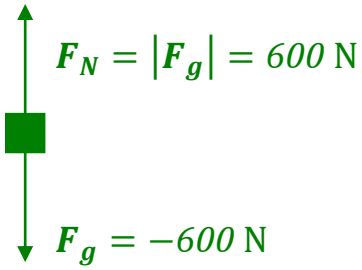
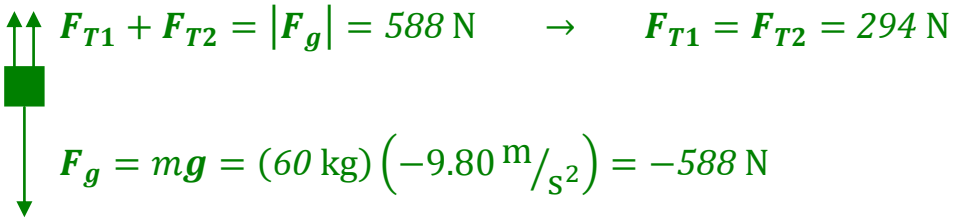
"PHUN" WITH "PHREE" BODY DIAGRAMS ANSWER KEY

***Instructions**: Answer the following questions in your journal. For problems 1-8, draw a FBD for the situation described in each problem.*

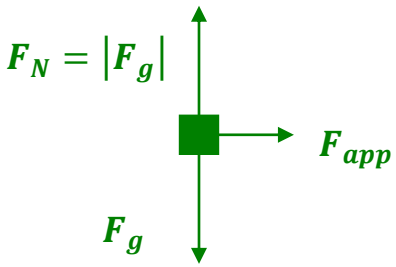
1. An anvil with a weight of 600N is at rest on a table



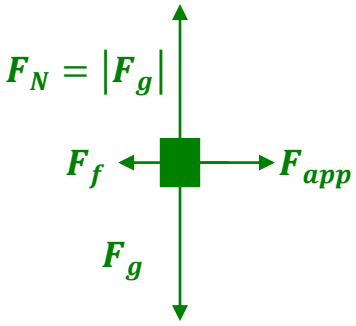
2. A girl (mass = 60.0 kg) is sitting motionless on a swing that is supported by 2 chains.



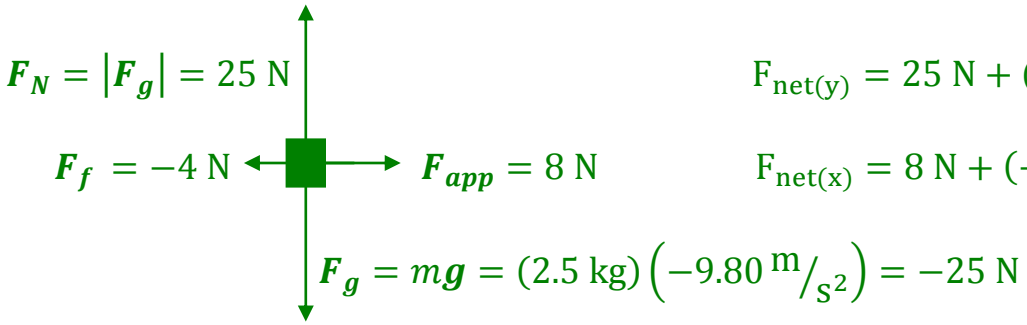
3. A rightward force is applied to a book sitting on a table causing it to accelerate. Assume the surface is **frictionless**.



4. Diagram all the forces acting on the book in problem three if friction is taken into account.



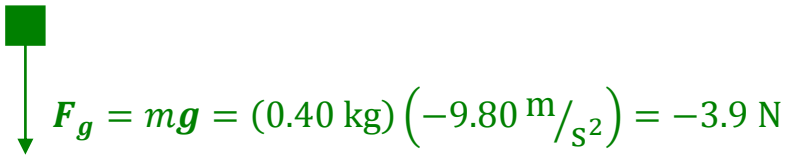
5. A rightward force of 8 N is applied to a 2.5 kg book sitting on a table causing it to accelerate. Include 4 N force of friction in your analysis. What is the **net force** on the book?



