

# Year 8 Science

---

## Speeding Up

# Speed and Units

- \* Speed is defined as how distance you travel in a given unit of time
- \* Equation:  $\text{Speed} = \text{distance} \div \text{time}$
- \* This numerical value though means nothing unless you know the units
- \* meters per second  
miles per hour  
kilometres per hour .....ect

# Measuring Speed

- \* Any measurement of speed requires a distance travelled and an amount of time.
- \* Those that only need a very small amount of time (such as radar, a speedometer or an anemometer) are known as direct measurers of speed
- \* If the time period is longer then you are less likely to know if the speed has changed. This means you are actually measuring an average speed over that time

# How do forces work?

- \* If we sit a special little train on an air track and we give it a nudge with a spring loaded bolt. It goes racing down the track.
- \* So we apply a force to a body and we get an acceleration

**BUT WHAT ELSE IS INVOLVED?**

# Really that simple?

- \* Things to consider
  - \* Friction of travel over the ground
  - \* Weight of the object
  - \* How soft the object is

# So the fuller version is.....

- \* Apply a force to a body and get an acceleration
- \* Apply the same force to a bigger object and get less acceleration
- \* If an object is soft then force is used in changing the shape
- \* The more friction the quicker the object will slow down

# Friction

- \* Friction is a force which acts against motion
- \* When you work against friction heat is generated
- \* Smoother surfaces tend to have less friction

# Drag (e.g. Air resistance)

- \* The slowing effect caused by collisions between a moving object and the fluid it is travelling in (liquid or gas)
- \* The changing of the shape of an object to reduce drag is called streamlining
- \* As an object gets faster it will collide with more fluid particles per second causing more drag



# Resultant or Reactive Forces

- \* When two forces act on the same object their effects are combined into a resultant force
- \* If there is no resultant force then the object will remain stationary or moving at the same speed
- \* When a golf club hits a ball on the other hand the ball hits the golf club with exactly the same force but in the opposite direction. This is called an equal and opposite reaction

# Terminal velocity

- \* When an object falls to ground it accelerates at  $10\text{ms}^{-2}$
- \* As its speed increases the force of air resistance increases slowing this acceleration
- \* Eventually the force of air resistance increases to the stage that it equals the gravitational pull
- \* This means the resultant force is 0 and the object has reached terminal velocity