

FORCE

Definitions :

A force is ...

1. a push or a pull in a particular direction.
2. an interaction between **two** objects, since every force is exerted **BY** one object **ON** another object, **in** a particular direction.

The unit of force is the **Newton, N** (named after Sir Isaac Newton)

Forces are measured with a **spring balance** (sometimes called a Newton balance)

Newton investigated the relationship between forces and motion. His discoveries are summarised as three laws.

Newton's 1st Law

Objects will only accelerate if an unbalanced force acts on them

Newton's 3rd Law

If X exerts a force on Y, then Y exerts a force on X that is equal in size, but opposite in direction.

Newton's 2nd Law

$$F = m.a$$

We cannot see forces directly, instead we observe the effects that they produce.

Effects include :-

1. Causing a change in motion...stopping, starting, speeding up, slowing down, changing direction – all described by the term **-ACCELERATION**
2. Causing rotation
3. Causing distortions in shape and size.

There are two groups of forces ...contact forces & forces that 'act at a distance'.

Contact forces include :-

1. Friction
2. Air resistance
3. Normal (surface)
4. Tension
5. Upthrust (buoyancy)

Forces that 'act at a distance' are:-

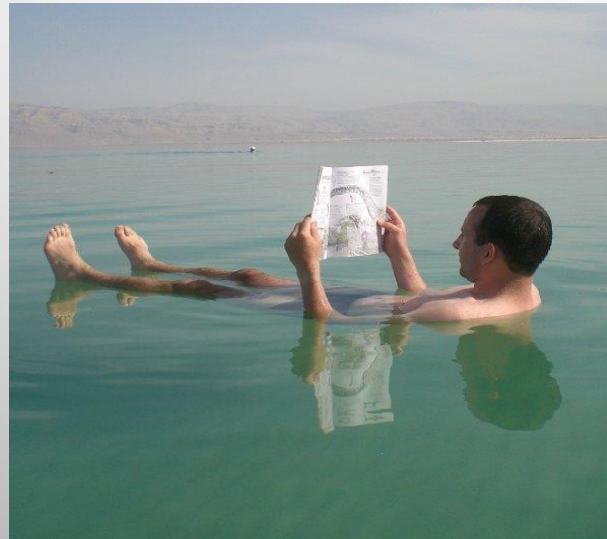
1. Gravitation
2. Electrostatic
3. Magnetic

'Distance' forces are associated with **fields**

Forces transfer energy by doing mechanical work.



Examples



Identifying Forces

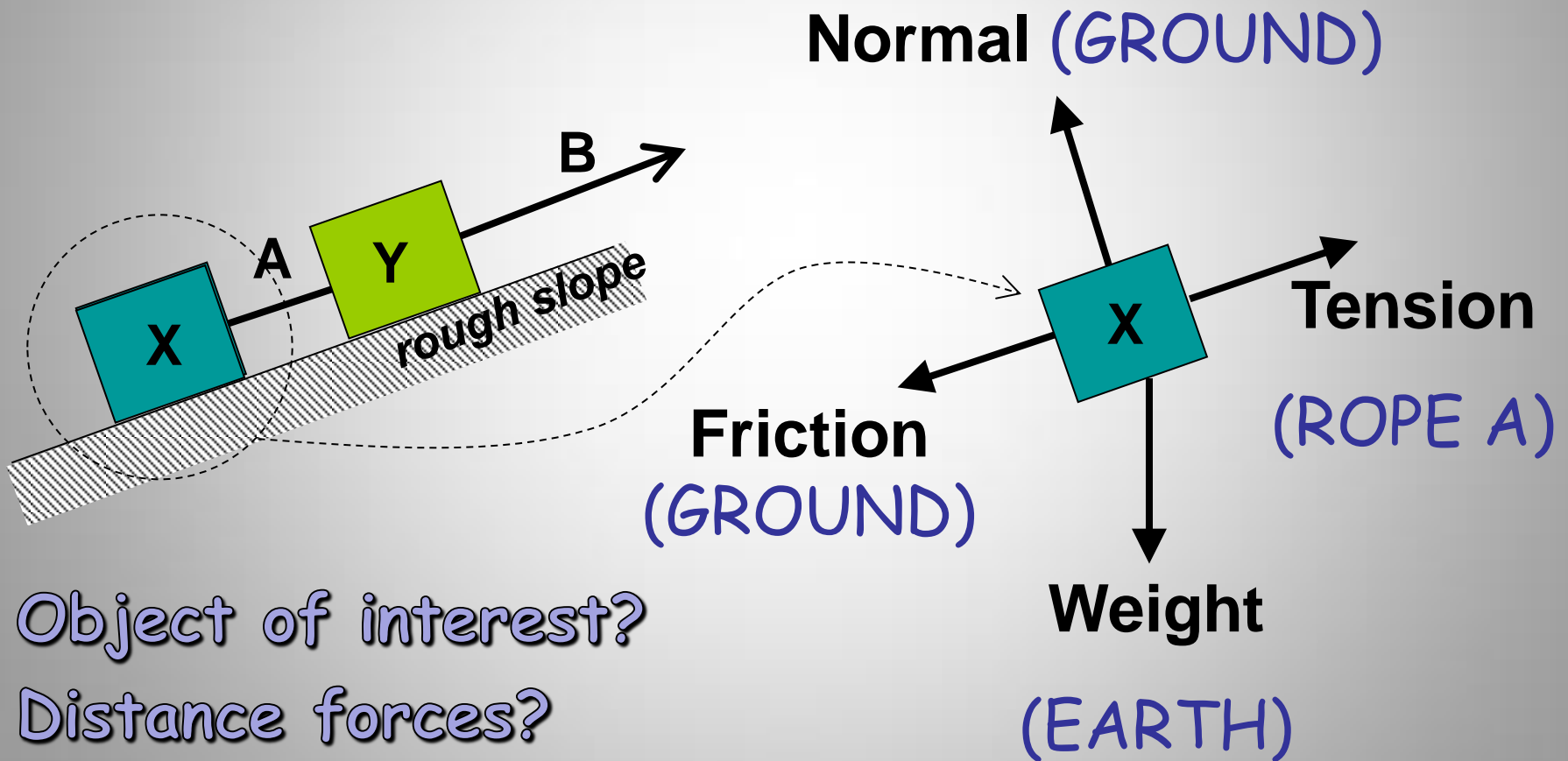
Every force is exerted BY one object ON another object.

The force is always exerted in a particular direction.

- What object is the force exerted on?
 - What object is exerting the force?
 - In what direction is the force exerted?
 - What is the name of the force?

Example:

Block X and Y are connected with a rope A. They are being pulled up a rough slope with a second rope B.



Object of interest?

Distance forces?

Contact forces?

Identify all the forces acting on the hot air balloon. The balloon is floating and is stationary.

Answer:

