## شكراً لتحميلك هذا الملف من موقع المناهج الإماراتية

## ملخص ومراجعة ثانية الدرس الأول Motion and Force القوة والحركة



تاريخ نشر الملف على موقع المناهج: 2024-02-14 08:17:40 | اسم المدرس: Marey Ahmed

## التواصل الاجتماعي بحسب الصف التاسع المتقدم


## روابط مواد الصف التاسع المتقدم على تلغرام

| التربية الاسلامية | اللغة العربية | اللغة الانجليزية | الرياضيات |
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## المزيد من الملفات بحسب الصف التاسع المتقدم والمادة فيزياء في الفصل الثاني

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|---|---|
| 1 | ملخص ومراجعة ثانية الدرس الأول Motion and Force القوة والحركة |
| 2 | ملخص ومراجعة الدرس الأول Motion and Force القوة والحركة |
| 3 | ملخص الوحدة الرابعة Forces القوى |
| 4 | حل مراجعة الوحدة الخامسة in Forces and Displacement بعدين في والقوى الإزاحة Two Dimension |

| المزيد من الملفات بحسب الصف التاسع المتقدم والمادة فيزياء في الفصل الثاني | |
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| 5 | مراجعة الوحدة الرابعة Dimension One in Forces القوى في بعد واحد |

LESSON 1

# FORCE AND MOTION

## Newton's first law and inertia

***Newton's first law*** : **if the object at rest it will remain at rest when the net force on the object equals zero , and if the object move with constant speed it will remain move with constant when the net force on the object equals zero**

- **Two situations for the net force on the object equals zero**
  1- **If the object at rest ($v = 0 \ so \ a = 0$ )**
  2- **If the object move with constant speed ( $v \ constant \ so \ \Delta v = 0 \ and \ a = 0$)**
- **The object at equilibrium state when $F_{net} = 0$ , $a = 0$**
- **Two kinds of equilibrium**
  1- **static equilibrium when the object at rest (no motion)**
  2- **kinetic equilibrium when the object move with constant speed**
- **Inertia is the Tendency of an object to resist change in velocity ( the object doesn't want to change its motion)**



Mr / Ahmed Marey

Q1) Which one move difficulty ( chair or table )?

**Table, because it has a big mass so big inertia and difficult to change its motion so difficult to move**

Q2) If your father drive the car with constant speed and you sit inside the car what will happen for you in each situation ?

a) If your father press on the race (speeding up )

**You will go backward because you still has inertia but the car's inertia gone**

b) If your father press on the brake (slowing down)

**You will go forward because you still has inertia but the car's inertia gone**

c) If the car still move with constant speed

**You will not move in the car because you and the car still have inertia**

# Newton second law:

States that: The acceleration of an object is **directly** proportional to the net **force** and **inversely** proportional to the **mass** of the object.

From Newton's second law we can say:
- If the force increases, acceleration increases.
- If the mass increases, acceleration decreases

$$a = \frac{\sum F}{m}$$

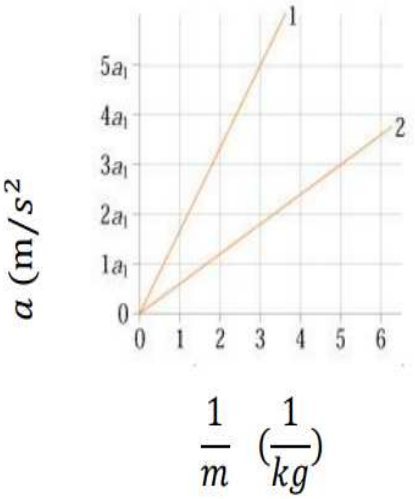
Newton's second law can be expressed mathematically by the formula:

$$\sum F = F_{net} = ma$$

| | |
|---|---|
| m: mass | SI unit: kg |
| a: acceleration | SI unit: $m/s^2$ |
| F: force | SI unit: N |

$N \equiv kg.m/s^2$

**Q3) look to the graph and answer the following question**




**1) Which quantity in physics shows the slope ?**

Slope = $\frac{a}{\frac{1}{m}} = a\,m = F_{net}$ *equation* Slope = $F_{net}$

**2) Which one (1 or 2) has a big net force ?**

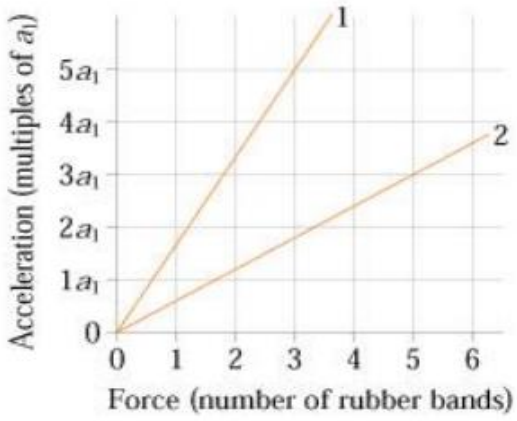
**1 because it has the steeper line so it has the biggest slope and there is a linear proportional between slope with net force**

