

AP Physics B

Experiment, The Force Constant of a Spring

It can be shown that the period of oscillation for a mass oscillating on the end of an ideal spring is only dependent upon the mass and the spring constant according to the equation:

$$T = 2\pi\sqrt{\frac{m}{k}}$$

Hooke's Law also provides a means of determining the spring constant:

$$F_s = k\Delta x$$

You are to go into the lab and measure the spring constant of your spring in two different ways. For each method, you should construct a graph of your data to help you determine the spring constant. (Doing so reduces the work that you have to do and insures that your calculations are more accurate.)

This report requires the following:

- (1) Title, Names, etc. (Section 1 on the handout: Lab Reports)
- (2) Purpose (Section 2 on the handout: Lab Reports)
- (3) Data (Section 4 on the handout: Lab Reports)
- (4) Analysis (Section 5 on the handout: Lab Reports)

Include any graphs and calculations you use to determine k.

- (5) Conclusion: A short paragraph comparing your two methods.

- Calculate a percent difference (**not** a percent error – neither of your values is the “accepted” or ideal value):

$$\% \text{ difference} = \frac{|k_1 - k_2|}{\left(\frac{k_1 + k_2}{2}\right)} \times 100$$

- Does one of your results seem more accurate? Justify your answer in terms of sources of error.

Rubric Outline

1 point: Title, purpose, etc.

4 points: Data tables

4 points: Graphs

6 points: Calculations

3 points: Conclusion

2 points: Units and significant digits handled appropriately