

Write one important fact from each paragraph in this space.

Science Shorts -8

Laws of Motion

Sir Isaac Newton developed three laws of motion, what are the basics of modern mechanics. The first law is that a body at rest will stay at rest until acted upon by an outside force. The same is true for a body in motion. Once an object is in motion it will continue until some outside force changes the motion. For example, a book that is sitting on your desk will not move unless something (or someone) makes it move. On the other hand, if you roll a marble across the floor it will continue to roll until something stops it. This tendency to stay at rest or in motion is called inertia.

The second law is a little more complicated than the first. This law says that any change in motion of an object is proportional to the force that causes the change. Think about a ball rolling toward you. If you kick it, you have created a force that changes the motion of the ball. It will now travel in the direction in which you kicked it. If you kick it hard, it will go faster than if you kick it softly.

The weight of the ball also affects the amount of force needed to change the motion. If the ball is made of light plastic, it will require little effort to make it move in another direction. If the ball is a solid bowling ball, you will have to kick it much harder to make it change directions. This second law of motion helps us understand momentum and how to make things move. It is used in everything from figuring out the thrust of rockets to a coach's decision as to which football player to use in defense.

The third law of motion says that for every action there is an equal and opposite reaction. For example, a boat propeller spins and throws water backward. The opposite and equal reaction is that the boat moves forward. This law holds true for any movement.

Isaac Newton was a brilliant mathematician and a great observer. An apple really didn't fall from a tree and hit him on the head but he did see an apple fall. When that apple fell he asked questions like any good scientist and those questions led him to develop the mathematics for gravity and his three laws of motion. When you observe an event do you ask questions like what, why, or how? To be a good scientist, you should!

1. What is the main idea of the story?

- a. Newton discovered inertia.
- b. Newton studied motion and what made things move.
- c. Newton's three laws of motion are the basis for all modern mechanics.

2. State the three laws of motion.

3. Which of the three laws would be of most importance to a soccer player?

4. When a rocket is launched, gas particles are thrown out and the rocket moves forward. Which law of motion is being applied in this example? _____

5. What does the word inertia "mean"?

- a. a lack of energy
- b. a backward thrust that propels an object forward
- c. the tendency of an object to stay at rest or in motion

6. Once an object is set in motion, what two forces will eventually cause it to stop? _____

7. If a light plastic ball and a leather ball filled with sand are both kicked with exactly the same amount of force, what will be the difference in how each moves? _____

8. Write a short paragraph - on your own paper - giving examples for each of the three laws of motion.