Activity 5 Names: _____

Answers should be filled in on this sheet except where noted.

1. Pick up an acrylic frame, 6 hooks, and 3 rubber bands from the front of the room.
2. Find an object that can be used as a mass (25 grams is about the minimum).
3. Measure the mass of the object and convert it to a force, W.

Object weight: $W =$ _____N

4. Suspend the mass from three holes on the frame using the three rubber bands.
5. Using a ruler, measure the *x*, *y* and *z* distances from one end of the rubber band to the other.

For the first rubber band: $\delta_{x,1} =$ _____mm

$\delta_{y,1} =$ _____mm

$\delta_{z,1} =$ _____mm

For the second rubber band: $\delta_{x,2} =$ _____mm

$\delta_{y,2} =$ _____mm

$\delta_{z,2} =$ _____mm

For the third rubber band: $\delta_{x,3} =$ _____mm

$\delta_{y,3} =$ _____mm

$\delta_{z,3} =$ _____mm

6. Using the weight from step 3 and the measurements from step 5, calculate the force in each applied to each rubber band assuming particle equilibrium. Show your work on a separate sheet.

For the first rubber band: $\dot{F}_1 =$ _____N

For the second rubber band: $\dot{F}_2 =$ _____N

For the third rubber band: $\dot{F}_3 =$ _____N

7. Measure the length of each rubber band and use it to calculate the force in each rubber band using the provided calibration.

For the first rubber band: L_1 = _____mm

F_1 = _____N

For the second rubber band: L_2 = _____mm

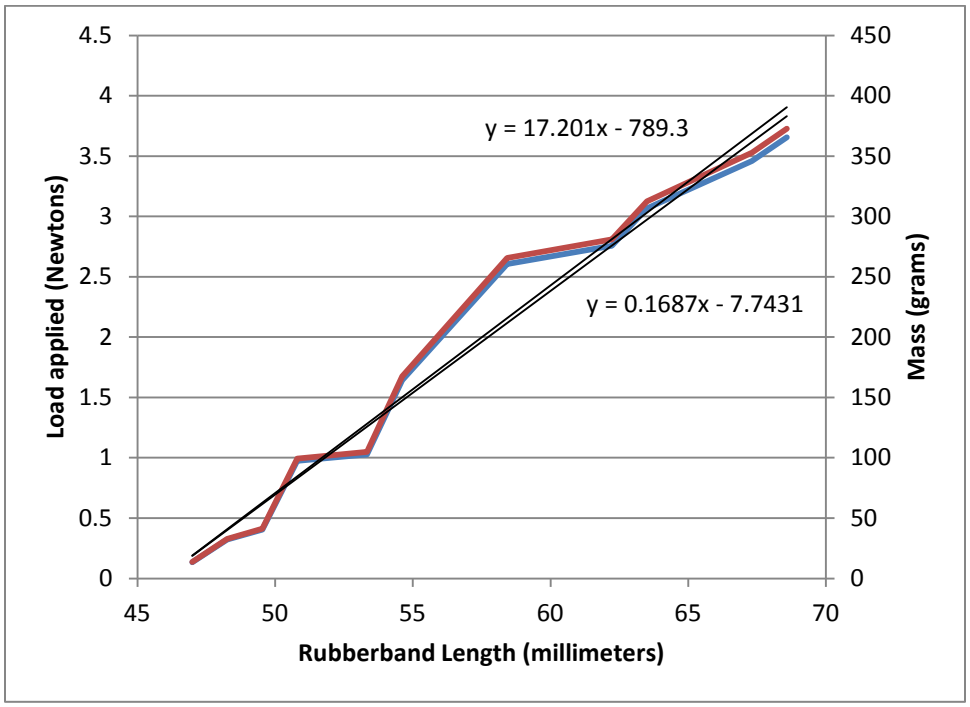
F_2 = _____N

For the third rubber band: L_3 = _____mm

F_3 = _____N

8. Calculate the performance metric, $m = \sqrt{(F_1 - \dot{F}_1)^2 + (F_2 - \dot{F}_2)^2 + (F_3 - \dot{F}_3)^2}/W$

m = _____



Load in Newtons: F = 0.1687*Length(mm) – 7.7431