



## Physics: Reproducibility of Scientific Data

Paper citation: *Hu A, Peachey B (2016). Redesigning an Experiment to Determine the Coefficient of Friction. J Emerging Investigators 76: 1-5*

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In order to be widely accepted, scientific discoveries must stand up to the test of time. After a paper is published, other research groups will often try to replicate one lab's results to build upon them. After many repeated experiments, the interpretation of data published paper may evolve as more data become available.

In the paper “**Redesigning an Experiment to Determine the Coefficient of Friction**”, the authors calculate coefficients of kinetic friction from a new experimental setup.

1. Using the authors' experimental setup, design two follow-up experiments to independently verify their claims that their design allows for a smaller variance in  $\mu$  (the coefficient of kinetic friction).
2. Perform at least one of these follow-up experiments using both the “old method” mentioned in the paper introduction and the “new method” described throughout the paper. For your initial experiment, try not to vary too many parameters. Describe your follow-up experiment in 5 to 7 sentences.
3. What are your means and standards of deviation for the “old method” and “new method” in your follow-up experiment? Were you able to independently verify the original claim?
4. Now choose several variables and manipulate them in the experimental setup. Record all changes and calculate new means and standards of deviation. Does the claim still hold?