A web app for physics education

Interactive simulations + graphing + instructional content

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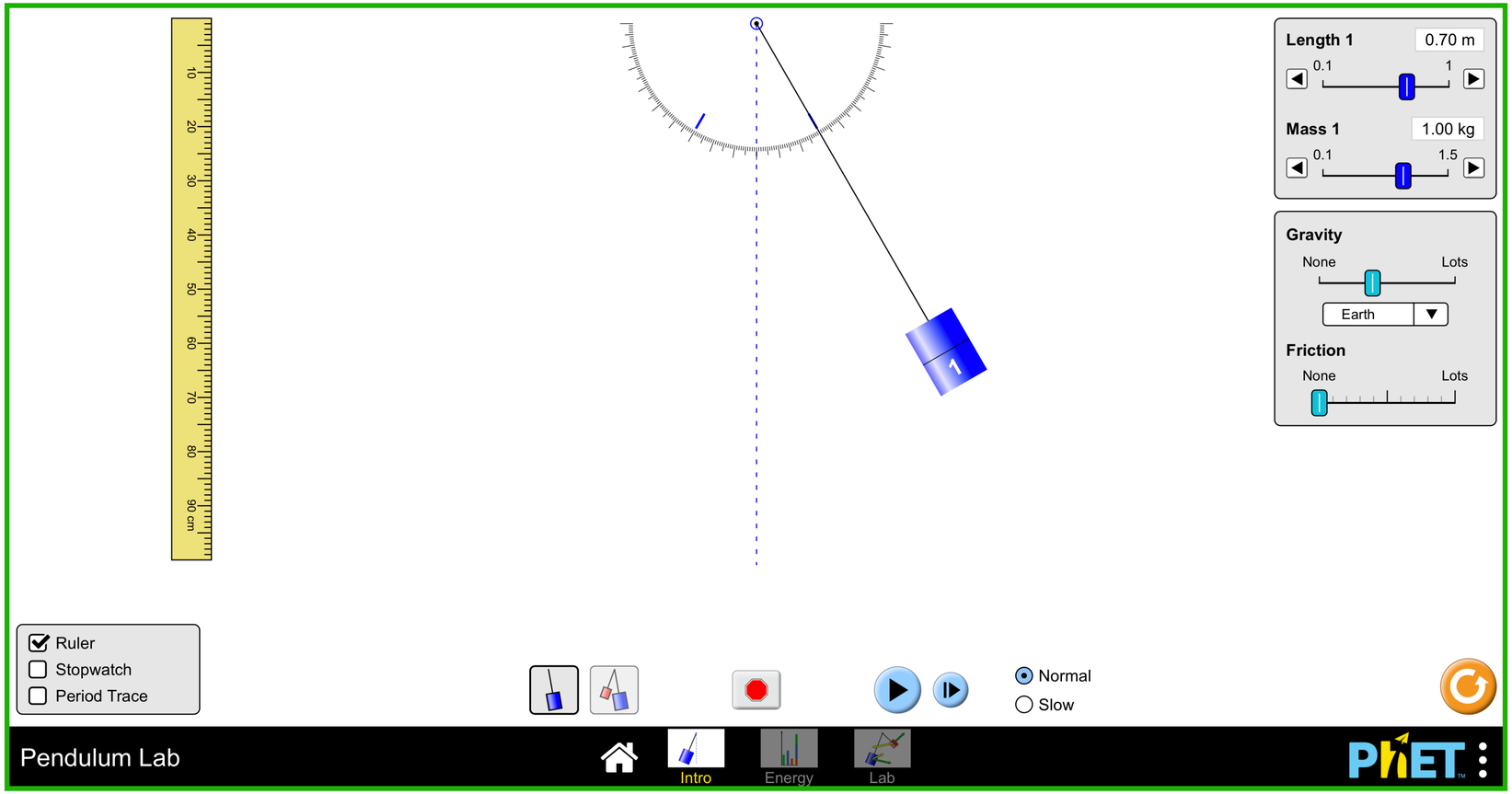


