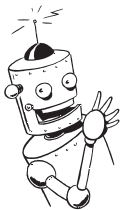


## Chapter 6 Newton's Second Law of Motion

**Friction - Pressure****Pre-Test - Post-Test**

1. Suppose the force of friction on a sliding object is 10 N. The force needed to maintain a constant velocity is \_\_\_\_\_.  
A) 10 N.  
B) more than 10 N.  
C) less than 10 N.
2. A block is dragged without acceleration in a straight-line path across a level surface by a force of 6 N. What is the frictional force between the block and the surface?  
A) 6 N  
B) More than 6 N  
C) Less than 6 N  
D) Need more information to say.
3. Pressure is defined as \_\_\_\_\_.  
A) distance per time.  
B) time per area.  
C) force per area.  
D) force per time.  
E) velocity per time.
4. Which of the following would exert the most pressure on the ground?  
A) A woman standing in high heel shoes  
B) A woman standing in running shoes  
C) A woman standing on skis
5. If you pull horizontally on a crate with a force of 150 N and the crate doesn't move, the friction force must be 150 N. Now if you pull with 250 N so the crate slides at constant velocity, the friction force is \_\_\_\_\_.  
A) more than 250 N.  
B) more than 150 N but less than 250 N.  
C) 250 N.  
D) none of the above.
6. Which encounters the greater force of air resistance... a falling elephant or a falling feather?  
A) the elephant  
B) the feather  
C) same



Chapter 6 Newton's Second Law of Motion

# Friction

## 6.02 Pressure

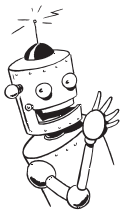
1. A book is placed on a table top. In which position will the book apply the largest force to the table top?
2. In which position will the book apply the greatest pressure to the table top?
3. When you stand on one foot on a bathroom scale, will this change the reading on the scale? Explain
4. What is pressure?
5. How does the area of contact affect the pressure a force exerts on an object?
6. Is it possible for a woman in heels to exert more pressure on the ground than an elephant? Explain
7. Two spheres of different size are placed in your hands and weighed by comparing. Why is this not a good method for determining which spheres weighs more? Explain
9. What are the two types of surface friction?
10. Describe the difference between static and sliding friction.
11. What is the formula used to calculate surface friction?
12. What is the cause of friction?
13. How is surface friction effected by the speed of an object?
14. What is the purpose of anti-lock brakes on a car?
15. How does pressure effect the amount of friction acting on an object?
16. Do wider tires provide more friction with the ground than narrow tires?
17. Why do people put wider tires on their car?

## 6.03 Surface Friction

8. What is friction?

## 6.04 Air Resistance

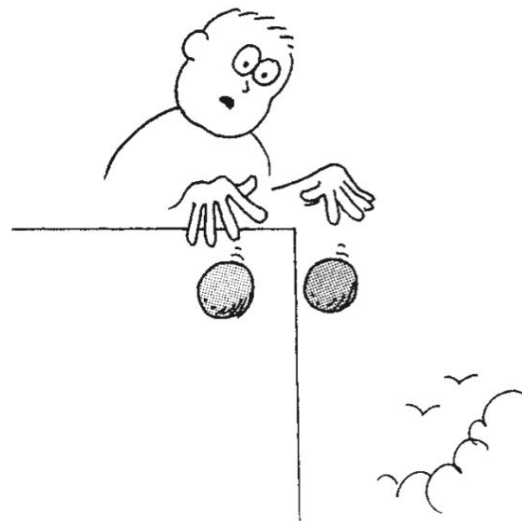
18. Does air resistance on a falling object increase or does it decrease with increasing speed?



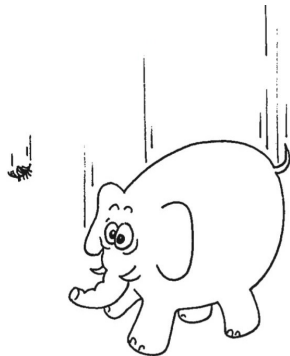
**Chapter 6 Newton's Second Law of Motion**

- 19. What are the main factors that determine the force of air resistance acting on a falling object?
- 20. As an object falls faster and faster through the air, where air resistance is a factor, does its acceleration increase, decrease, or remain constant?
- 21. What is terminal velocity?
- 22. What is the acceleration of a falling object that has reached its terminal velocity?
- 26. If and when Galileo dropped two balls from the top of the Leaning Tower of Pisa, air resistance was not really negligible. Assuming both balls were the same size yet one much heavier than the other, which ball struck the ground first? Why?

