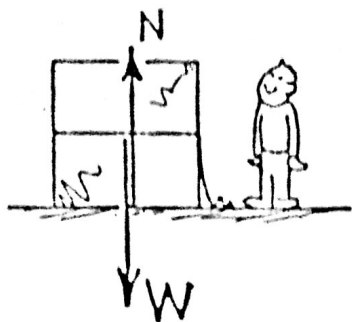


# CONCEPTUAL Physics PRACTICE PAGE

WS4

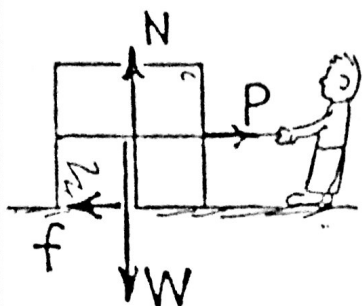
## Chapter 4 Newton's Laws of Motion

### Friction



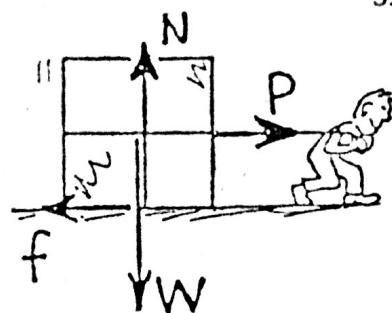
1. A crate filled with delicious junk food rests on a horizontal floor. Only gravity and the support force of the floor act on it, as shown by the vectors for weight  $W$  and normal force  $N$ .

- a. The net force on the crate is (zero) (greater than zero).  
 b. Evidence for this is no acceleration.



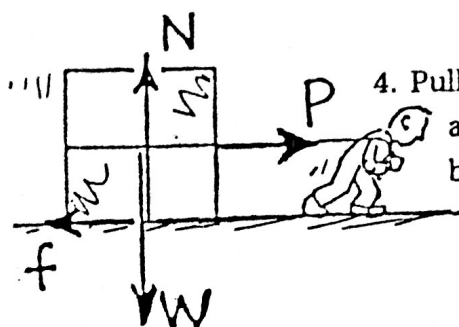
2. A slight pull  $P$  is exerted on the crate, not enough to move it. A force of friction  $f$  now acts,

- a. which is (less than) (equal to) (greater than)  $P$ .  
 b. Net force on the crate is (zero) (greater than zero).



3. The pull on the crate is increased until the crate begins to move. It is pulled with pull  $P$  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. 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. 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  $f$ ? 150N

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

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

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? 0 m/s<sup>2</sup> 300 N? 1 m/s<sup>2</sup> 500 N? 5 m/s<sup>2</sup>