

## 6.4 Newton's Third Law

### LEARNING TARGETS

6.3 I can define, explain, and apply Newton's third law to solve problems.



### Newton's Laws of Motion

1. Newton's First Law of Motion
  - Every object will continue in a **state of rest** or **with constant speed in a straight line** unless acted upon by an external force.
2. Newton's Second Law of Motion
  - When a net force act on an object, the **object accelerates** in the direction of the net force. The acceleration is directly proportional to the net force and inversely proportional to the mass. Thus,  $a \sim F/m$  or,  $a \propto F/m$
3. Newton's Third Law of Motion
  - Whenever one object exerts a force on a second object, the **second object exerts an equal and opposite force** on the first.

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slide 2

### Mass vs. Weight

Mass	Weight
<ul style="list-style-type: none"> <li>a measure of how much matter an object is made of</li> <li>does not change, regardless of where something or someone is</li> </ul>	<ul style="list-style-type: none"> <li>the force of gravity on an object</li> <li>equal to the mass of the body times the local acceleration of gravity</li> </ul>
<p>Mass = 59 kg Weight = 579 N</p>	<p>Mass = 59 kg Weight = 96 N</p>

Why do you think the person's weight is less on the moon?

<http://www.exploratorium.edu/conh/weight/index.html>

# Motion

### Tug of War

If both sides pull with 400 N, what will the scale read?



### Reaction Forces

You can't have one without the other!



## Reaction Forces

We are conducting a crash test to increase vehicle safety. We will be testing a head-on collision with 2 identical vehicles, both traveling at 50 mph toward each other. Will the results of the collision resemble a one car collision into a solid wall at 50 mph or 100 mph?