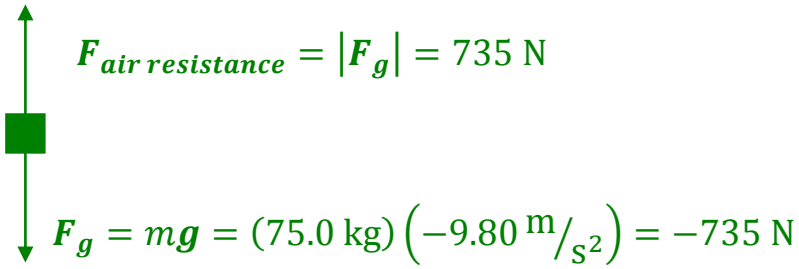
$F_{net(y)} = 25\text{ N} + (-25\text{ N}) = 0\text{ N}$

$F_{net(x)} = 8\text{ N} + (-4\text{ N}) = 4\text{ N}$

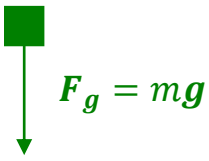
6. A student drops a milk carton with a mass of 0.40 kg, **neglect air resistance**.



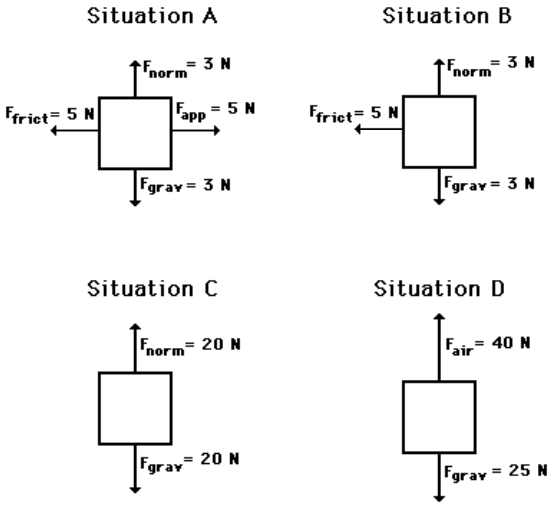
7. A daring Spartan (m = 75.0 kg) goes skydiving and has reached a **constant velocity** as they drop. Include air resistance in your analysis and diagram all forces.



8. A football is moving upwards towards its peak after being booted by the punter. **Neglecting air resistance**, diagram all the forces acting on the ball as it moves towards its peak.



9. In the situations to the right, there is an unbalanced force (usually called the **net force**) that acts on the object shown by each FBD. A net force exists whenever all vertical forces do not cancel each other and/or all horizontal forces don't cancel out. In each situation, **identify the net force**, including units, and the direction in which it is acting.



Situation A:

$F_{net(y)} = F_N + F_g = 3\text{ N} + (-3\text{ N}) = 0\text{ N}$

$\text{F}_{\text{net(x)}} = F_{app} + F_f = 5\text{ N} + (-5\text{ N}) = 0\text{ N}$

Situation B:

$F_{net(y)} = F_N + F_g = 3\text{ N} + (-3\text{ N}) = 0\text{ N}$

$\text{F}_{\text{net(x)}} = F_f = 5\text{ N}$

Situation C:

$F_{net(y)} = F_N + F_g = 20\text{ N} + (-20\text{ N}) = 0\text{ N}$

Situation D:

$F_{net(y)} = F_{air} + F_g = 40\text{ N} + (-25\text{ N}) = 15\text{ N}$

10. Describe a possible situation that would create the FBD shown in Situation A.

ANSWERS WILL VARY! Sample Answer: *A box weighing 3 N is pushed along the floor at a constant speed with a push force of 5 N.*