



Forces

Section 1 Newton's Second Law

A. Force and motion are _____.

1. An object will have greater _____ if a greater force is applied to it.
2. The _____ of an object and the force applied to it affect acceleration.

B. **Newton's second law of motion** connects force, mass, and acceleration in the equation *acceleration equals net force _____ by mass.*

C. _____—force that opposes motion between two surfaces that are touching each other

1. _____, areas where surface bumps stick together, are the source of friction.
2. Friction between two surfaces that are not moving past each other is called _____ friction.
3. _____ friction—force that opposes the motion of two surfaces sliding past each other
4. Friction between a rolling object and the surface it rolls on is called _____ friction.

D. _____ that opposes the force of gravity

1. The _____ of air resistance depends on an object's shape, size, and speed.
2. _____—forces on a falling object are balanced and the object falls with constant speed

Section 2 Gravity

A. **Law of _____**—any two masses exert an attractive force on each other

1. _____ is one of the four basic forces that also include the electromagnetic force, the strong nuclear force, and the weak nuclear force.
2. Gravity is a _____ force that gives the universe its structure.

B. Due to _____, all objects fall with the same acceleration regardless of mass.

Note-taking Worksheet (continued)

- C. _____—gravitational force exerted on an object
1. Weight _____ as an object moves away from Earth.
 2. Weight results from a force; _____ is a measure of how much matter an object contains.
- D. Objects in the space shuttle _____ because they have no force supporting them.
- E. _____ have horizontal and vertical velocities due to gravity, and follow a curved path.
- F. Acceleration toward the center of a curved path is called **centripetal acceleration**; it is caused by **centripetal** _____, an unbalanced force.

Section 3 The Third Law of Motion

- A. **Newton's third law of motion**—to every action force there is an equal and _____ reaction force
1. Action-reaction forces act on _____ objects and differ from balanced forces.
 2. _____ is based on Newton's third law of motion.
- B. Before it was discovered, the existence of the planet _____ was predicted based on gravitational forces and Newton's laws.
- C. _____—related to how much force is needed to change an object's motion; momentum equals mass times velocity.
- D. Law of conservation of momentum—momentum can be _____ between objects; momentum is not lost or gained in the transfer.