Mr. Jenkins
Physics I

**Assignment Sheet**
**Newton's Laws of Motion**
**Dynamics and Static Equilibrium Part 1**

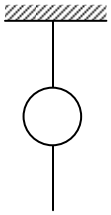
Objectives
You will be able to:

A. state Newton's first law and give several examples to illustrate it.
   apply Newton's second law to a free body diagram with unbalanced forces for find an acceleration.
   state Newton's second law in words and equation form. Explain why it is important to isolate an object when applying this law.
   identify the forces acting on an object and draw the free-body diagram for the object.
B. apply the terms static equilibrium, inertia, mass, net force, newton, normal force, friction force, coefficient of friction in problem solving.
   give the relationship between mass and weight.
   distinguish between actual and apparent weight.
   state Newton's third law and point out the action-reaction pairs in simple situations.
   combine Newton's second law with the kinematical equations to determine the motion of objects with constant forces on them.
C. resolve forces acting on an object on an incline into components parallel to and perpendicular to the incline and apply Newton's second law to various motions.
   apply free-body diagrams, understanding of the functioning of scales and balances to solve simple problems in an accelerating reference frame.
D. solve static equilibrium problems on inclines and with multiple blocks.

Reading

A. Forces in One Dimension, p. 86–87
   4.1 Force and Motion, p. 87–95
B. 4.2 Using Newton's Laws, p. 96–101
   Forces in an Elevator, p. 108–110
   Free Body Diagrams, The Physics Classroom, Force and Its Representation,
   http://www.physicsclassroom.com/Class/newtlaws/u2l2c.cfm
   **(This is the first page of a section, read the whole section)**
   4.3 Interaction Forces, p. 102–107
   5.2 Friction, p. 126–130
C. 5.3 Forces and Motion in Two Dimensions, p. 131–135
   The First Condition for Static Equilibrium, The Physics Classroom, Newton's Second Law
   http://www.physicsclassroom.com/Class/newtlaws/u2l3a.cfm
   **(This is the first page of a section, read the whole section)**
D. Systems of Blocks, notes
   Incline, notes

Laboratory
Vector Hitch
Semi-Atwood machine
Crane lab
Cart on an incline



Focus Questions

1. A mass is suspended from a string and a second string is attached to the bottom. Why is it that a slow, continuous increase in the downward force breaks the string above the mass, but a sudden increase breaks the lower string?
2. Only one force acts on an object. Can the object have zero acceleration? Can it have zero velocity? Explain.
3. You're opening a company that will export gourmet food from the earth to the moon. You want the package labels to be accurate at either location. How should you label the amount of food in each package – by mass or by weight? Explain.
4. Briefly explain why we resolve vectors into parallel and perpendicular components, rather than into x-y components, when solving for a block that might slide up or down an incline.