

Heavy Spring Pendulum Notes and Tips

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1 Frame

The spring can be attached to a frame resting on a relatively level surface or to the ceiling. Our set up was a metal frame resting on a table, but the previous group hung the pendulum from the ceiling.

The floor and walls in the basement of Nielsen vibrate slightly. This resulted in small extraneous oscillations in our spring. Hanging the system from the ceiling prevents that issue. These vibrations are likely of negligible importance, but this issue perhaps warrants further investigation.

The metal frame setup made data collection relatively simple. Two people watching the pendulum along perpendicular axes can give an upper and lower bound on maximum amplitude. Unfortunately, this method still left something to be desired since we did not measure the actual maximum amplitude. There may be a more effective observation method.

2 Weights and Bob

In our power point we included a detailed method of how to properly center the mass of the bob. If the bob is not balanced correctly, the pendulum will likely become more unstable.

When measuring the length of the spring, get an idea of where the center of mass of the bob is, and consider its location when calculating the length of the pendulum.

We filed the bottom of the bob to a point with a lathe so that it fit slightly into a depression on top of the release guide, making it easier to release the bob in a consistent manner.

3 Spring

There's some loss in symmetry when attaching the bob to the spring since the bob attaches to the side of the spring. This could possibly be mitigated by bending the attachment point, attaching to more points on the spring, or by

using a spring with a small diameter.

There's some degree of ambiguity in the readings we found about whether the unstretched length of the spring l_0 is measured while hanging under its own weight or completely unstretched.

4 Tips

Record and document everything. It's easy to forget things, and easy to be accused of forgetting things. Documentation will help prevent headaches, and is ultimately the purpose of experiment as well.

Organize and label everything too. You will likely be called on to recollect all your documentation

Do work you're proud of, and clean up!