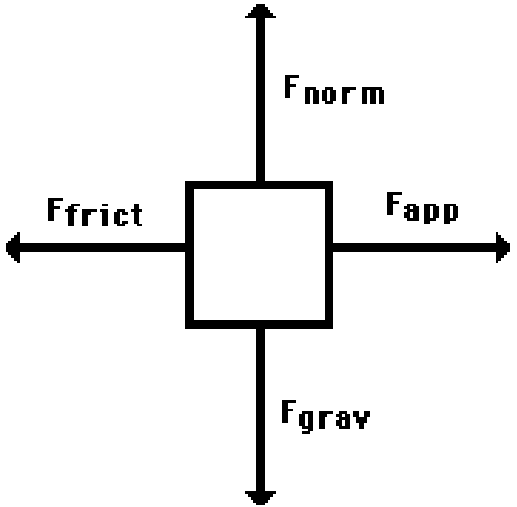
A car sits in a parking lot.

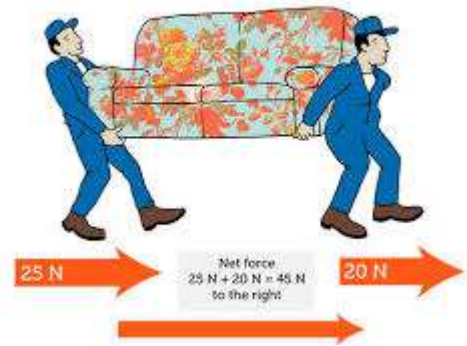
A box is pushed across the floor by two friends.

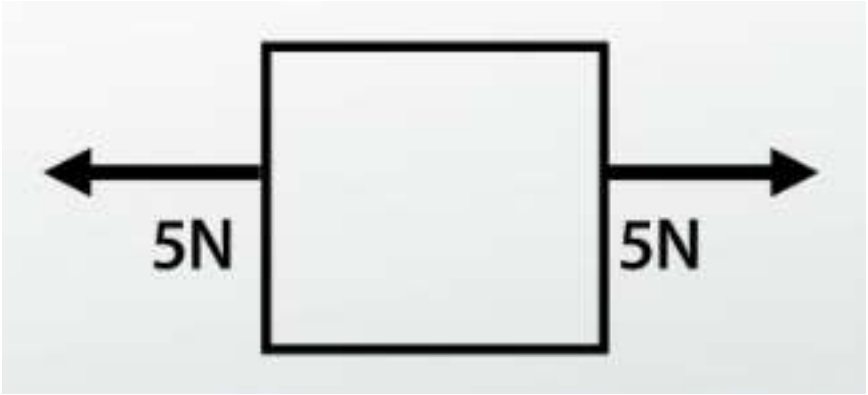
A ball is thrown straight upward.

A box is sitting on a ramp.

Net Force


Fnorm
Ffrict
Fapp
Fgrav

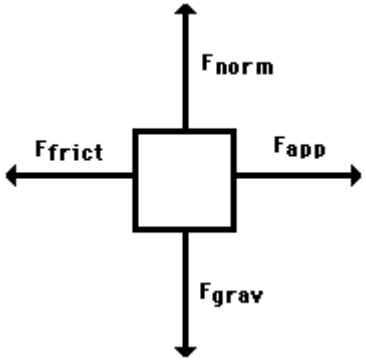

25 N
Net force
25 N + 20 N = 45 N
to the right
20 N


5N
5N

The 2 Situations

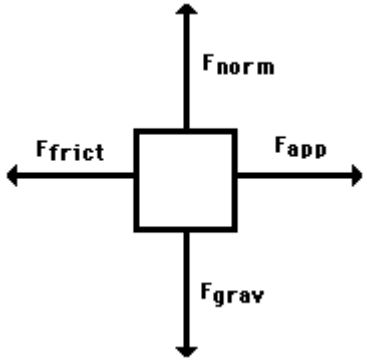
Object at rest or constant velocity:

Net Force = 0



Object accelerating:

Net Force = ma



A 10 kg box is pushed with 10 N to the right and friction pushes back with a force of 4 N. What is the acceleration of the box?