

Newton's Second and Third Laws of Motion



When a boat is on the water, two Laws of Physics affect its motion. They were discovered by a 17th century physicist, Sir Isaac Newton.

Newton's Second Law of Motion

Newton's Second Law of Motion explains one set of factors that affect how fast your boat will move through the water.

Newton's Second Law Formula states that $\text{Force} = \text{Mass} \times \text{Acceleration}$

We want to know what our acceleration (speed) will be, so we solve for acceleration

Formula: $\text{Force}/\text{Mass} = \text{Acceleration}$

Your Boat: $\text{Force (paddler's strength)}/\text{Mass (weight of boat)} = \text{Acceleration (speed)}$

The lighter your boat and the stronger your paddler, the faster your boat will go.

Newton's Third Law of Motion

Newton's Third Law of Motion explains that for every action, there is an equal and opposite reaction.

In your boat, your paddler will push his/her paddle into the water. The water pushes back against the blade and propels the boat forward. The force – the speed of your boat – depends on how hard your paddler is pushing against the water!