

Name _____

Newton's Third Law of Motion Answer Key

1. Mass is a measure of the amount of matter in an object and it remains the same no matter where the object is in the universe. The weight of an object is the force of gravity acting on it. The weight can change depending on where the object is in relation to a gravitational field. For example, a 2 kg object will still be 2 kg on the moon, but its weight will be less because the gravitational force on the moon is less than on Earth.

2. $F = ma = 1200 \text{ kg} \times (20 \text{ m/s} / 10 \text{ s}) = 2400 \text{ N}$

3. Newton's first law of motion, also known as the law of inertia, states that 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.

4. $a = F/m = 50 \text{ N} / 10 \text{ kg} = 5 \text{ m/s}^2$

5. Newton's second law of motion states that the acceleration of an object is directly proportional to the net force acting on it and inversely proportional to its mass.

6. According to Newton's first law, an object in motion will remain in motion at a constant velocity if the net force acting on it is zero. So, the net force is 0 N.

7. The SI unit of force is the Newton (N).

8. $a = F/m = 75 \text{ N} / 15 \text{ kg} = 5 \text{ m/s}^2$

9. Newton's third law of motion states that for every action, there is an equal and opposite reaction.

10. According to the law of conservation of momentum, the force (thrust) provided by the ejected gas is mass of gas x speed of gas = $50 \text{ kg/s} \times 400 \text{ m/s} = 20000 \text{ N}$