Normal (Support) Force

by
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Definitions

Normal Force or Support Force: It is the force pushing two surfaces in contact together. It acts at right angles (perpendicular) to the surface.

Normal means perpendicular to the surface.

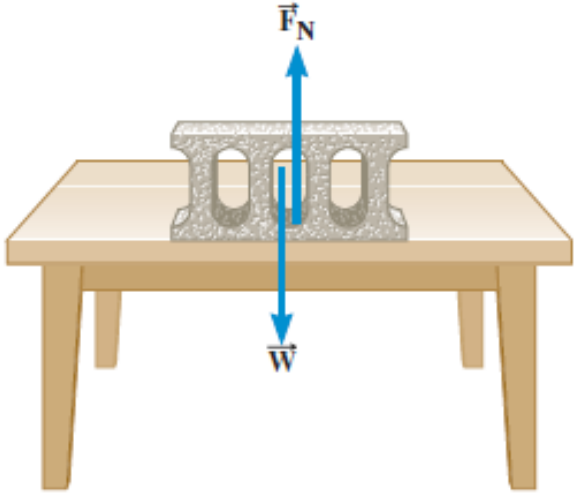
Weight: is the earth's gravitational force on the object.

Equilibrium: An object is in equilibrium when it has zero acceleration. The F net acting on it is zero.

$$F_{net} = m \times a.$$

Normal (Support) Force and Equilibrium

This is block resting on a table.



Two forces act on the block:

1) Its weight W pushes down on the table with a force = W.

2) The surface of the table pushes up with a force called the normal force F_N in the opposite direction (up).

Suppose the upward direction is the positive direction.

$$F_N = -W$$

If the weight W of the block = -10N, then the normal force F_N = 10 N.

Net force = some of all the forces

F net = F_N + W = 10-10 = 0.

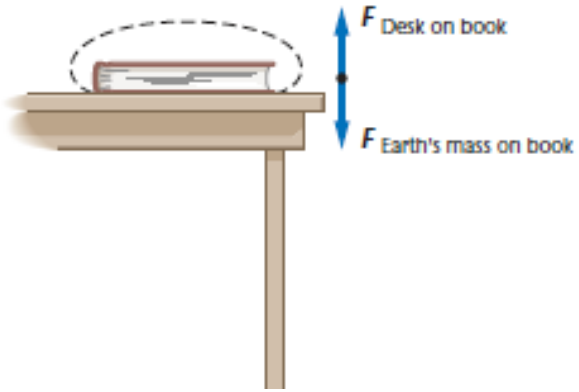
The block is resting at the table. F net acting on it is zero. So, the block is not accelerating at the table. We say that the block is in equilibrium.

Practice Problem;

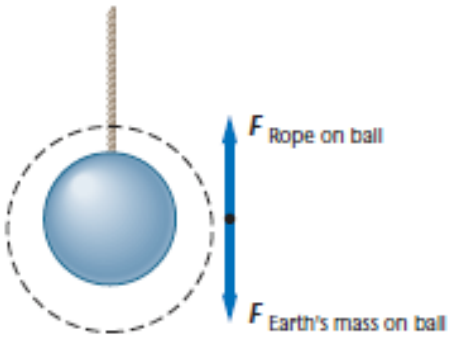
Answer questions **1, 2 and 3.**

1. For each of the situations below, identify the normal force, the weight and the net force. Use the net force and explain why these ***objects are in equilibrium***. You can use the table below as a guide. (Neglect the dashed circles around the object)

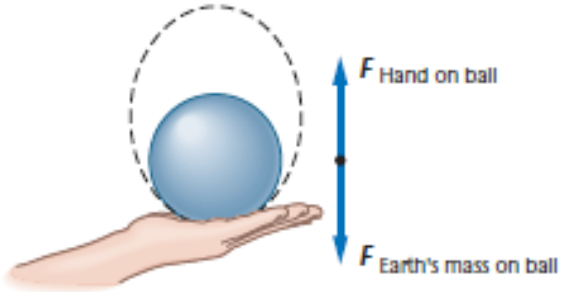
Book on desk



Ball hanging from rope



Ball held in hand



Situation	Normal Force (F_N)	Weight (W)	Net Force (F net)	Equilibrium, Why?
Book on Desk				
Ball hanging from a rope				
Ball held in hand				