2.1 - Mass and Weight

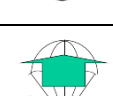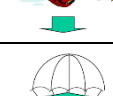|	
Mass	Measure of the amount of **material** something is made up of. Mass is the **same** on all **planets**.
Measuring Mass	Use a **mass balance**.
Units for Mass	**Kilograms (kg)**
Weight	Measure of the **force** on something due to **gravity**. **Changes** depending on which **planet** you are on.
Measuring Weight	Use a **Newton meter**.
Units for Weight	**Newtons (N)**
Equation	**Weight** = **mass** x **gravitational field strength** (W = m x g)
Gravitational Field Strength	**Strength** of **gravity** on a planet. On **Earth,** g = **10** N/kg.

2.2 - Stretching Springs

Deformation	**Changing** the **shape** of an object – **stretching**, **compressing** or **bending**. Requires at least **two** forces.
Elastic Deformation	The object **returns** to its **original size** and **shape** once the forces are **removed**.
Inelastic Deformation	The object does **not return** to its **original size** and **shape** once the forces are **removed**.
Hooke's Law	The **extension** of a **stretched spring** is **directly proportional** to the **force** applied to it, up to the **limit** of **proportionality**.
Directly Proportional	Shown on a graph by the line of best fit being a **straight line** through the **origin**. If one variable doubles, the other doubles.
Force – Extension Graphs	Plot **force** on the **y** axis, **extension** on the **x** axis. The **steeper** the line, the **stiffer** the spring.
Equation	**Force** = **spring constant** x **extension** (F = k x e)

2.3 - Speed, Distance and Time

Equation	**speed** = **distance / time** (s = d/t)
Units	speed = **m/s** distance = **m** time = **s**
Typical speed values	Walking = **1.5 m/s**, Running = **3 m/s**, Cycling = **6 m/s**, Car = **25 m/s**, Sound (in air) = **330 m/s**
Converting Distances	**1 m = 100 cm, 1 km = 1000 m**
Converting Times	**1 minute = 60 s, 1 hour = 60 minutes**
Distance – Time Graphs	**Straight diagonal** line = **constant** speed **Steeper** line = **faster** speed **Flat horizontal** line = **stationary**

2.4 - Terminal Velocity for a Sky Diver (Don't draw diagrams)

Stage 1		**Weight** is much **greater** than **air resistance**. Resultant force acting **down**. Sky diver **accelerates** as he falls.
Stage 2		As sky diver **accelerates**, air resistance **increases.** Resultant force is **less** but still acts **down**. Sky diver still **accelerates** but at a **slowe**r rate.
Stage 3		**Air resistance** is now **equal** to the **weight**. Forces are **balanced** – no resultant force. Sky diver falls at a **constant** speed known as **terminal velocity**.
Stage 4		**Air resistance** now **greater** than **weight** as parachute provides a **larger surface area**. Resultant force now acts **up**. Sky diver is still falling but **decelerates**.
Stage 5		As sky diver **decelerates**, air resistance **decreases**. Forces are **balanced** again – no resultant force. Sky diver fall at a new **slower terminal velocity**.

Y8 Science Cycle 1 - Sheet 2

Forces & Motion