

Newton's First Law:
aka: Law of

EN _____

- An object at rest stays at rest and an object in motion stays in motion unless acted upon by an unbalanced force.



<http://www.physicsclassroom.com/mmedia/newtlaws/cci.cfm>

_____ is directly related to _____

- The greater the mass the greater the tendency to resist change of an object's motion.

an _____ is a f.o.r. in which the law of inertia holds true.

IRF's or NOT???

- a car moving with constant velocity
- the Earth
- a bus that is slowing down
- a skier that is going downhill
- a person on a merry go round
- a skateboard rolling on a level sidewalk

So what is a "Force" anyway? push or pull that one object exerts on another

Forces of Nature:

1) _____ ; attraction between masses
examples:

2) _____ :
examples:

3) _____ : Helps to explain atomic collisions

4) _____ : binds atoms nuclei together

How do represent forces?

1. as vectors (measured in terms of direction and magnitude)
measured in _____ (N) = kg x m/s²

2. Free Body Diagrams

a.

b.

1.

2.

3.

4.

5.

Draw a picture of the book sitting on the desk. Identify all the forces acting on it.

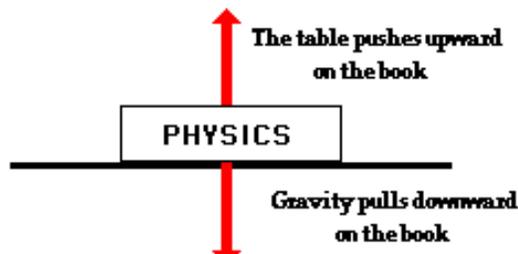
Ex. Palmer throws the football to McFadden

Force can cause change in an object' s motion

Balanced Forces	Unbalanced Forces
Net Force	

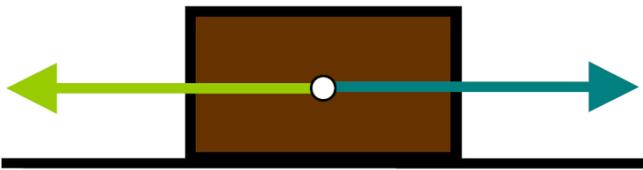
_____ : if the net force on an object is zero The object will either be at rest or at a constant velocity.

The forces on the book are balanced.



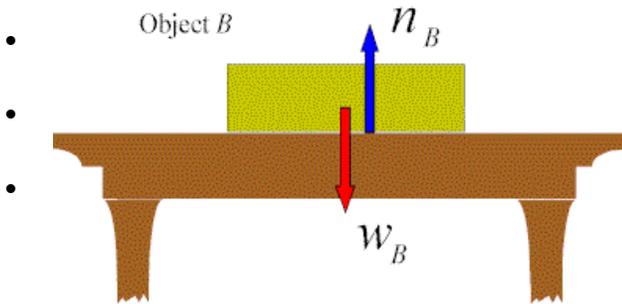
At Constant Velocity:

$F_{\text{applied}} =$ _____



Would you expect the object to accelerate?

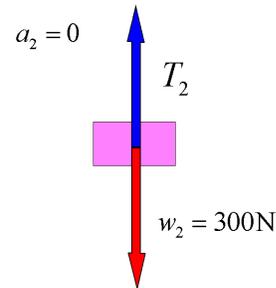
Free Body Diagrams



- Forces are represented by arrows called _____.
- This diagram shows 2 forces,
 - _____
 - _____

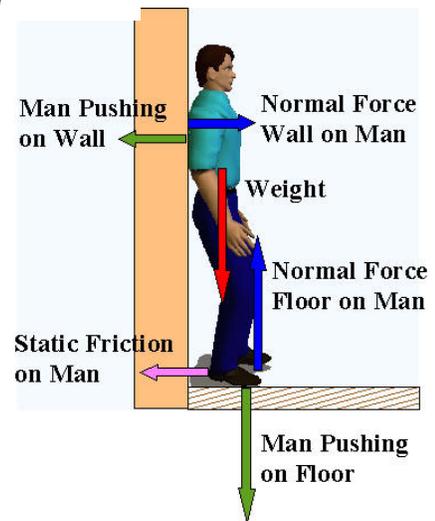
What is the tension (force) in the string holding up the weight?

Are the forces balanced?



Weight is a _____:

- You push on the Earth with a force called _____
- We can measure force in _____ (or pounds etc).
- Your weight depends on your _____ and the distance from the center of gravity of the earth

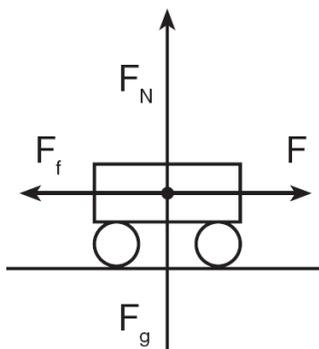


Normal Force(F_n)

- The normal force is the reaction of the surface to the action or push of the object over the surface.

The magnitude of the normal force is equal to the magnitude of the push against the surface exerted by the object.

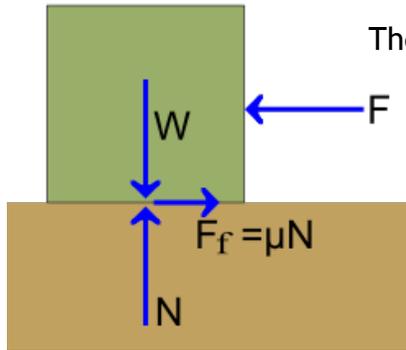
Is there a net force?



If the object is moving to the right, what would you expect to happen over time?

Is there a net force?

Describe the velocity of the cart.

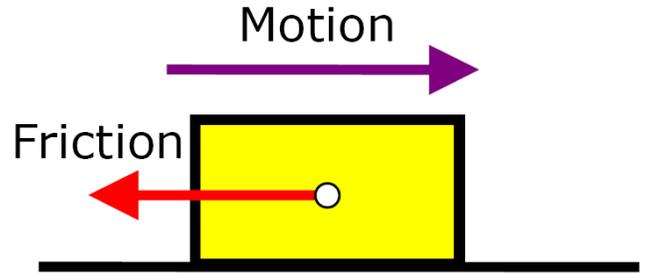


_____:
 The contact force that acts to oppose sliding motion between surfaces.
 Parallel to the surface Opposite the direction of sliding

_____:
 The contact force exerted by a surface on an object. Perpendicular to and
 away from the acceleration of the object barring any resistive forces.

Friction Force (F_f)

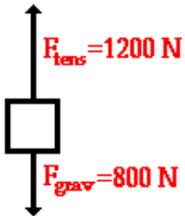
_____ force vector
 always drawn _____



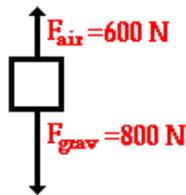
Practice some free body diagrams practice: Calculate Net Force

What is the F_{net} ?

F_{net} is 400 N, up



F_{net} is 200 N, down



F_{net} is 20 N, left

