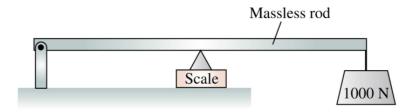# PAL Problem Set 15 for Phys 5A
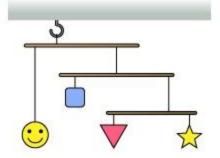## (Static Equilibrium)

Always explain your answers and show your work.

Problem 1 - What does the scale read? What is the force by the pivot point on the rod (magnitude and direction)?

Massless rod

Scale

1000 N

Problem 2 - If you put a heavy load in a wheelbarrow, the force you apply to the handles is much less than the weight of the load and the wheelbarrow. To lift with the least force, you put the load toward the front of the wheelbarrow, near to the front wheel. Explain how this reduces the force to support the handles.

Problem 3 - The artist Anya Calderona constructs the mobile shown in the figure. In the illustrated configuration, the mobile is perfectly balanced. Assume the strings and crossbars are massless and that the star has mass m.

A. What are the masses of the triangle, square, and smiley face?
B. Anya decides to make the star twice as massive, and not change the length of any crossbar or the location of any object, what does she have to do with the mass of the smiley face to keep the mobile in perfect balance? Note that she may have to change masses of other objects to keep the entire structure balanced.

Problem 4 - A car manufacturer claims that you can drive their new vehicle across a hill with a 47^0 slope before the vehicle starts to tip. The vehicle is 2.0 m wide from the center of the front wheels to the center of the back wheels. How high is its center of gravity?