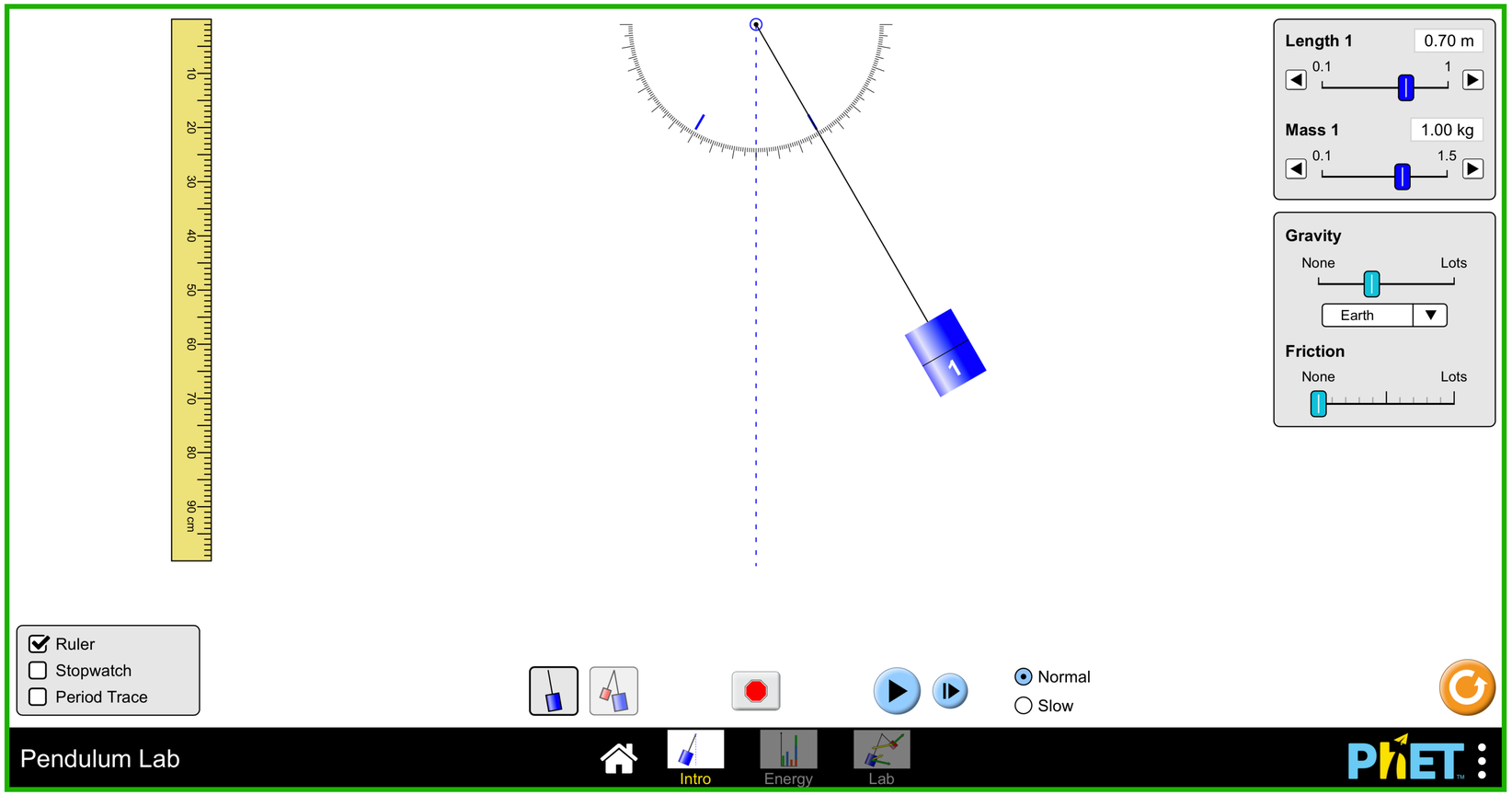
https://phet.colorado.edu/sims/html/pendulum-lab/latest/pendulum-lab_en.html

