

Read It!

## Balanced and Unbalanced Forces

Newton's first law says an object at rest stays at rest and an object in motion stays in motion with the same speed and in the same direction unless acted upon by an unbalanced force.

But what exactly is meant by the phrase unbalanced force? What is an unbalanced force? To find the answer, we will first consider a science book at rest on a tabletop.

There are two forces acting upon the book. One force, the Earth's gravitational pull, exerts a downward force. The other force, the push of the table on the book, pushes upward on the book.

Since these two forces are of equal magnitude, and in opposite directions, they balance each other. The book is said to be at **equilibrium** or **balanced**.

Now consider a book that was pushed and is now sliding from left to right across a tabletop. The book is in motion even after the push stops. As the book moves to the right, friction acts to the left to slow the book down. This is an unbalanced force; and as such, the book changes its state of motion. The book is not at equilibrium and eventually starts to slow down. Speeding up or slowing down (accelerating) causes an object to be **unbalanced**.

Keep in mind that an object that is moving at a constant speed (not accelerating) is also said to be **balanced**. An example of this would be a satellite orbiting the Earth.

Balanced and unbalanced forces are all around us.

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#1

Which could be an example of a balanced force?

- A. An asteroid moving at a constant speed through space
- B. A car accelerating from a stop sign
- C. A box of dishes falling from a counter
- D. A rocket taking off

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(T/F) A balanced force is only an object that is not moving.

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#3

Which could be an example of an unbalanced force?

- A. A plate sitting on a dining room table
- B. A ball at the top of a hill that is not moving
- C. Earth orbiting the Sun
- D. A baseball that has been thrown to home plate.

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#4

In paragraph 4 the term equilibrium means?

- A. balanced
- B. uneven
- C. not equal
- D. unbalanced

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