Impulse – Momentum Theorem

We can restate Newton's 2nd Law as follows:

The last expression is very useful. You may already have noticed that on the left side of this equation is impulse and on the right side of the equation is change in momentum. This means, for any object, the impulse that you give to it equals the amount you change it's momentum. The units of each side are also equivalent:

ex. What velocity will a 40 kg child sitting in a 40 kg wagon acquire if pushed from rest by a force of 75 N for 2.0 seconds and it was initially moving at 1 m/s?

ex. A car of mass 1000 kg is traveling at 100 km/hr when the driver sees a deer on the road ahead. If the brakes can exert a force of 5000 N, how long does it take the car to stop?