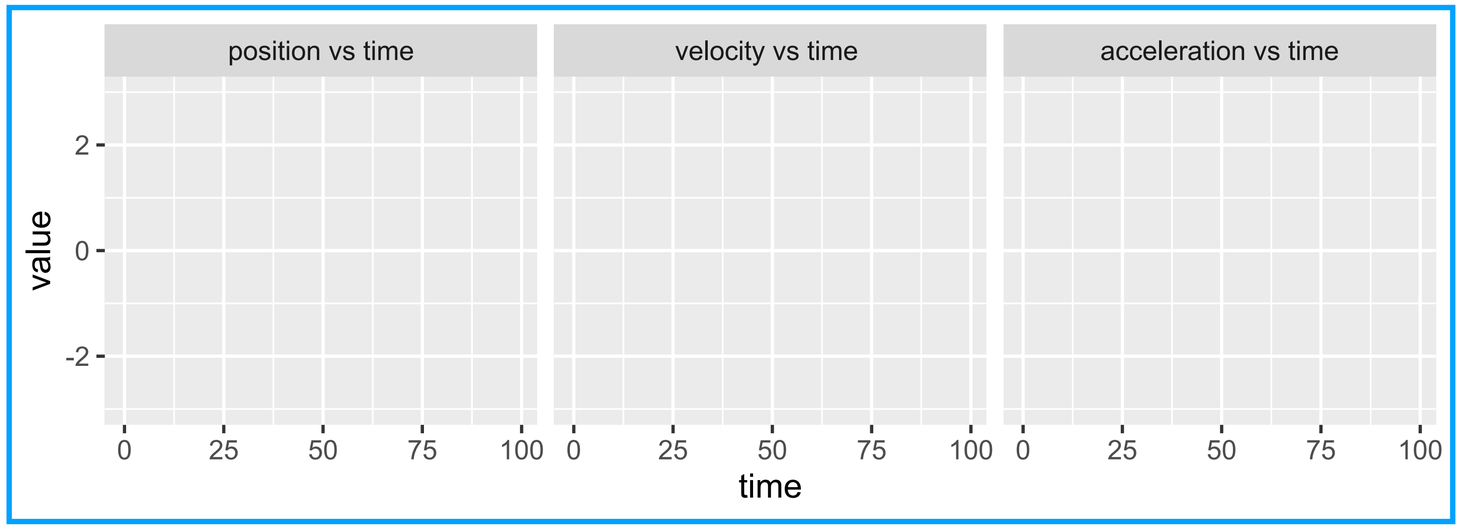
First component:
A physics simulation engine

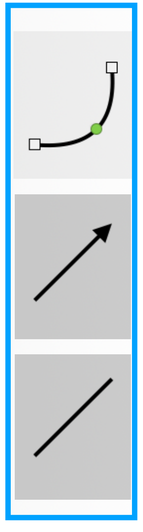
There are open source engines available that we hope to build from

