Newton's Laws of Motion

Sir Issac Newton

Newton's Laws of Motion

1st Law

- "Law of Inertia"
- An object at rest will remain at rest unless an outside force affects it.
- An object in motion will continue in motion unless an outside force act on it.

Newton's Laws of Motion

1st Law

If the car were to abruptly stop and the seat belts were not being worn, then the passengers in motion would continue in motion.

Newton's Laws of Motion

2nd Law

- F = m a
- The rate of acceleration of an object is affected by the mass of the object and the force applied to the object.

Newton's Laws of Motion

2nd Law

In order to push the shopping carts at the same rate of acceleration, more force needs to be applied to the shopping cart with a greater mass (more groceries).

Newton's Laws of Motion

3rd Law

- For every action there is an equal and opposite reaction.

Newton's Laws of Motion

3rd Law

As the bullet is expelled from the gun (action force) the gun pushes back on the hunter's shoulder (reaction force).

Newton's Laws of Motion

3rd Law

The wings of a bird push air downwards. In turn, the air reacts by pushing the bird upwards. The size of the force on the air equals the size of the force on the bird; the direction of the force on the air (downwards) is opposite the direction of the force on the bird (upwards).
For every action, there is an equal (in size) and opposite (in direction) reaction.
Action-reaction force pairs make it possible for birds to fly.

Check Your Understanding

While driving down the road, an unfortunate bug strikes the windshield of a bus. **1st**

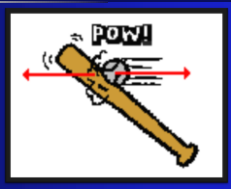
As the wheels spin backwards, they grip the road and push the road backwards. In turn, the road reacts by pushing the wheels forward.

3rd

The bus driver applies more force to the gas pedal. As a result, the bus accelerates.

2nd

Check Your Understanding



The harder the batter swings, the farther the ball will fly into the outfield.

2nd

Check Your Understanding

A fish uses its fins to propel itself through water.

3rd

Check Your Understanding

1st

http://www.glenbrook.k12.il.us/gbssci/phys/Class/newtlaws/u2l1a.html