Lab 11
Determining an Unknown Mass

OBJECTIVES
1. To think “out of the box” and design your own experiment in a group setting.
2. Design three experiments to measure the mass of an unknown mass given a known mass.

EQUIPMENT
Anything we have in the Stockroom

PROCEDURE
a. Given a set of reference masses (10, 20, 50 and 100 grams), design three experiments that are independent of each other that measure the mass of an unknown object given a known mass. Use the concepts of kinematics, Newton’s Laws, energy, momentum, and rotational motion.

* Note: the only given mass is the known mass! If other masses are to be used in your experiment, for example the mass of a dynamics cart, one will have to perform an additional experiment to find the mass of the dynamics cart. Also, more points will be rewarded if error analysis is used to analyze your data.

Before proceeding, your proposed experiments must be approved by either the Instructor (Joe) or LIA (John). They should include how the experiment will be performed, how the data will be analyzed, and how error uncertainties are calculated.

Mass scales will not be available.

b. Organize your data into tables and graphs.

c. Error analysis (standard error or percent differences) will guide you in choosing which experiment was the most accurate/precise.

d. Compare the three experiments and choose an experiment that your group has deemed most accurate. Explain your reasoning.