Speed, Distance, Time

Speed	measured in metres per second, ms-1
Distance	measured in metres, m
Time	measured in seconds, s, a measure of how long something takes
D=VxT	distance = velocity x time

Distance Time Graphs

-line upwards=getting farther away

-line downwards=getting closer

-flat line=staying still

Force

force = mass x acceleration	Fnet=ma
-**weight** is a force measured in Newtons which changes depending on where you are eg. Earth vs. Mars	-**mass** is the amount of matter contained in an object measured in kilograms.

Effect of doubling the mass or force

-if you double the mass but keep the force the same, acceleration will be halved

-if you double the force, acceleration will be doubled

Work

the measure of energy transfer when an object is moved over a distance

W=Fd

Work (J) = Force (N) x Distance (m)

When work is done to an object, the object gains energy

When an object does work, it loses energy

work done=energy lost or gained

The Ramp Question

If one ball is thrown up a ramp and the other is dragged up, both balls will gain the same amount of gravitational potential energy assuming they are lifted to the same height, so the work done will be equal, assuming no energy is lost as heat and sound.

Acceleration/Decceleration

Acceleration	a measure of how fast your speed is increasing, symbol is 'a', measured in ms-2
Decceleration	a measure of how fast your speed is decreasing

Speed Time Graphs

-line upwards=constant acceleration

-line downwards=constant deceleration

-flat line=constant speed

-area under the graph=distance travelled

Friction and Pressure

friction is caused when things rub against each other

-friction transfers kinetic energy into heat and sound energy	-friction increases when rougher or larger surfaces contact
-friction ALWAYS opposes motion	-it is measured in Newtons, N

Air Resistance is a form of friction affecting all objects moving through the air

Terminal Velocity occurs when forces become equal and opposite so they are their constant, maximum speed

Eg. when a parachute opens the force of air resistance increases because the surface area has increased. This causes the parachuter to decelerate.

pressure is a force spread over an area

High Pressure is a force spread over a small area

Low Pressure is a force spread over a large area

P=F/A where P is measured in Pa, F is N, and A is m^2.

By **liviabrookes**

cheatography.com/liviabrookes/

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Power

*the speed at which work is done

P=W/T where P is measured in W, W is J, T is s

eg. if you walk up stairs slowly or quickly the same amount of work has been done. However, doing it faster means you have used more power.

Unrelated to Power

-1/2 the acceleration means twice the mass
-Acceleration in freefall has a value equal to the strength of gravity and so is 10ms-2 on Earth
-Weight and gravity force have the same value

Forces

-forces can be a push, pull, twist, or turn.

-forces are measured in Newtons (N)

-when the forces on an object are unbalanced, that object moves

-only comment/draw uneven forces unless told otherwise

-always have arrows pointing away from the object

-always have arrows touching the object

the forces are **thrust, friction, gravity,** and **air resistance** or **support**

balanced forces mean the object is stationary or travelling at constant speed

unbalanced forces mean the object will either speed up, slow down, or change direction

Energy

is measured in Joules, J

-**Kinetic Energy** is the energy possessed by a moving object

-the more mass the object obtains and the faster it moves, the more kinetic energy it has

-Ek=1/2mv^2

-**Gravitational Potential Energy** is the energy stored in an object because it has been raised a certain height above the ground against the force of gravity

-Ep=mgh

Types of Energy

non-stored energy:	*stored/potential energy:*
- light and sound	-gravitational (height)
-kinetic (movement)	-elastic (spring)
-heat	-nuclear (atoms)
-electrical	-chemical (batteries)

Conservation of Energy

energy is neither created nor destroyed, it is only transferred from one state to another

when energy is converted from one form to another, a proportion is lost as heat and sound energy due to the force of friction