

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/s². 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

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)