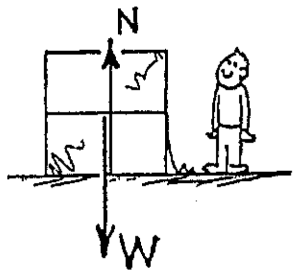
Name ______________________________ Date __________

CONCEPTUAL Physics PRACTICE PAGE

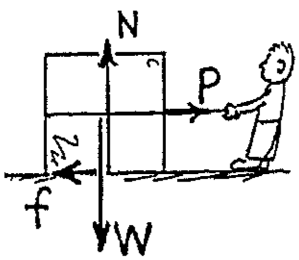
Chapter 4 Newton's Second Law of Motion
Friction



1. A crate filled with delicious junk food rests on a horizontal floor. Only gravity and the support force of the floor act on it, as shown by the vectors for weight **W** and normal force **N**.

   a. The net force on the crate is [zero] [greater than zero].

   b. Evidence for this is ______________________.

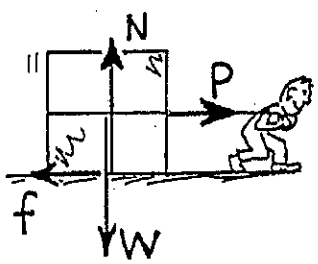


2. A slight pull **P** is exerted on the crate, not enough to move it.

   a. The force of friction **f** acting on the crate is

   [less than] [equal to] [greater than] **P**.

   b. The net force on the crate is [zero] [greater than zero].



3. Pull **P** is increased until the crate begins to move. It is pulled so that it moves with constant velocity across the floor.

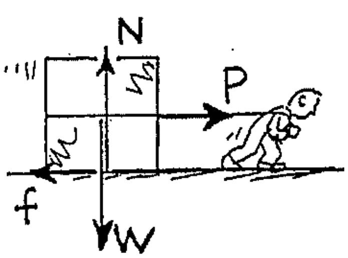
   a. Friction **f** is [less than] [equal to] [greater than] **P**.

   b. Constant velocity means acceleration is

   [zero] [greater than zero].

   c. The net force on the crate is

   [less than] [equal to] [greater than] zero.



4. Pull **P** is further increased and is now greater than friction **f**.

   a. The net force on the crate is

   [less than] [equal to] [greater than] zero.

   b. The net force acts toward the right, so acceleration acts

   toward the [left] [right].

5. If the pulling force **P** is 150 N and the crate doesn't move, what is the magnitude of **f** ? ________

6. If the pulling force **P** is 200 N and the crate doesn't move, what is the magnitude of **f** ? ________

7. If the force of sliding friction is 250 N, what force is necessary to keep the crate sliding at constant velocity? ________

8. If the mass of the crate is 50 kg and sliding friction is 250 N, what is the acceleration of the crate when the pulling force is 250 N? ____________ 300 N? __________ 500 N? ________

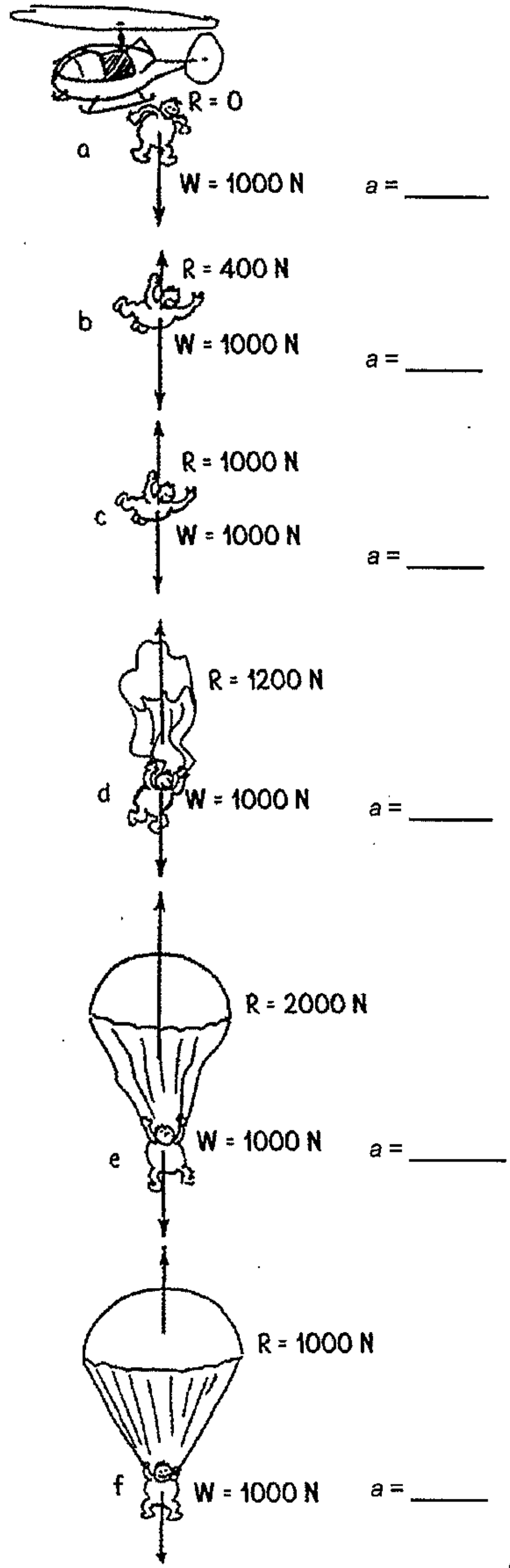
Hewitt Drew it!

Chapter 4 Newton's Second Law of Motion
Falling and Air Resistance

Bronco skydives and parachutes from a stationary helicopter. Various stages of fall are shown in positions *a* through *f*. Letting downward be positive in direction, and using Newton's Second Law,

$$a = \frac{F_{net}}{m} = \frac{W - R}{m}$$

find Bronco's acceleration at each position (answer in the blanks to the right). You need to know that Bronco's mass *m* is 100 kg so his weight is a constant 1000 N. Air resistance *R* varies with speed and cross-sectional area as shown.



Circle the correct answers:

1. When Bronco's speed is least, his acceleration is

   [least] [most].

2. In which position(s) does Bronco experience a downward acceleration?

   [a] [b] [c] [d] [e] [f]

3. In which position(s) does Bronco experience an upward acceleration?

   [a] [b] [c] [d] [e] [f]

4. When Bronco experiences an upward acceleration,

   his velocity is [still downward] [upward also].

5. In which position(s) is Bronco's velocity constant?

   [a] [b] [c] [d] [e] [f]

6. In which position(s) does Bronco experience terminal velocity?

   [a] [b] [c] [d] [e] [f]

7. In which position(s) is terminal velocity greatest?

   [a] [b] [c] [d] [e] [f]

8. If Bronco were heavier, his terminal velocity would be

   [greater] [less] [the same].