

Section 1 Newton's First Law

Underlined words and phrases are to be filled in by students on the Note-taking Worksheet.

A. **Force**—push or pull on an object

1. The combination of all the forces acting on an object is the **net force**.
2. When forces are **balanced forces**, they cancel each other out and do not change an object's motion; when forces are **unbalanced forces**, the motion of an object changes.

B. **Newton's first law of motion**—an object will remain at rest or move with constant speed unless a force is applied.

C. **Friction** is a force that resists sliding between two touching surfaces or through air or water.

1. Friction **slows down** an object's motion.
2. **Static** friction—the type of friction that prevents an object from moving when a force is applied
3. **Sliding** friction is due to the microscopic roughness of two surfaces; it slows down a sliding object.
4. **Rolling** friction between the ground and a wheel allows the wheel to roll.

DISCUSSION QUESTION:

What are three types of friction? *Static friction, sliding friction, and rolling friction*

Section 2 Newton's Second Law

A. **Newton's second law of motion** connects force, acceleration, and mass; it explains that an object acted upon by a force will accelerate in the direction of the force; acceleration equals net force divided by mass.

B. **Gravity**—attractive force between two objects; depends on the mass of the objects and distance between them; gravitational force is also called **weight**.

C. The second law explains how to **calculate** the acceleration of an object if its mass and the forces acting on it are both known.

D. In circular motion, the **centripetal** force is always perpendicular to the motion.

E. The **terminal velocity** is reached when the force of gravity is balanced by air resistance; the size of the air resistance force depends on the shape of an object and its speed.