

What is Newton's first law of motion?

Lesson Review

Write *true* if the statement is true. If the statement is false, change the underlined term to make the statement true. Write your answers in the spaces provided.

- _____ 1. Inertia is the tendency of an object to stay at rest or in motion.
- _____ 2. Balanced forces are needed to move a pencil across a desk.
- _____ 3. A chair will move by itself because of its inertia.
- _____ 4. Newton's first law of motion explains how inertia affects moving objects.
- _____ 5. In a car accident, a passenger not wearing a seat belt may crash through a windshield because of his or her inertia.
- _____ 6. A balanced force does not change the velocity of an object.
- _____ 7. An object will remain at rest unless a balanced force acts upon it.
- _____ 8. In baseball, inertia makes it easy for a baseball player to make sharp turns at the bases.

Skill Challenge

Skills: *experimenting, analyzing*

Read the following description of an experiment. In the space provided, write a conclusion explaining the results of this experiment in terms of inertia.

Shannon placed an uncooked egg on her desk. She gave the egg a gentle turn to start it spinning. She then stopped the egg from spinning for a moment, and quickly released it. When she released the egg, the egg began to spin again.

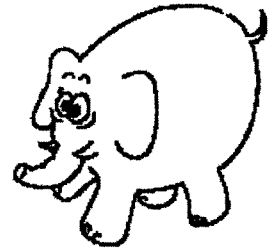
Conclusion: _____

CONCEPTUAL QUESTIONS

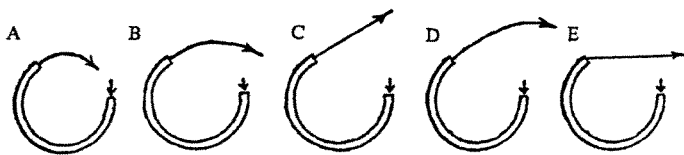
Name _____

NEWTON'S FIRST LAW

1. If you were in a spaceship and fired a cannonball into space, how much force would have to be exerted on the ball to keep it moving once it has left the spaceship?
2. Many automobile passengers have suffered neck injuries when struck by cars from behind. How does Newton's law of inertia apply here?
 - How do headrests help to guard against this type of injury?
3. Suppose you place a ball in the middle of a wagon, and then accelerate the wagon forward. Describe the motion of the ball relative to the ground.
 - Describe its motion relative to the wagon.



4. If an elephant were chasing you, its enormous mass would be most threatening. But if you zigzagged, its mass would be to your advantage. Why?
5. Two closed containers look the same, but one is packed with lead and the other with a few feathers. How could you determine which has more mass if you and the containers were orbiting in a weightless condition in outer space?
6. A metal ball is put into the end of the tube indicated by the arrow. The ball is then shot out of the other end of the tube at high speed. Pick the path the ball will follow after it exits the tube. Note – you are looking down on these tubes, they are not vertical.



7. How much support force does a table exert on a book that weighs 15 N when the book is placed on the table?
 - What if a hand pushes down on the book with a force of 20 N?
 - What if a rope lifts up on the book with a force of 10 N? (The hand is no longer there.)
8. If suddenly the force of gravity of the sun stopped acting on the planets, in what kind of path would the planets move?