

What Is Motion?

The World of Motion

When a thing changes its position it is in motion. This means it moves from one place to another. When things are in motion, people can measure them. They can measure acceleration. They can measure speed. They can measure velocity. And they can measure momentum. These are all parts of motion.

Acceleration

To move, a thing must change speed. It might go faster. It might slow down. It might stop. Or, it might change direction. A change in speed or direction is called acceleration.

Speed and Velocity

When a thing moves, it has speed. Speed is how long it takes to move a certain distance. Velocity is like speed. But, it tells more. It is the speed and the direction a thing is going.

Momentum

Momentum tells how much force a thing has to keep going the same velocity until it stops. It is made up of an object's mass and velocity. You can stop the momentum of a toy car moving 10 meters (33 feet) per hour. It is easy. The toy truck does not have much mass. It is small and light. But you can not stop the momentum of a big truck moving 10 meters (33 feet) per hour. It is hard to stop. The truck has more mass. It is big and heavy. So, it has more momentum than the toy car.

Not all things with great momentum are big. Sand is very small. Wind can pick it up. Sand in the wind can go very fast. It can hit a person's face and sting. It has great momentum because of its speed. Momentum is one reason people wear seatbelts. Sometimes cars stop quickly. A seatbelt stops our momentum. It makes us stop with the car. It keeps us from hitting the front of the car. That keeps us safe!

Motion Formulas

Forces can be calculated. You can use formulas to do it. You can use a formula to figure out how fast a thing is going. You can find its velocity. You can also find how much momentum it has. These are the formulas for speed, velocity, and momentum:

speed = distance/time	75 km/hour	47 mph
velocity = distance/time in a certain direction	75 km/hour northeast	47 mph northeast
momentum = mass × velocity	7,500 kg-m/s	10,340 lbs.-mph

