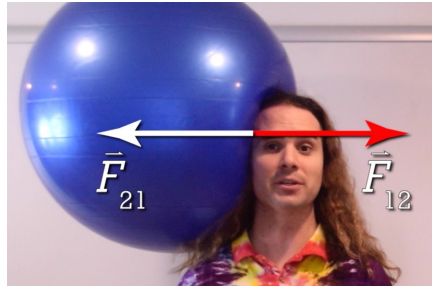




Flipping Physics Lecture Notes:  
Introduction to Newton's Third Law of Motion

Newton's Third Law of Motion:  $\vec{F}_{12} = -\vec{F}_{21}$



For every force object 1 exerts on object 2 there is an equal and opposite force object 2 exerts on object 1 where both forces are vectors.

For example, the force the ball exerts on my head is equal in magnitude and opposite in direction to the force my head exerts on the ball.

These two forces,  $\vec{F}_{12}$  &  $\vec{F}_{21}$ , are called a Newton's Third Law Force Pair. They are equal in magnitude and opposite in direction. They act on two different objects and occur simultaneously.

An often quoted version of Newton's Third Law is "For every action there is an equal and opposite reaction." I do not like this version of the law because the terms "action" and "reaction" are unclear; Newton's Third Law has to do with forces not "actions." Also, the terms "action" and "reaction" imply that the two forces are not simultaneous, which is incorrect. The two forces are simultaneous. Newton's Third Law Force Pairs are sometimes referred to as "Action/Reaction Pairs".

Two more examples of Newton's Third Law Force Pairs:

