LAB 12
Measuring “g”

OBJECTIVES
Design and execute two experiments to determine "g" as precisely and accurately as possible using Cabrillo Physics equipment and materials.

EQUIPMENT
Any equipment in the physics stockroom (or from other sources if available and approved by the instructor).

PROCEDURE
Part 1: Design two experiments to measure "g"

With your lab partners, design two experiments to measure the local value of "g" as precisely and accurately as possible. Your experimental setup, procedure and analysis should be chosen to minimize both random and systematic errors.

(a) Make a list of the equipment and materials you think you will need, and if necessary, verify their availability. If you need "non-standard" lab equipment, please check with Joe to be sure we have the items!

(b) Describe your intended experimental procedure, explain specifically what steps you will take to minimize random and systematic errors, and quantitatively estimate the target uncertainty (σ) in "g" that you expect to achieve.

- Minimizing random errors is accomplished by using measuring instruments with high resolution in both time and space, eliminating uncontrolled sources of error and increasing the number of independent trials.

- Minimizing systematic errors is accomplished by using well-calibrated equipment, identifying and eliminating avoidable factors, and identifying and estimating unavoidable factors (e.g., the rotation of the earth, deviations from ideal shapes, etc).
Part 2: Measure "g"

Execute the experiments you have designed to measure "g".

(a) Determine the **uncertainty** in your measured value and compare with your target uncertainty. If your measured and target uncertainties are very different, discuss why.

(b) Determine the **discrepancy** between your measured value and the accepted local value of "g". If the discrepancy is significant, discuss how you could eliminate or account for the remaining systematic error(s).

(c) Compare the two experiments and choose the experiment that your group has deemed most accurate. Explain your reasoning.