Rotational Equilibrium Worksheet

As you work through the steps in the lab procedures, record your experimental values and the results on this worksheet. Use the exact values you record for your data to make later calculations.

Procedure A: Balancing torques

What is the position of the center of mass of the meter stick?

Complete the table below.

Data Table 1

	Mass m (g)	**Lever Arm x (cm)**	**Torque including sign ($g \cdot cm^2/s^2$)**
m_1			
m_2			
m_3			Predicted =

Using the predicted torque in Data Table 1, predict the value of x_3.

$x_{3,\text{pred}}$ = _____

What is the experimental value of x_3?

$x_{3,\text{expt}}$ = _____

What is the percent difference between the predicted and experimental value of x_3?

percent difference = _____%

Are the predicted and experimental values of x_3 in close agreement? (A difference of $\pm 3\%$ would be considered acceptable in this situation.)

CHECKPOINT 1: Set-up and calculations

Procedure B: Finding the Mass of the Meter Stick

If you have not already done so, draw a sketch of the experimental set-up with appropriate labels in the space provided below before you proceed further.

Complete the data table below.

Data Table 2

	Mass m (g)	**Lever Arm x (cm)**	**Torque including sign ($g \cdot cm^2/s^2$)**
m_1			
m_2			Predicted =

Using the predicted torque in Data Table 2, predict the value of the mass of the meter stick m_2.

$m_{2,\text{pred}} =$ _____

What is the experimental value of the mass of the meter stick m_2?

$m_{2,\text{exp}} =$ _____

What is the percent difference between the predicted and experimental values of m_2?

percent difference = _____%

Are the predicted and experimental values of m_2 in close agreement? (A difference of $\pm 3\%$ would be considered acceptable in this situation.)

CHECKPOINT 2: Diagram, uncertainty formula, set-up, and calculations

Procedure C: Determining an unknown mass

If you have not already done so, draw a sketch of the experimental set-up with appropriate labels in the space below before you proceed further.

Complete the data table below.

Data Table 3

	Mass m (g)	**Lever Arm x (cm)**	**Torque including sign ($g \cdot cm^2/s^2$)**
m_1			
m_2			
m_3			Predicted =

Using the predicted value of the torque in Data Table 3, predict the value of the mass of shot plus bucket.

$m_{3,\text{pred}}$ = _____

What is the experimental value of the mass of shot plus bucket?

$m_{3,\text{expt}}$ = _____

What is the percent difference between the predicted and experimental values of m_3?

percent difference = _____%

Are the predicted and experimental values of the mass of shot plus bucket in close agreement? (A difference of ±10% would be considered acceptable in this situation.)

CHECKPOINT 3: Diagram, set-up, and calculations