

Physical Science: Newton's Three Laws of Motion & Forces



Name: _____ Date: _____

Part A: Physics Analysis. Solve the force and motion problems below.

1. A passenger riding in a city bus jolts forward toward the driver when the bus suddenly slams on its brakes. Which physical principle explains this phenomenon?
 - A. Newton's First Law: The passenger's body possesses inertia and tends to keep moving forward at constant velocity until acted upon by an external stopping force.
 - B. Gravity momentarily reverses direction when wheels lock up.
 - C. Air pressure inside the vehicle drops to zero instantaneously.
 - D. Newton's Third Law: The windshield pulls on the passenger with magnetic force.

2. A soccer player kicks a 0.5 kg ball, causing it to accelerate at 40 m/s^2 . What net force was exerted on the ball by the player's foot?
 - A. 80 Newtons
 - B. 20 Newtons
 - C. 200 Newtons
 - D. 10 Newtons

3. When a space rocket's engines ignite, hot exhaust gases are violently expelled downward. According to Newton's Third Law, what is the reaction force that propels the rocket upward?
 - A. Atmospheric air pushes back down against the top of the rocket cone
 - B. The expelled exhaust gas particles exert an equal and opposite upward thrust force directly onto the rocket engine
 - C. Earth's magnetic pole pushes against the metal fuselage
 - D. The vacuum of space pulls the rocket into orbit

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Part B: Newton's Laws Classification Matrix. Categorize each physical scenario under the appropriate Law of Motion.

Sort these items: A hockey puck glides across frictionless ice at constant velocity without slowing down; Doubling the mass of a cart requires twice as much force to achieve the same acceleration; A swimmer pushes backward against the pool water and accelerates forward; A seatbelt catches and restrains a driver when their car comes to an abrupt halt; Pushing a light empty shopping cart accelerates it much faster than pushing a fully loaded cart with identical force; A cannon recoils backward simultaneously as the heavy cannonball is blasted forward

1st Law (Inertia)	2nd Law ($F = ma$)	3rd Law (Action-Reaction)