

## Chapter 5

4. For each of the following interactions, identify action and reaction forces. (a) A hammer hits a nail. (b) Earth gravity pulls down on a book. (c) A helicopter blade pushes air downward.

9. If you drop a rubber ball on the floor, it bounces back up. What force acts on the ball to provide the bounce?

19. You push a heavy car by hand. The car, in turn, pushes back with an opposite but equal force on you. Doesn't this mean that the forces cancel one another making acceleration impossible? Why or why not?

21. The strong man will push the two initially stationary freight cars of equal mass apart before he himself drops straight to the ground. Is it possible for him to give either of the cars a greater speed than the other? Why or why not?

24. If a Mack truck and Honda Civic have a head-on collision. Upon which vehicle is the impact force greater? Which vehicle experiences the greater deceleration? Explain your answer.

38. The rope supports a lantern that weighs 50 N. Is the tension in the rope less than, equal to, or more than 50 N? Use the parallelogram rule to defend your answer.

48. Here the stone is sliding down a friction-free incline. (a) Identify the forces that act on it, and draw appropriate force vectors. (b) By the parallelogram rule, construct the resultant force on the stone (carefully showing that it has a direction parallel to the incline-the same direction as the stone's acceleration).