Force and acceleration

If the forces acting on an object are unbalanced then the object will accelerate, like these wrestlers:





Force, mass and acceleration

Μ

- A force of 1000 N is applied to push a mass of 500 kg. How quickly does it accelerate?
- A force of 3000 N acts on a car to make it accelerate by 1.5 ms⁻². How heavy is the car?
- 3) A car accelerates forward at a rate of 5 ms⁻². If it weighs 500 kg how 4 much driving force is the engine applying?
- 4) A force of 10 N is applied by a boy while lifting a 20 kg mass. How much does it accelerate by?

Terminal Velocity

Consider a skydiver:

- At the start of his jump the air resistance is _____ so he _____ downwards.
- 2) As his speed increases his air resistance will _____
- 3) Eventually the air resistance will be big enough to ______ the skydiver's weight. At this point the forces are balanced so his speed becomes ______ - this is called TERMINAL VELOCITY



Terminal Velocity

Consider a skydiver:

5) Because he is slowing down his air resistance will ______ again until it balances his ______. The skydiver has now reached a new, lower _____.





Weight vs. Mass

Earth's Gravitational Field Strength is 9.8 N kg⁻¹. In other words, a 1kg mass is pulled downwards by a force of 9.8 N.

Μ

Weight = Mass x Gravitational Field Strength

(in N) (in kg) $(in N kg^{-1})$

- 1) What is the weight on Earth of a book with mass 2kg?
- 2) What is the weight on Earth of an apple with mass 100g?
- 3) Dave weighs 700N. What is his mass?
- 4) On the moon the gravitational field strength is 1.6 N kg⁻¹. What will Dave weigh if he stands on the moon?