https://phet.colorado.edu/

Alternatively, consider building from scratch





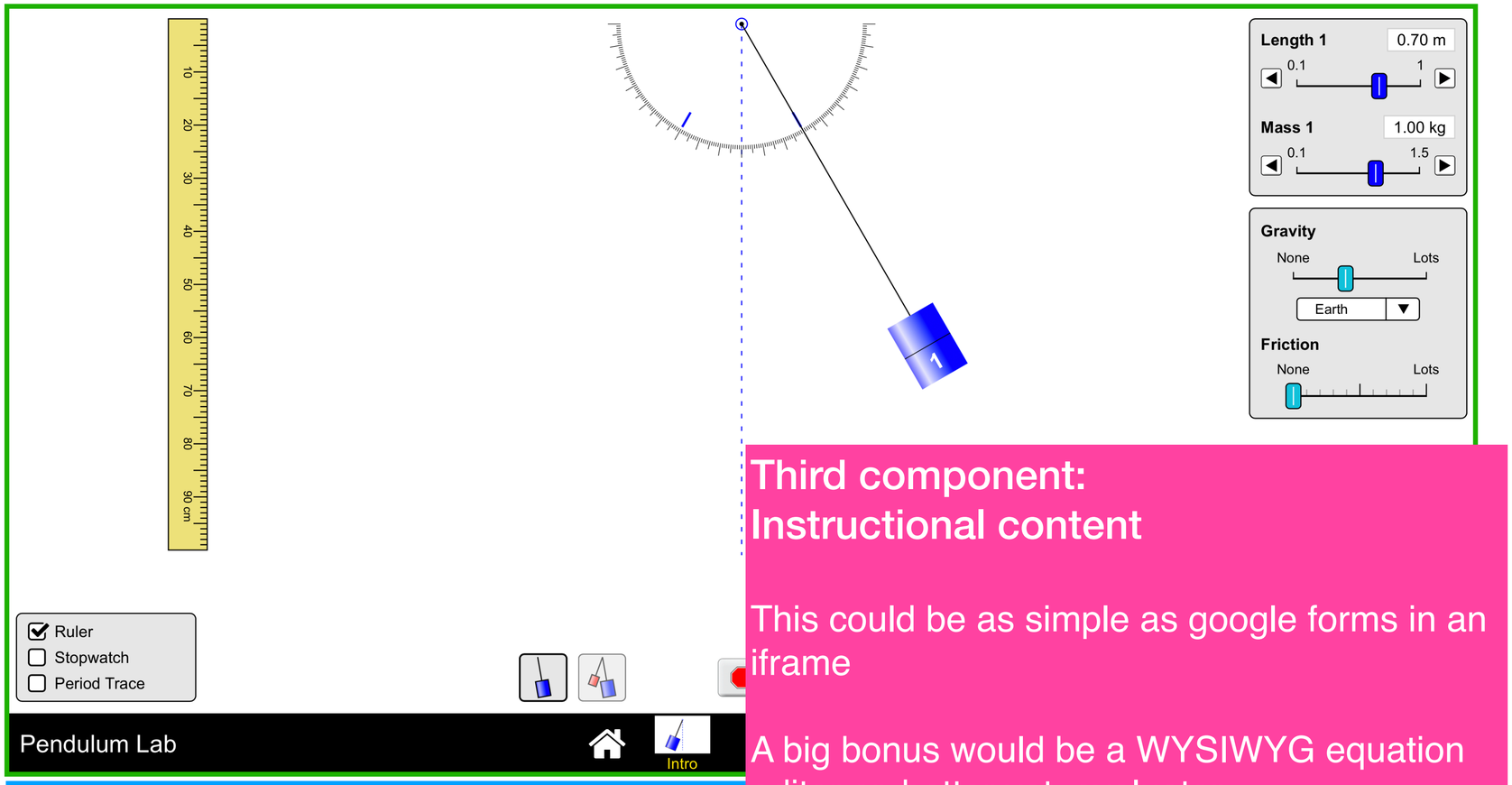


Second component:
Graphs that represent aspects of the sim

Plots should present output from the simulation

Students should be able to add lines to plots using basic editor tools.

