Lesson plans for *Gravity Force Lab* Activities 1 and 2 :

Homework

Learning Goals:
Students will be able to:

Activity 1- Introduction

- Describe how force between two masses changes with mass and distance.
- Describe how the force on a small mass compares to the force on a larger mass. *"Identify action-reaction pairs" is what this is called in my text*
- Compare the force of gravity between planets to the force of gravity between objects like rocks or people.

The following goal could be addressed, but I chose not to put it on the homework because I didn't want this assignment to take too long. I plan to use the sim to do a textbook problem in a class discussion

- Use the simulation to check textbook problems that ask to find the gravitational force between two masses. *I had "applies Universal Law of Gravity", but I decided that was too much help with other goals.*

There are other learning goals for the unit under "Lab Skills", but are not explicitly included in all activities. See my webpage for unit learning goals.
http://jeffcoweb.jeffco.k12.co.us/high/evergreen/science/loeblein/learninggoals/physics_lg.html

Activity 2- Advanced

- Design experiments that allow you to derive an equation that relates mass, distance, and gravitational force.
- Use measurements to determine the universal gravitational constant.

Background:
I am assigning this during the last unit of the semester. My students will have had many opportunities to design experiments and evaluate curve fit. If you would like to see how this fits in the scope of my course, see http://phet.colorado.edu/teacher_ideas/view-contribution.php?contribution_id=358

Activity 2 could be used anytime during the year when you are trying to help students with experimental design. I have other activities scheduled that use other sims during this unit, so I do not plan to use Activity 2 this year:

Pendulum Homework http://phet/teacher_ideas/view-contribution.php?contribution_id=563
Pendulum 2 Find g on Planet X Homework
http://phet/teacher_ideas/view-contribution.php?contribution_id=564
Masses and Springs: Determine Mass of unknown Homework
http://phet.colorado.edu/teacher_ideas/view-contribution.php?contribution_id=4

***Gravity Force Lab* Introduction:**
You may want to check out the Teaching Tips.

Lesson:
These are designed for homework assignments.