

REVIEW

GEORGIA CONTENT
STANDARD S8P3.b*Balanced and
Unbalanced Forces*

STANDARD Students will demonstrate the effect of balanced and unbalanced forces on an object in terms of gravity, inertia, and friction.

Read the summary to answer questions on the next page.

A **force** is a push or a pull. Newtons (abbreviated N) are the units of force. Any force has both a direction and a **magnitude**, or size. For example, you can have a force of 10 N to the right, or a force of 10 N to the left.

In many situations, two or more forces are acting on an object. Then you have to calculate the **net force**, the sum of all the forces acting at once. The object will move in the direction of the net force. If the forces are moving in the same direction, the sum will be larger than the value of the individual forces. For example 10 N to the right plus 5 N to the right equals 15 N to the right. If the forces are acting in opposite directions, the sum will be less than the value of the largest force. For example, 10 N to the right plus 15 N to the left equals 5 N to the left.

If an object is not moving, we say the forces acting on it are **balanced**. The net force is zero. Think about **gravity**, the force that pulls objects together. If you hold a ball, the upward force from your hand balances the downward pull of gravity on the ball. The ball does not move either up or down. If you remove the force of your hand by letting go of the ball, the force of gravity is no longer balanced by another force and the ball falls.

A moving object can also have balanced forces. Any object moving with constant velocity will continue to move in the same direction with the same speed if all the forces on it are balanced. This is the concept of **inertia**: the resistance of an object to a change in the speed or the direction of its motion. Only an unbalanced force can change the motion of an object. You need an unbalanced force to overcome inertia.

Now suppose you push a box across the floor with a steady speed. You are applying a force to the box. **Friction** is a force that resists motion between two surfaces in contact. Friction on the box balances your push. If you push with a greater force than the force of friction, the box will move faster and faster. If you push with less force than the force of friction, the box will slow down.

PRACTICE



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STANDARD S8P3.b

Balanced and Unbalanced Forces

DIRECTIONS: Choose the letter of the *best* answer.

1. What is a net force?
 - A the sum of forward forces
 - B the sum of all forces acting on an object.
 - C the difference between the largest force and the smallest force
 - D a force that is flexible depending on direction
2. A book lies on a table. The table pushes up on the book with a force of 5 N. What is the force of gravity pulling the book downward?
 - A 2.5 N
 - B 5 N
 - C 10 N
 - D 49 N
3. Which is an example of a balanced force?
 - A the force of position
 - B a situation in which the net force is zero
 - C a force that can change an object's motion
 - D A force that resists forward motion
4. Friction is
 - A a force between two surfaces in contact.
 - B a force of attraction that depends on mass.
 - C a force that resists being balanced.
 - D an unpredictable and irregular force.
5. Inertia is
 - A a force that resists motion between two surfaces.
 - B resistance to a change in speed or direction.
 - C an absence of velocity.
 - D a situation in which forces can easily become unbalanced.
6. What does it take to change the motion of an object?
 - A a reduction of friction
 - B unbalanced forces
 - C a change in mass
 - D a net force of less than zero