

KEY

Unit #4: Newton's Laws of Motion Study Guide

1. Know key science vocabulary word meanings: force, mass, acceleration, Newton's 1st Law, Newton's 2nd Law, Newton's 3rd Law, inertia, net force, normal force, free body diagram, action force, reaction force.
2. Be able to calculate acceleration, force, and mass in Newton's 2nd Law problems.

$$F = m \times a \qquad a = \frac{F}{m} \qquad m = \frac{F}{a}$$

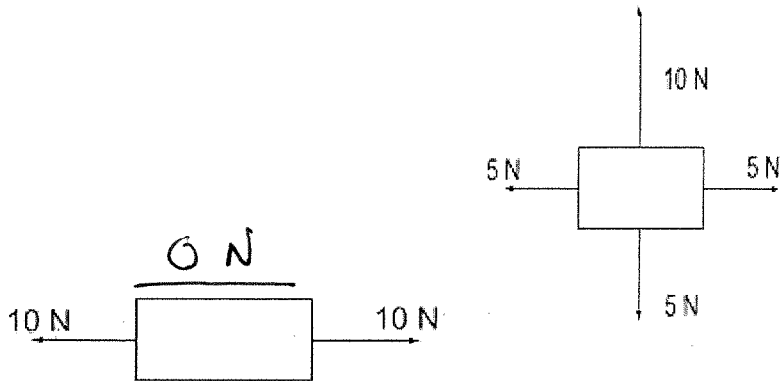
What is the acceleration of a 50 kg block of cement that is pulled upwards with a force of 600 N?

$$a = \frac{F}{m} = \frac{600\text{N}}{50\text{kg}} = \boxed{12\text{ m/s}^2}$$

A truck has a mass of 2,000 kg and accelerates at a rate of 2 m/s². What is the magnitude of force that acts on the truck?

$$F = ma = 2,000\text{kg} \cdot 2\text{m/s}^2 = \boxed{4,000\text{N}}$$

3. Determine the net force on an object when given force values.



5 N, up

INERTIA IS THE TENDENCY OF AN OBJECT TO RESIST A CHANGE IN MOTION + NEWTON'S 1ST LAW DESCRIBES HOW OBJECTS WANT TO KEEP DOING WHAT THEY ARE DOING

4. Why is Newton's 1st Law of Motion also known as the law of inertia?
5. Why don't action and reaction forces cancel each other out?
6. In Newton's 2nd Law of Motion ($a = F \div m$), as mass increases what happens to acceleration? WHEN MASS ↑, ACCELERATION ↓

7. D A push or a pull is known as
 - a. Acceleration
 - b. Motion
 - c. Inertia
 - d. force

8. C According to Newton's third law of motion, when a hammer strikes and exerts force on a nail, the nail
 - a. Creates a friction with the hammer.
 - b. Disappears into the wood
 - c. Exerts an equal force back on the hammer.
 - d. Moves at a constant speed.