

**Note-taking  
Worksheet****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.