*If you simultaneously drop a pair of tennis balls from the top of a building, they will strike the ground at the same time.*



**6.04 The Feather and Elephant**

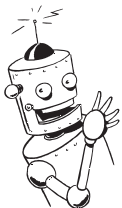


- 23. If a leaf weighs 0.01 N, what is the force of air resistance when the leaf reaches terminal velocity?
- 24. If an elephant weighs 20,000 N, what is the force of air resistance when the leaf reaches terminal velocity?
- 25. Which encounters the greater force of air resistance... a falling elephant or a falling feather?
- 27. If one of the tennis balls is filled with lead pellets, will it fall faster and hit the ground first?
- 28. Which of the two tennis balls will encounter more air resistance? Defend your answers.

**6.04 The Parachutist**

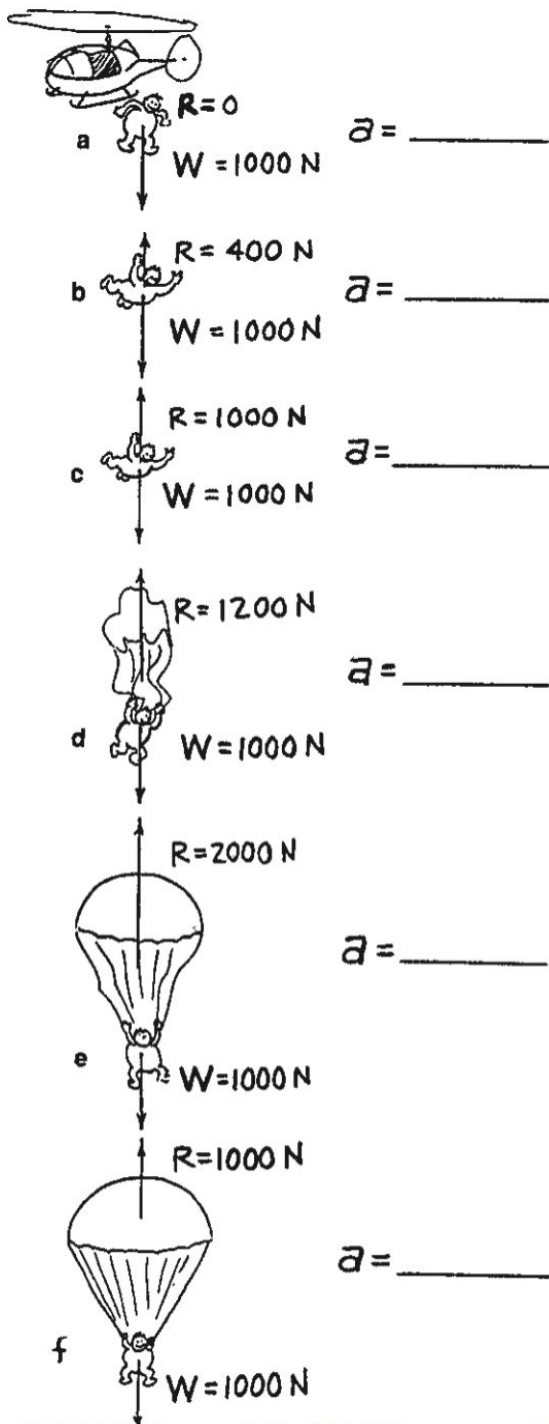
- 29. What happens to the direction of motion of a falling parachutist when they pull the cord opening the chute?

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**Chapter 6 Newton's Second Law of Motion**

Forrest (100-kg) skydives and parachutes from a stationary helicopter. Various stages of fall are shown in positions a-f. Using Newton's second law find Forrest acceleration at each position.



30. In which position(s) does Forrest experience a downward acceleration?  
(a) (b) (c) (d) (e) (f)
31. In which position(s) does Forrest experience and upward acceleration?  
(a) (b) (c) (d) (e) (f)
32. When Forrest experiences an upward acceleration, his velocity is  
(still downward) (upward also)
33. In which position(s) is Forrest's velocity constant?  
(a) (b) (c) (d) (e) (f)
34. In which position(s) is terminal velocity greatest?  
(a) (b) (c) (d) (e) (f)
35. If Forrest were heavier, his terminal velocity would be  
(greater) (less) (the same)

**Brain Challenge**

36. The brakes are slammed on a speeding truck and it skids to a stop. If the truck were heavily loaded so it had twice the total mass, the skidding distance would be:
  - a. the same.
  - b. 1 1/2 times as far.
  - c. twice as far.
  - d. four times as far.

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