PH201 Reading Week 5

Chapter 5: Applying Newton's Laws

From chapter 4 you know Newton's three laws and how to draw free body diagrams. In chapter 5 you will practice, how do you apply them? You will analyze objects that remain stationary or move in a straight line. After spending the first 3 ½ weeks studying the motion of object that have constant acceleration, you are probably curious how you can calculate the acceleration a.

Student Learning Objectives

In covering the material of this chapter, students will learn to:

- To draw and make effective use of free-body diagrams.
- To recognize and solve simple equilibrium problems
- To distinguish between mass, weight, and apparent weight.
- To use simple models of drag and friction.
- To apply force and motion concepts and tools to problems with single-particle dynamics.
- To understand how to apply Newton's laws for interacting objects.

Some questions that successful students can answer after reading the text

What is the difference between static and dynamic equilibrium? What is the similarity?

How do you use Newton's 2nd law when there are multiple forces involved?

What is the difference between mass and weight?

In what circumstances can an object appear to have more or less weight?

What is the definition of apparent weight?

When would a person be "weightless" - have an apparent weight of zero?

What is the direction of the normal force of a block on an inclined slope?

What is the direction of the normal force of the inclined slope on the block?

How is the coefficient of friction related to a friction force?

When there is static friction, is it always true that $f_s = \mu_s N$?

When there is kinetic friction, is it always true that $f_s = \mu_k N$?

How is rolling friction different from static and kinetic friction?

Can you describe what friction looks like on a microscopic scale?

How is drag related to the size of an object?

How is drag related to the velocity of an object?

What is terminal speed, and what is the cause of terminal speed?