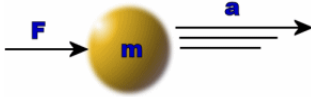


## Newton's 2nd Law

### Objective:

Introduce Newton's 2nd Law.

Differentiate between weight & mass.



## Newton's 2nd Law

- Outside force needed to cause a change in motion. (overcome inertia)
- Applying a  $F_{Net}$  on a mass, accelerates it.

equation:  $F_{Net} = m \cdot a$   
 units:  $N = kg \cdot m/s^2$

## Newton's 2nd Law

What is the relationship between force, mass and acceleration?

$a \sim F_{Net}$  *direct relationship*

$a \sim 1/m$  *inverse relationship*



## FBD

Mass = 1 kg

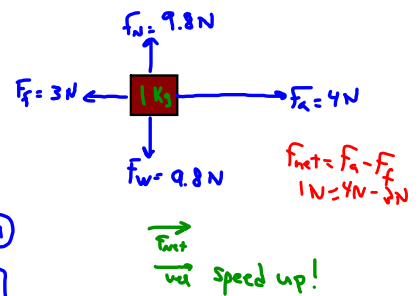
$F_{net} = ma$

$F_{net} = 1N$   
 $m = 1kg$

$F_{net} = ma$

$1N = 1kg \cdot a$

$a = 1m/s^2$



## FBD

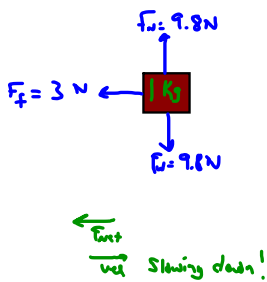
Mass = 1 kg

$F_{net} = ma$

$F_{net} = -3N$   
 $m = 1kg$

$-3N = 1kg \cdot a$

$a = -3m/s^2$



## $F = m \cdot a$ Applied to Gravity

- Acceleration of Gravity ( $m/s^2$ )

rate at which falling objects speed up depends on the planet

Earth =  $-9.8 m/s^2$   
 Moon =  $-1.6 m/s^2$

Assignments . . .



- Begin Chapter 4 HW #1 - 10

