Physics

Changes in momentum

- **A force can change the momentum of an object**
- **If the force is bigger the momentum changes faster**

Force cause changes in momentum

Force acting for some time changes the momentum

- **When a force acts on object for sometime it changes the objects momentum**

Newton's second law explain this

A force causes acceleration

F = ma

Acceleration means

a= change in velocity / time

So ,

Force = mass x change in velocity / time

Mass x change in velocity = change in momentum

Force = change in momentum / time

F = mv - mu / t

If Momentum changes quickly then the force is very big

If the time is small the force is large

- **example in a car crash Momentum changes very fast and it is a big force so there is more injury**

Momentum change also means acceleration change

- **If velocity changes acceleration happens**
- **Force = mass x acceleration**
- **So if acceleration is big speed changes fast and force needed is big**

Conservation of momentum and Newton's third law

Momentum before collision = Momentum after collision

Momentum example on the notes
Do revise that

Stopping distance and reaction Times

Stopping distance= thinking distance + breaking distance

Thinking distance

The distance the car travels while the driver reacts is the thinking distance

It is affected by

- reaction time
- Tiredness
- Alcohol
- Drugs
- Destruction
- speed

Braking distance

Distance after breaks are pressed

It is affected by

- Speed
- mass of car
- brakes condition
- grip friction between the tire and Road

Low friction happens when

- road is Icy
- road is wet
- road is dirty
- tires are bad

Example situation

a mother driving kids early morning

thinking distance

kids district her she reacts slover

breaking distance

road may have ice or leaves so it has less friction

Ruler Drop experiment

- Sit with arm on table
- someone holds ruler between your fingers
- they drop ruler without warning
- you catch it as fast as you can
- the number where you catch it is equal to the distance ruler fell
- if there is a more distance that will be equal to slower reaction

Can calculate reaction time using equations because ruler accelerates due to gravity

Energy stores

- Energy can be stored in different ways in objects
- There are eight types of energy stores you must know

The eight energy stores

1. kinetic energy Store
2. Thermal energy Store
3. chemical energy Store
4. gravitational potential energy Store
5. elastic potential energy Store
6. electrostatic energy Store
7. magnetic energy Store
8. nuclear energy Store

Kinetic energy Store

- anything that is moving has kinetic energy
- if there is faster movement so there will be more kinetic energy

Thermal energy Store

anything that has heat

hotter objects have more thermal energy

Chemical energy Store

found in food fuel and batteries

when chemical reaction happens this energy is released

Gravitational potential energy Store

- anything that is high above the ground has this energy
- if it can fall it has gravitational potential energy

elastic potential energy Store

- anything stretched or scratched springs rubber bands have the synergy

electrostatic energy Store

- when charges attract or repel

magnetic energy Store

- one magnets attract or repel

Nuclear energy Store

- energy inside atoms
- released in nuclear reactions