

# Physical Science Readers: Investigating Forces and Motion

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## Teacher Created Materials Publishing

5301 Oceanus Drive  
Huntington Beach, CA 92649-1030  
<http://www.tcmpub.com>

ISBN 978-0-7439-0573-2

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# Forces Make Things Happen!

Without forces, the world would be a very boring place. Nothing would happen at all!

A **force** is a push or pull or twist that usually causes movement. Forces cannot be seen, but their effects can be seen. Forces can make objects move, speed up, slow down, turn, change direction, or change shape.

You use forces all the time. The force of your muscles on your bones makes you move. When you kick a football, the force on the ball makes it move. Your weight is a force. It pushes down on the earth.

Forces are even acting on things when they are still. For example, a swing that isn't moving is being affected by two important forces. **Gravity** (GRAV-i-tee) is a force that is pulling the swing down. At the same time, the chain or rope pulls it back up.

↓ Forces move your body and the soccer ball and keep the swing where it is. Forces even keep the Moon in the sky!



A force called the strong force keeps atoms together. Without forces, the universe would be a big soup of lost particles.

The unit of force is the **newton (N)**. It is named after Sir Issac Newton, an important scientist and mathematician born in 1642. Newton wrote the rules that describe the effects of forces. He showed that gravity is the same force whether it makes an apple fall from a tree or keeps planets in their orbits.



## Measuring Forces

Forces can be measured using a Newton Meter (also called a spring scale). A Newton Meter has a spring in it. The more force that pulls on the spring, the more it stretches.

## Moon Diet?

**Mass** is the amount of "stuff" (called matter) from which something is made. Your mass is the same wherever you are in the universe. Your weight is the force that gravity exerts on your mass. On the moon, gravity is one-sixth of the strength it is on Earth. So, if you were there, your mass would be the same as always, but your weight would be only one-sixth of that on Earth. So, a person who weighs 100 pounds (444 N) on Earth will weigh about 16 pounds (71 N) on the moon.