

# An Introduction to Forces

## SPH4C

A **force** is a \_\_\_\_\_ or a \_\_\_\_\_.

It is a \_\_\_\_\_ quantity and is symbolized by:

In the SI system, force is measured in \_\_\_\_\_:

**Applied Force** is a general term for any \_\_\_\_\_ force, e.g.

**Tension:**

the force exerted by \_\_\_\_\_.

The tension along a string is \_\_\_\_\_.

**Friction:**

the force acting \_\_\_\_\_.

Static friction: the force that prevents \_\_\_\_\_

\_\_\_\_\_ friction: the force that acts against an object's motion

Air resistance (drag): friction on an object moving through air  
(many physics problems with neglect this)

**Normal Force :**

the force acting \_\_\_\_\_.

i.e. if you push on a wall, \_\_\_\_\_

\_\_\_\_\_

There exist forces for which contact between objects is not necessary. These forces are

called \_\_\_\_\_.

One example is \_\_\_\_\_ force, the force of attraction between *all*

objects with \_\_\_\_\_.

(The gravitational force the Earth exerts on an object is called its \_\_\_\_\_).

Usually an object will have more than one force acting upon it.

A \_\_\_\_\_ (FBD) shows **all** the forces acting on an object  
– and **only** the forces acting on the object.

A representation of the object is drawn in the \_\_\_\_\_ of the diagram and the  
forces acting on it are drawn as arrows pointing \_\_\_\_\_.

The arrows must be \_\_\_\_\_!

Example 1: A ball is falling downward through the air. Draw a FBD for the ball.

Example 2: A book is being pushed rightward across a table. Draw a FBD for the book.



## More Practice

1. Draw a free-body diagram for each of the following objects:

(a) A car engine being lifted from a car by a rope attached to a pulley

(b) an car moving with constant velocity on a level road

(c) an apple hanging from a tree branch

(d) a skydiver being slowed by a parachute

2. Ms. Rosebery is pulling across level snow a sled on which is sitting her daughter Ivy. Tied to the back of Ivy's sled is another tiny sled on which Ivy's baby doll is sitting. Draw the free-body diagrams for:

(a) Ms. Rosebery

(b) Ivy

(c) Ivy's sled

(d) Ivy's doll's sled