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Reflection – Probeware Math-Science Interdisciplinary Lesson Plan

The emphasis of this lesson is to have students use the tools of physics and math to create a model that represents the real world, in the process students use technology in a simple, but powerful way in which they take data and abstract it to make a model of a real world situation. The strength of this lesson plan comes from its non-cursory use of calculus and regression to interpret and fit the data. Because of this, this probe ware lesson fits just as well into an introductory calculus classroom as it does into a physics classroom and serves as an extension to motion, forces, and rates of change.

It is an overarching goal in my class to have students use induction to reason out how the world works. One way to modify this lesson plan is to expand the allotted time to allow for students to discover, rather than be told, the relationship between the force of air resistance and velocity. However, there is a danger in losing the focus of the lesson plan in doing so. I think as is it has students practicing using regression to find constant and to see the relationship between variables, this is a suitable amount of scaffolding for a lesson that shows up early in the year.

This lesson serves to introduce concepts that are completely overlooked in most introductory classes. Both fluid dynamics and differential equations, are difficult, but vitally important to understanding our world. No single lesson plan can address these topics in depth, this one provides an opportunity to see both being applied on a very simple level, possibly for the first time. This will provide some context if they go on to see them in a later course.

A future modification to this lesson is to add a researched based application. This lesson creates a model of air resistance and terminal velocity dependent on mass, but it would be interesting to have students work out other models. Students could be asked to plan an

experiment which determines a model of air resistance based on some other measurable variable, such as area, height, rotation, or angle. This would further reinforce the skills of using induction to derive common formulas in physics.

A performance based modification might be to follow this lesson with a different fluid dynamics scenario such as boats in water. Students might design different boats, race them, and determine what measurable factors determined the boat velocities. In a performance based evaluation students might could redesign there boats using the models of resistance they are to create.