Year 7 – Spring 1

1. Forces

Forces make things move. They can act to push or pull on an

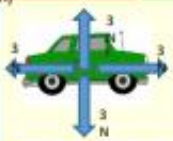
- Gravity
- Friction
- Upthrust
- Reaction Force

We measure force using a newton meter. The unit of force is the Newton, which is represented by the symbol N. A newton meter works by stretching a spring

Contact Forces: Between two objects which are touching (e.g. friction)

Non-Co objects which aren't touching (e.g. gravity)

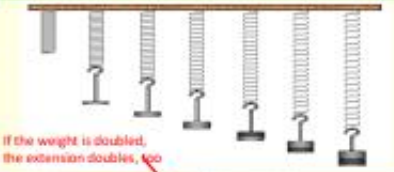
Balanced Forces: a non-moving object will stay stationary and a moving object will stay travelling at the same speed.



Unbalanced Forces: If there is a resultant force (e.g. 8-3= 5N upwards in the example on the left), the object will accelerate in that particular direction.

2. Hooke's Law

The extension of a spring is directly proportional to the force applied to it.



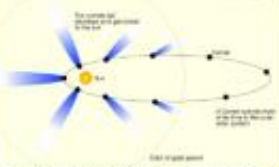
If the weight is doubled, the extension doubles, too

Weight (N)	Extension (cm)
10	5
20	10
40	20

7. The Solar System

My	Very	Easy	Method	Just	Speeds	Up	Naming
e	e	a	a	u	a	r	e
r	n	r	r	p	t	a	p
c	u	t	s	i	u	n	t
u	s	h		t	r	u	u
r				e	n	s	n
y				r			e

Make sure that you have **memorised** the order of the planets in our Solar System. (Pluto is no longer classified as a planet).



The planets in our **Solar System** travel, in orbit, around a star (the Sun). Their orbits are described as being elliptical - like a squashed circle.

As **Mercury** is the closest planet to the Sun, it is the hottest. **Neptune**, as the furthest away planet, is the coldest.

3. Friction

Friction is a contact force that acts in the opposite direction to movement.

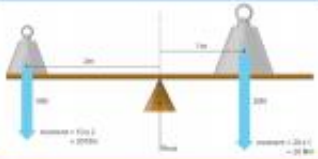
Sometimes, friction can be useful to keep us safe, other times, we might try to reduce the friction on an object, using streamlining.

Friction transforms kinetic (movement) energy into heat. This can be useful if we need to grip onto a surface or slow down quickly. Creating a 'rough' surface will increase the amount of friction between objects.

Streamlining an object means changing its shape - and the materials which make it - so that it generates less friction (or drag). An object with smooth surfaces and 'arrow-like' shape will generate less friction.

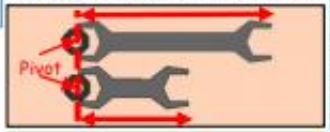
4. Moments

Moment (Nm) = Force (N) x Distance From Pivot (m)



The units for the moment of a force are given as **Newton metres** (Nm).

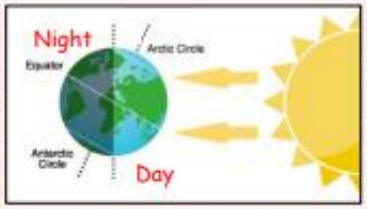
The turning effect of a force is called the **moment** and is calculated by multiplying the force by its distance from the pivot.



In this examples, it'll be far easier to turn the nut when using the longer spanner. This is because the distance from the pivot is greater, so the turning effect (moment) of the force will also increase.

8. Day & Night

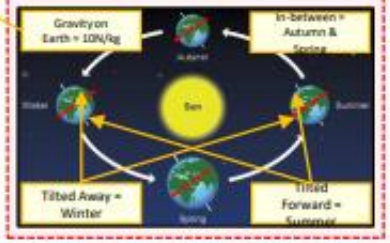
While orbiting the Sun, the Earth also rotates on its **axis** (an imaginary line which runs between the north and south poles). It takes the Earth 24 hours to rotate on its axis (hence why a day on Earth lasts 24 hours).



Days last for different lengths of time on other planets, because they might rotate faster, or more slowly than the Earth.

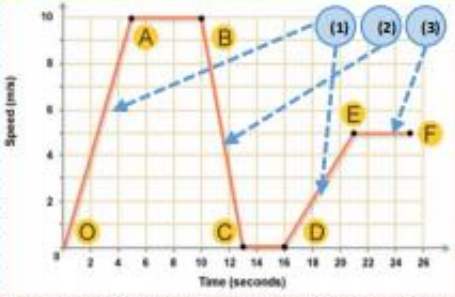
9. Seasons

The Earth is divided up into the northern and southern hemispheres. As the Earth's axis is tilted at an angle of 23.5°, the Sun will always shine more on one hemisphere, compared to the other. It's this tilt which causes us to experience seasons.



5. Speed, Distance & Time

If an object's **speed**:
Increases = Accelerating
Decreases = Decelerating
Stays the same = Moves at a constant rate.



The **speed** of an object describes its rate of movement. An object with a high speed covers a large distance in a small amount of time. The units of speed are metres per second (m/s).

Speed (m/s) = distance (m) ÷ time (s)

An object's speed can be represented on a speed-time graph

(1) When the line is moving in an upwards direction, the object's speed is **increasing** (acceleration)

(2) When the line is moving downwards, the object's speed is **decreasing** (deceleration)

(3) If the line is flat, the object is either moving at a **constant speed** or is **stationary** (if speed = 0).

If the line on the speed-time graph is curved, the object's **acceleration is changing.**

6. Mass, Weight & Gravity

Gravity is a force that 'pulls' objects towards the center of the Earth. When you jump, you're exerting a force stronger than gravity for a short amount of time.

Mass is a measurement of how much of something there is. It's measured in grams (g) or kilograms (kg).

Weight, on the other hand, is a measure of the force acting downwards on an object, due to gravity. Like all forces, the units for weight are Newtons (N).

Weight (N) = Mass (Kg) X Gravity

on the Earth | in outer space | on the Moon

An object's mass stays the same, anywhere in the Universe, whereas its weight will vary, depending on the strength of the gravity.