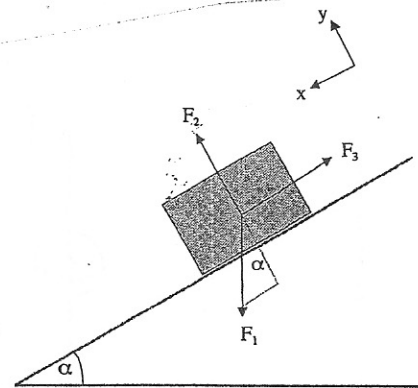


General Physics Week 4 : FORCES!

Do ALL WORK NEATLY (given information, equation(s), algebra, substitution, and unit analysis for full credit. Don't forget significant figures. The first step for Forces problems is to draw a free body diagram. Use additional sheets as necessary in order to show all work neatly! Box the final answer. Correct in red pen during class.

1. If the block to the right is sliding down the inclined plane, label each of the forces and explain what each is.



2. If we increase the angle in the diagram shown, what will happen to the normal force? What will happen to the force of gravity? The components of the force of gravity?

3. The law of inertia states that no force is required to maintain motion. Why, then, do you have to keep pedaling your bicycle to maintain motion?

4. If forces of 15.0 N and 10.0 N act in opposite directions on a 5.00 kg object, what is the acceleration of the object? If the object was initially at rest when the forces were applied, how far has the object traveled after 5.0 seconds?

5. In what direction does the force due to drag point? How does this relate to summing forces and terminal velocity?

6. A child pulls a 30 N red wagon with a force of 15 N. What is the magnitude of the force that the wagon exerts on the child? Why?

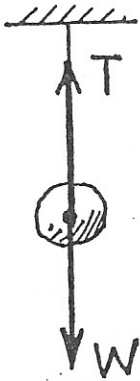
You're happiest while you're making the greatest contribution. -Robert F. Kennedy

CONCEPTUAL *Physics* PRACTICE PAGE

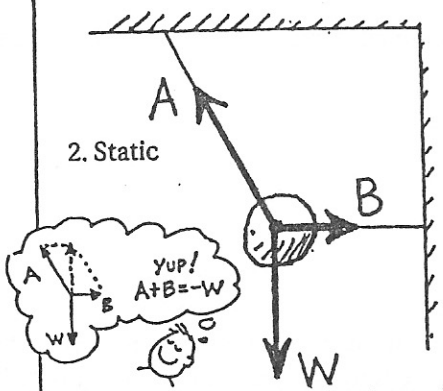
Chapter 4 Newton's Laws of Motion Force-Vector Diagrams

In each case, a rock is acted on by one or more forces. Draw an accurate vector diagram showing all forces acting on the rock, and no other forces. Use a ruler, and do it in pencil so you can correct mistakes. The first two are done as examples. Show by the parallelogram rule in 2 that the vector sum of $A + B$ is equal and opposite to W (that is, $A + B = -W$). Do the same for 3 and 4. Draw and label vectors for the weight and normal support forces in 5 to 10, and for the appropriate forces in 11 and 12.

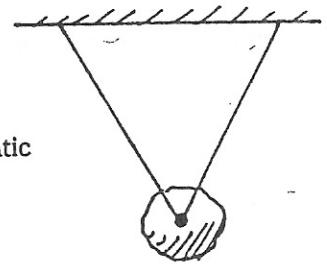
1. Static



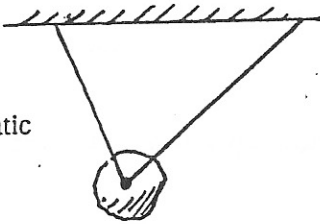
2. Static



3. Static



4. Static



5. Static



6. Sliding at constant speed without friction



7. Decelerating due to friction



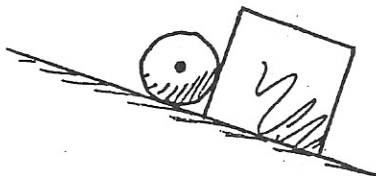
8. Static (Friction prevents sliding)



9. Rock slides (No friction)



10. Static



11. Rock in free fall



12. Falling at terminal velocity



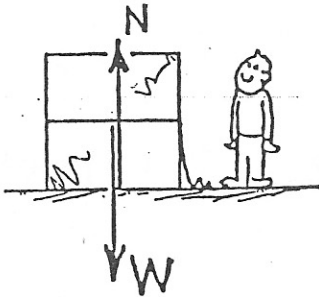
thnx to Jim Court

Hewitt
Drew it!

CONCEPTUAL *Physics* PRACTICE PAGE

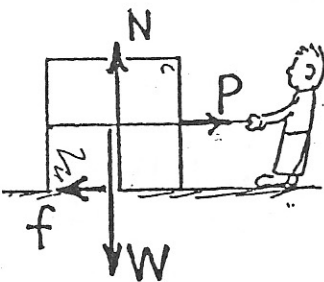
Chapter 4 Newton's Laws of Motion

Friction



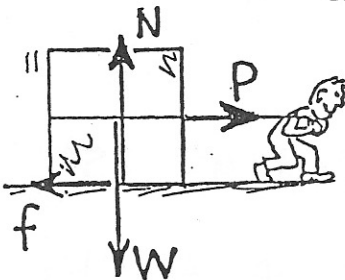
1. A crate filled with delicious junk food rests on a horizontal floor. Only gravity and the support force of the floor act on it, as shown by the vectors for weight W and normal force N .

- a. The net force on the crate is (zero) (greater than zero).
 b. Evidence for this is _____



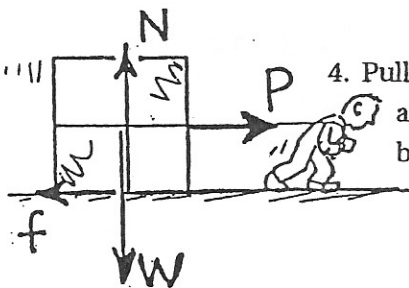
2. A slight pull P is exerted on the crate, not enough to move it. A force of friction f now acts,

- 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 ? _____
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? _____