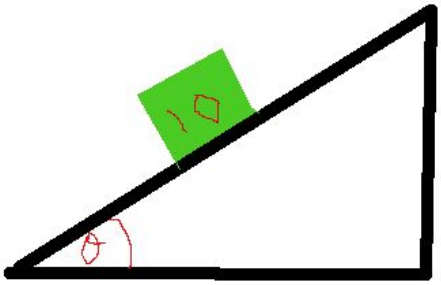
Momentum

v_0=10 m/s up the ramp.

We need to find the acceleration down the ramp.



$$F_{net} = -F_{down} - F_{friction}$$

$$ma = -mg\sin\theta - \mu mg\cos\theta$$

*why doesn't mass matter?

$$v_f^2 = v_i^2 + 2ad$$

$$0 = 10^2 + 2[\quad\quad]d$$

Now we have our acceleration down the ramp. With acceleration we can get velocity at t or distance, etc…

Momentum was defined by Sir Isaac Newton in the 1600's as the fundamental quantity of motion. Today, momentum is defined as the product of mass and velocity.

$$p = mv$$

Units:

$$kg * \frac{m}{s}$$

However, a Newton is;

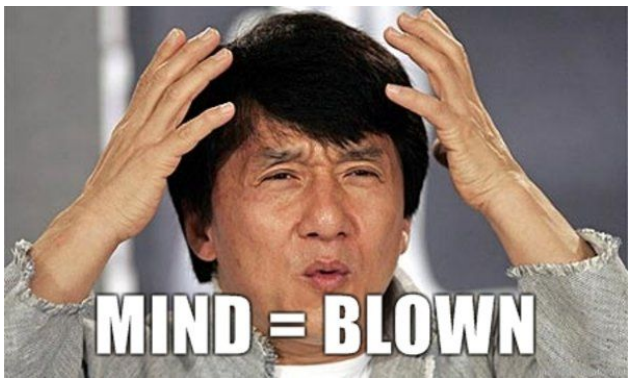
$$kg * \frac{m}{s^2}$$

We just have an extra 's' on the bottom. To adjust to this the unit of momentum is

$$p = N * s = Ns$$

We will be interested in the change in momentum: $\Delta p = mv_f - mv_i$ This is called the impulse "I". *now you see why verdana is important*

Get ready for a blown mind!



$$\Delta p = mv_f - mv_i$$
$$\Delta p = m(v_f - v_i)$$
$$\Delta p = m\Delta v$$
$$\therefore$$

The 3.0kg zombie head is rolling across a field at 2.0 m/s when a lone child intercepts the head and sends it back with a force of 50.0N. The kick took .25s. What is the final velocity of the head?

What is the change in momentum?

A pug runs towards a wall nose first, as pugs are prone to do. If the dumb dog was running at 10 m/s and had a mass of 6.0 kg and bounces off the wall at 10m/s what is the change in momentum?

In a heated game of zombie head footie a 10kg head was rolling at 4 m/s north and gets kicked. The head was then travelling at 3.0m/s west. What impulse was delivered during the kick?