$\theta_1 > \theta_2$

$slope_1 > slope_2$

$F_{net\,1} > F_{net\,2}$

**Q4 ) look to the graph and answer the following question**




**1) Which quantity in physics shows the slope?**

Slope = $\frac{a}{F_{net}} = \frac{1}{m}$ *equation*

Slope = $\frac{1}{m}$

**2) Which one (1 or 2) has a big mass ?**

**2 because it has the lowest slope but there is an inversely proportional between slope and mass**

**Q5) What will happen for the inertia if the mass increase twice?**

**It will increase twice (linear proportional)**

**Q6) What will happen for the acceleration if the mass increase twice?**

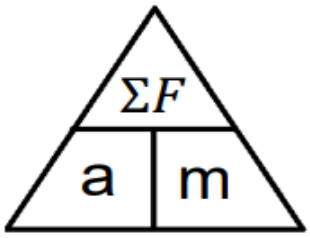
**It will decrease to half (inversely proportional)**

**Q7) What will happen for the acceleration if the net force (F net) increase twice ?**

**It will increase twice (linear proportional)**

EX 1 :

If the mass of a plane is 2000 Kg and the net force on it is 16000 N, what is the plane's acceleration?




EX 2 :

What is the net force on a car with a mass of 800 kg if its acceleration is 2 $m/s^2$?

EX 3 :

A wagon is being pulled by a horse. What is the wagon's mass if the net force on the wagon is 500 N and it has an acceleration of 2 $m/s^2$?

EX 4 :

the engine force is 4100 N and friction force is 100 N. If the car's mass is 1000 kg, find the car's acceleration.

EX 5 :

A 1000-kg car accelerates from 10 m/s to 26 m/s in 8 s. Calculate the net force acted on the car during that time.

EX 6 :

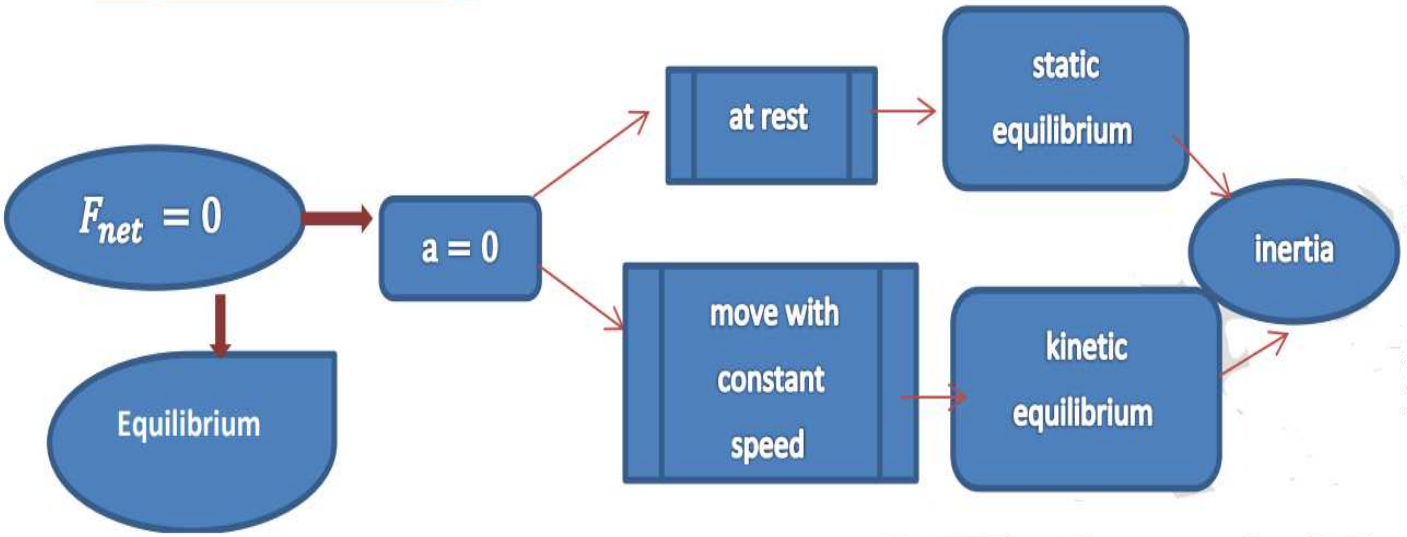
A 3000-kg truck is at rest. If a net force of 6000 N exerted on the truck for 10 s, what will be the trucks speed after the 10 s?

**Q1:** If the mass of a plane is 500 Kg and the net force on it is 1200 N, what is the plane's acceleration?

**Q2:** What is the net force on a car with a mass of 600 kg if its acceleration is 3 $m/s^2$?

**Q3:** A 2000-kg truck is at rest. If a net force of 4000 N exerted on the truck for 10 s, what will be the trucks speed after the 10 s?

## Important summary:




### Uniform Motion

no net force on object

no acceleration

velocity is constant or zero

described by 1st law

equilibrium

uniform motion

$F = 0$
$a = 0$
$v = 0 \ or \ \ v = const.$

### Non Uniform Motion

there is net force on object

there is acceleration

velocity is changing

described by 2nd law

$F = ma$
$a \neq 0$
$v: changing$