



# Newton's 1<sup>ST</sup> Law of Motion

LAW OF INERTIA.

Newton's first law states that an object at **rest** will **remain at rest** and an object in **motion** will **remain in motion**, unless an outside force acts on it (such as friction).



# Newton's 1<sup>ST</sup> Law of Motion

**Ex.** This law explains why you fly forward in a car when someone slams on the brakes. Because of Inertia, your body wants to keep moving at the same speed as the car.



# Newton's 2<sup>nd</sup> Law of Motion

**2<sup>nd</sup> Law States** that a force on an object will move the object in the direction of the force. The relationship between force, mass and acceleration is summarized by the formula:

$$\mathbf{F = M \cdot A}$$

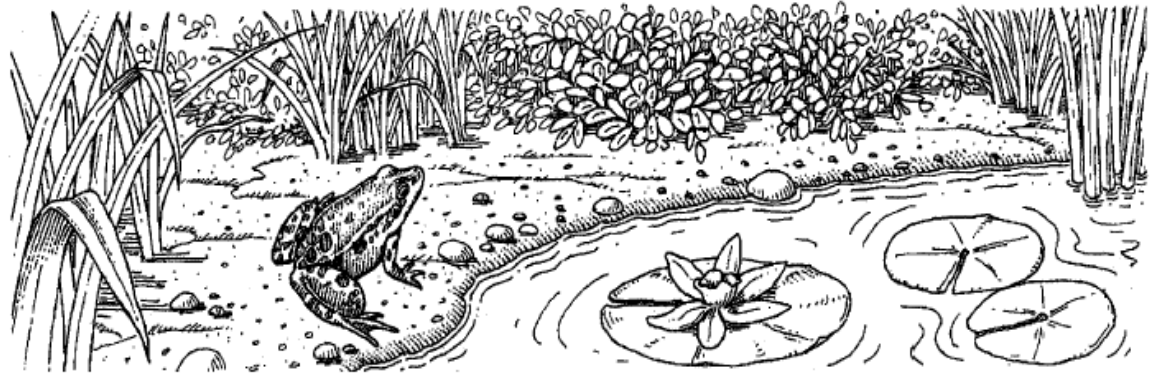
# Newton's 2<sup>nd</sup> Law of Motion

**Ex.** This law explains why a golf ball will fly in the direction of a force applied to it.



● ● ● | Q: The frog leaps from its resting position at the lake's bank onto a lily pad. If the frog has a mass of 0.5 kg and the acceleration of the leap is  $3 \text{ m/s}^2$ , what is the force the frog exerts on the lake's bank when leaping?

- (A) 0.2 N
- (B) 0.8 N
- (C) 1.5 N
- (D) 6.0 N

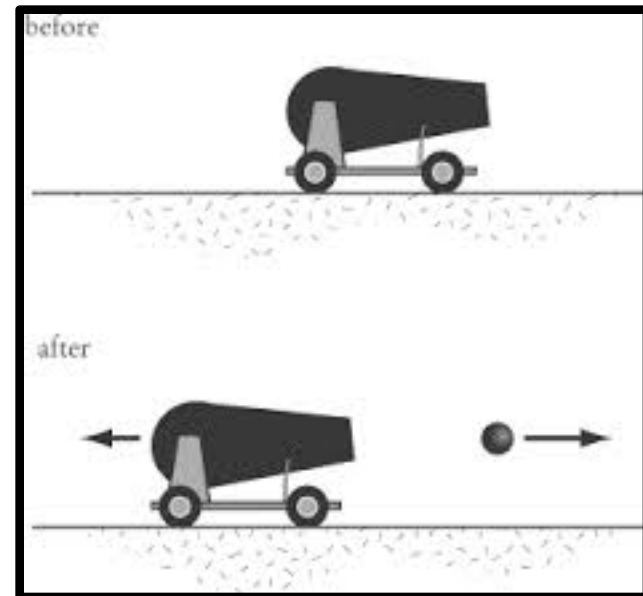


$F=ma$ ,  $m$  is mass in kg,  $a$  is acceleration in  $\text{m/s}^2$ .

So,  $.5 \text{ kg} \times 3 \text{ m/s}^2 = 1.5 \text{ N}$

# Newton's 3<sup>rd</sup> Law of Motion

**3<sup>rd</sup> Law States** that for every action there is an equal but opposite action.



# Newton's 3<sup>rd</sup> Law of Motion

**Ex.** A skater pushes back on the skates but the skater moves forward.

