

Newton #2

Try It Out

Take a metal marble and a wood marble and hold one in each hand at the same height above the tray of sand. Drop them both and observe. What differences do you notice?

What's Going On?

Last month our LFM covered Isaac Newton's first law of motion. But Sir Newton developed *three* laws that he is still famous for—more than 300 years later! His **second law of motion** describes how force, mass, and acceleration are related. Simply, force equals mass times acceleration. In plain English, you could say this in a number of ways:

- The harder you push something, the faster it will move
- The heavier something is, the harder it is to move (or to stop, like the marbles in the sand)
- The faster something is moving, the harder it is to stop

$$\mathbf{Force}_{net} = \mathbf{mass} \times \mathbf{acceleration}$$

Why Does It Matter?

This law of motion sounds a lot like common sense, but Newton's putting it into an equation allows us to make precise predictions about what will happen with objects in motion. It makes it possible for us to plan for big new adventures, like launching a rocket into space.



*Soyuz rocket headed for the Intl. Space Station
(Image: NASA)*

Wonder While You Walk...

Do the metal and wood marbles fall at the same rate? Why or why not?

Bonus question: When a rocket launches, its speed increases, but its acceleration also increases. This means if it goes 0-50 MPH in 5 seconds, it might go 50-100 MPH in 4 seconds. Why is that?



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