Key words

force
friction
gravity
inertia
mass

Newton's first law

- Newton's first law of motion states that an object will remain at rest or, if it is moving it will continue to move at a constant speed in the same direction, unless it is acted on by an external *force*. This might be a single force or the resultant of two or more unbalanced forces.

1 Effect of friction

- When the engine of a car is switched off, the car will eventually come to rest because *friction* and air resistance act on the car to slow it down. If these forces were absent the car would continue with a constant speed in a straight line.

2 Absence of friction

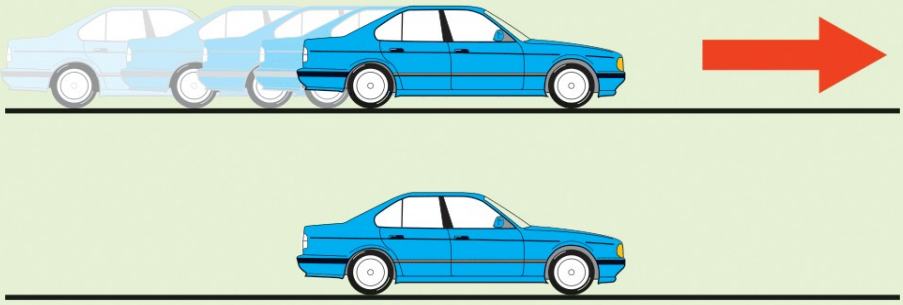
- In space there is no air. Once a rocket has escaped the *gravitational* pull of Earth it will continue to move with a constant speed in a straight line forever without needing any additional thrust from its engines.

3 Inertia

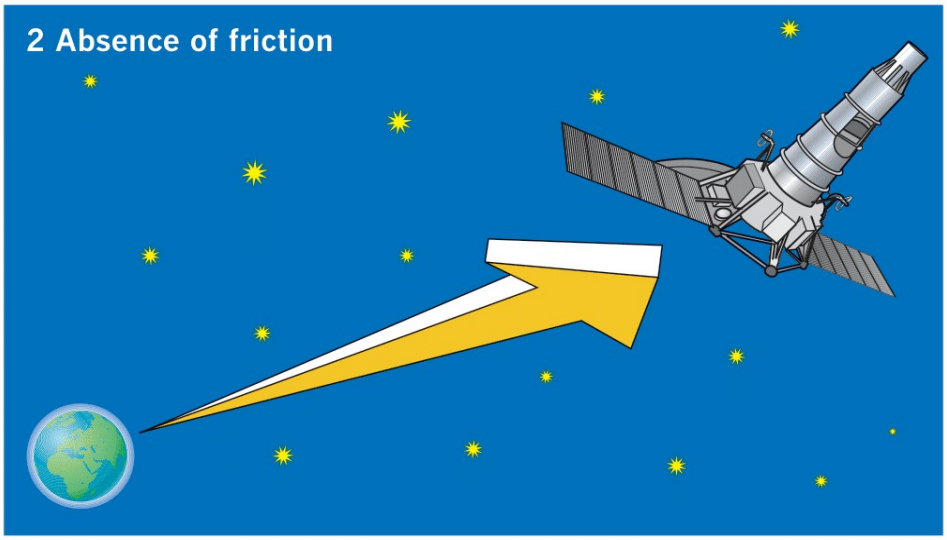
- All matter has an inbuilt opposition to being moved or, if it is moving, to having its motion changed. This property is called *inertia*.
- When the piece of card is flicked sharply it moves in the opposite direction to the flick but the coin remains where it is.
- The greater the *mass* of an object the greater its inertia. The greater its inertia, the more difficult it is to move when it is at rest and the more difficult it is to stop when it is in moving.
- Inertia provides a definition of mass. The mass of a body is a measure of its inertia.

Newton's first law of motion

1 Effect of friction



2 Absence of friction



3 Inertia