

Types of Forces

What is a force?

- A force is a push or pull acting upon an object as a result of its interaction with another object.

Types of Forces

There are a variety of force types were placed into two broad category headings on the basis of whether the force resulted from the contact or non-contact of the two interacting objects.

Contact Forces

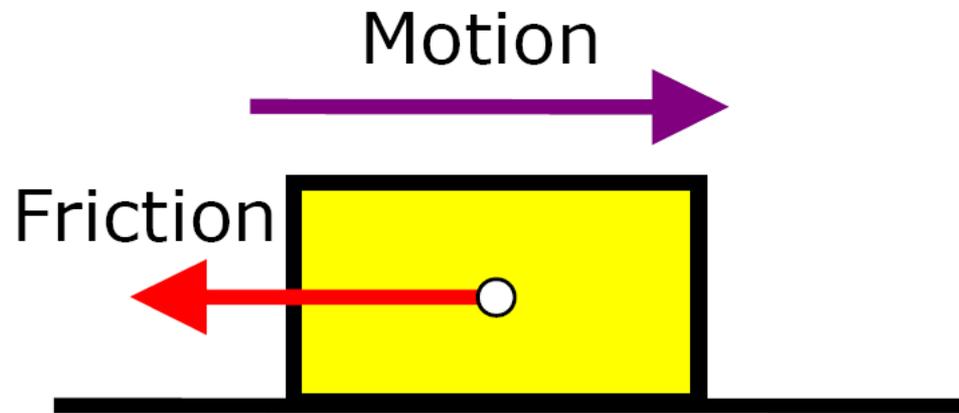
- Frictional Forces
- Tension Forces
- Normal Force
- Air Resistance Force
- Applied Force
- Spring Force

Action-at-a-Distance Forces

- Gravitational Force
- Electrical Force
- Magnetic Force

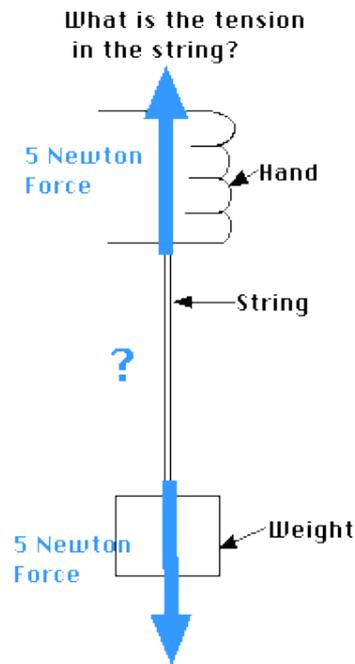
Frictional Forces

- The **friction force** is the force exerted by a surface as an object moves across it or makes an effort to move across it. There are at least two types of friction force - **sliding** and **static friction**. Though it is not always the case, the friction force often opposes the motion of an object.



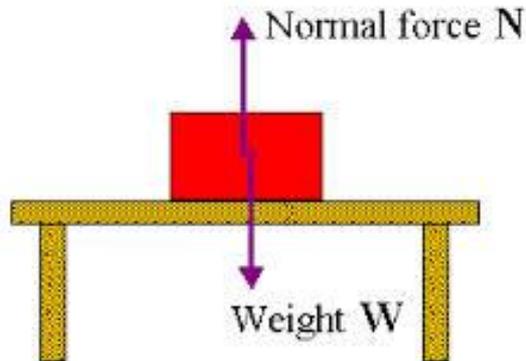
Tension Forces

- The tension force is the force that is transmitted through a string, rope, cable or wire when it is pulled tight by forces acting from opposite ends.



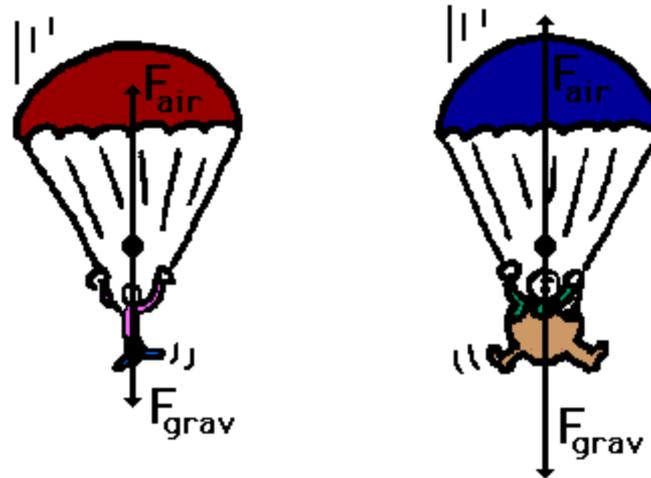
Normal Force

- The normal force is the support force exerted upon an object that is in contact with another stable object.



