Momentum

Key words

mass, momentum, force, velocity, time

mass = the amount of substance in a body
momentum = see below
force = a push or pull that acts on an object due to the interaction with another object
velocity = speed in a particular direction
time = how long to move from point A to B

The Science Bit

- Momentum is a term that describes **the strength or force of a moving object** (mass in motion).

- The momentum tends to keep it moving in the same direction. It is difficult to change the direction of movement of an object with a lot of momentum.

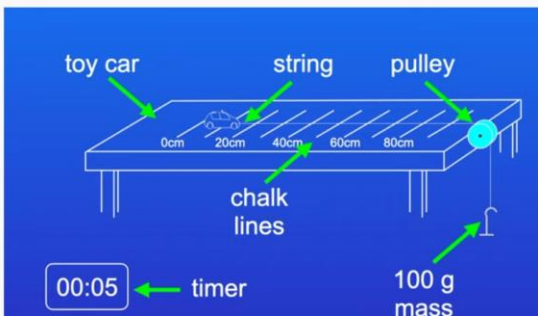
- *Momentum (kg m/s) = mass (kg) x velocity (m/s)*

Momentum does not just depend on the object's mass and speed.
Velocity is speed in a particular direction, so the **momentum of an object also depends on the direction of travel**.
So the momentum of an object can change if:

- the object speeds up or slows down
- the object changes direction

How to take it further

By increasing the weight acting on a toy car you can explore the effect increasing mass has on the car's velocity.



Fun Cycling Facts and Information

- On a bicycle, you can travel three times faster than you can walk, for the same amount of energy.
- Damien Hirst designed the world's most expensive bike Trek Madone, or the Butterfly Bike which was auctioned for $500,000 at Sotherby's.
- Bikes don’t actually need riders a bicycle can stay upright without a rider as long as it’s moving at 8mph or faster.
- The world's longest bike was 135 feet and 10.7 inches long

Bicycles turn energy created by our bodies into kinetic energy. Kinetic energy (moving energy).

A bicycle can convert up to 90 percent of a person’s energy and movement into **kinetic energy**. This energy is then used to move the bike.

The rider’s balance and momentum help keep the bike stable while traveling along a path.

During a bicycle race, an elite cyclist can produce close to 400 watts of mechanical power (about 15% of the power needed to work an electric kettle) over an hour and in short bursts over double that—**1000 to 1100 watts**.

For comparison, you can generate about 10 watts with a hand-cranked electricity generator, (though you can't use one of those for very long without getting tired)! That tells us it's much easier to generate large amounts of power for long periods of time by using your big leg muscles than by using your hands and arms.

That's why bikes are so clever: they make good use of the most powerful muscles in our body.