

CHAPTER OVERVIEW

5: Newton's Laws

Learning Objectives

- Understand Newton's Three Laws.
- Understand the concept of force and how to identify a force.
- Understand the concepts of mass and inertia.
- Understand how to draw free-body diagrams.

In this chapter, we introduce Newton's Laws, which is a succinct theory of physics that describes an incredibly large number of phenomena in the natural world. Newton's Laws are one possible formulation of what we call "Classical Physics" (as opposed to "Modern Physics" which include Quantum Mechanics and Special Relativity). Newton's Laws make the connection between dynamics (the causes of motion) and the kinematics of motion (the description of that motion).

prelude

You are at the supermarket, pushing a cart full of groceries. To keep the cart moving, you notice that you have to keep applying a force to the cart. You conclude that a continuous force is needed for continuous motion. This statement is,

- A. True, since the natural state of all objects is to be at rest. Eventually, all objects will be at rest, so to keep an object moving, a force needs to be applied.
- B. False. The force you apply to keep an object moving is only to counteract a frictional force.

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