Air Resistance Force

- The air resistance is a special type of frictional force that acts upon objects as they travel through the air. The force of air resistance is often observed to oppose the motion of an object.



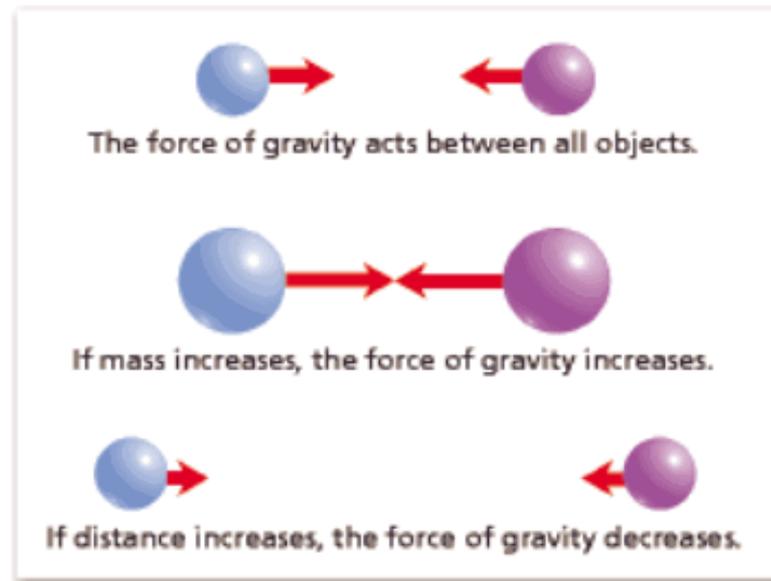
Applied Force

- An applied force is a force that is applied to an object by a person or another object. If a person is pushing a desk across the room, then there is an applied force acting upon the object. The applied force is the force exerted on the desk by the person.



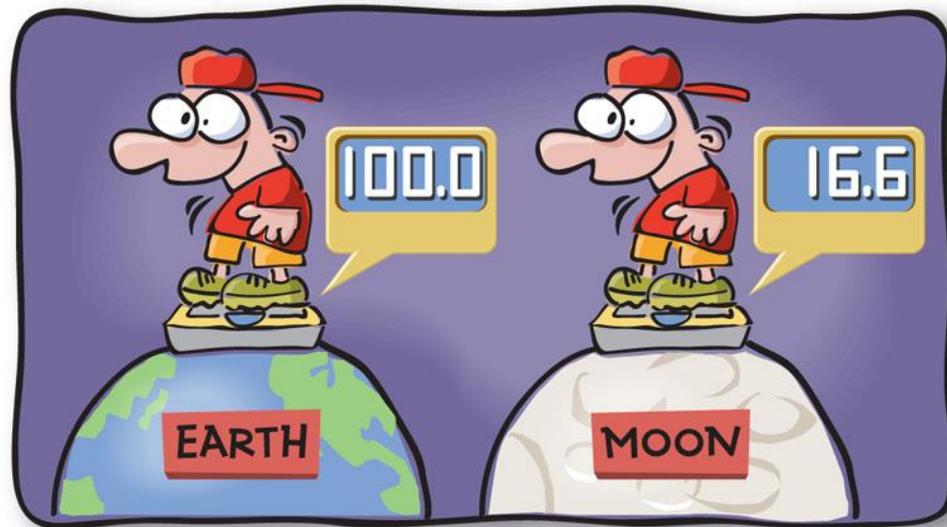
Gravitational Force (Aka Weight)

- The force of gravity is the force with which the earth, moon, or other massively large object attracts another object towards itself. By definition, this is the weight of the object.



Confusion of Mass and Weight

- The force of gravity acting upon an object is sometimes referred to as the **weight** of the object. The **mass** of an object refers to the amount of matter that is contained by the object; the weight of an object is the force of gravity acting upon that object.



Mass vs Weight

- **Weight** is measured in **Newtons (N)**.
 - Values can change from location to location.
- **Mass** is measured in **Kilograms (Kg)**.
 - Constant. Does not change from location to location.

How do I calculate for weight?

$$\text{Force}_{\text{grav}} = \text{mass} \times \text{gravity}$$

$$\text{N} = \text{kg} \times 9.81 \text{ m/s}^2$$

Sample Problem 1

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



Sample Problem 2

Object	Mass (kg)	Weight (N)
Melon	1 kg	?
Mike	?	980 N

$$F_{\text{grav}} = \text{mass} \times \text{gravity}$$