Harmonic motion experiment.

Overview:

Knowing the physics, we test out the real life parameters. Parameters being, kappa, and g.

We do this through measurement of time, and length of the pendulum, and the center of mass, and mass of each of the objects.

These are our 4 basic measurements. The last is included because it is the root of a lot of errors, and it is technically inaccurate.

An advanced timer had been used to caluclate the period of the pendulum. With each iteration, we changed the length of the point of pivot using a clamping device.

Theoretical basis:

Description of the procedure is due:

We use a perfect string, and tie it to a ball. This ball will swing at a constant w.

Relevant laws to be aware of: newton, moment of inertia, german guy superposition, center of mass.

F=mgsinx

Torque = -mgL\*sinx=d(Iw)/dt=I\*alpha

I can be calculated.

I = integ(r^2\*dm)=m\*L^2

x’’=-mgL/I \* x

w^2 = mgL/l

T^2 = 4pi^2/w^2=l\*4pi^2/mgL

Now, we main attain the period.

How do we get the kappa. It’s at the very bottom of the T^2 over length graph.

I.e. d(T^2)/dl = 0 🡺 kappa = L= sqrt(I/m)