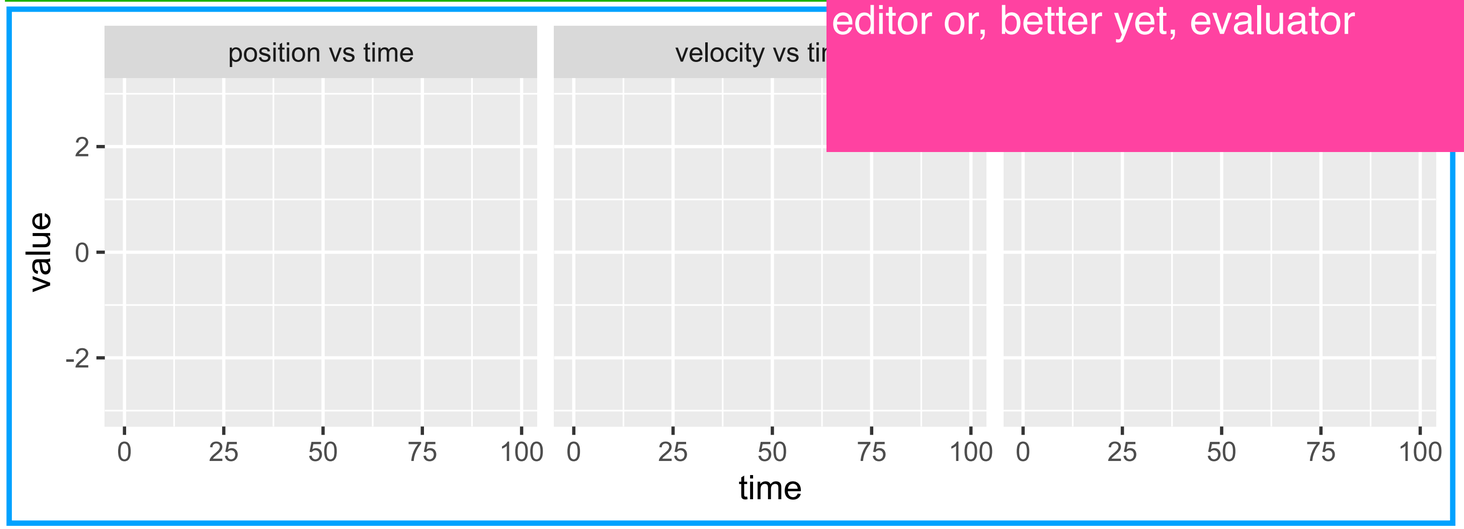
Student input **does not** need to interact with the simulation - the graphs just needs to represent data from the two different sources, the sim and the student

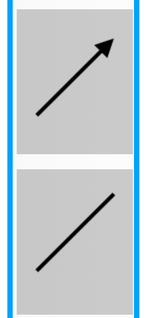


Third component: Instructional content

This could be as simple as google forms in an iframe

A big bonus would be a WYSIWYG equation editor or, better yet, evaluator





Exercise 1: Motion of a pendulum

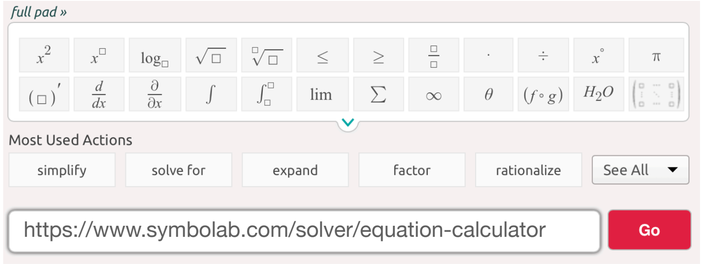
Before staring with simulation, please take a moment to sketch out how you think how the pendulum's position, velocity, and acceleration will changes over time when it is released from its current position — make sure to note the settings for gravity and friction!

You can directly edit plots using the provided plot editor tools. The goal is to capture the overall trend in the plots, don't worry too much about specific values.

After filling in the plots, go head a run the simulation and compare your plots to the output of the simulation.
[…]

Assessment questions

1. Write a formula expressing the position of a pendulum as a function of time



Summary

- Improving physics education with an integrated web app
- This presentation focussed on 3 components of student UI
- Also need to think about instructor UI, data capture
- Open to implementation ideas and looking forward to input from students