

Galileo: Inclined Plane Assignment

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In Galileo's inclined plane experiment, no one is completely sure how he was able to set up the instrumentation. One theory is that Galileo was able to recognize musical notes so well that he was able to discern rates of speed based on the musical notes.

Philosophers of science should have hands on experience with the challenges of creating situations that illuminate the structure of the world, in other words, doing experiments. The learning value here is an appreciation of the complexity and creativity involved in organizing a small part of the world so that it speaks clearly to us about the underlying regularities that we rely on for the prediction and control of our environment. In this assignment students evaluate the experimentation used by Galileo to recreate the inclined plane experiment.

Philosophers watch performances, and develop models based on observations. This experimentation provides the direct experience and evaluation from the actuality of creating the “small world” environment. The makerspace provides an awesome environment for this sort of hands on challenge. The space facilitates without constraining ideas. This is particularly important because a critical aspect of this exercise is the imaginative work needed to create an experiment, more than simply a prescriptive physics laboratory. What students need is the sense of trying something and having it go horribly wrong - then find something else.

Recreate the Galileo Ramp Experiment

Steps to complete the assignment:

- Review the literature about Galileo’s work with the inclined plane
- Working in small groups, develop an initial plan for recreating the central features of Galileo’s work
- Carry out the plan
- Gather data using the devices you have constructed
- Revise your plan based on observed data
 - If you feel your experiment was a success, add a degree of difficulty, e.g. timing
 - If you feel your experiment was a failure, identify changes to overcome difficulties
 - Keep going until you run out of time aka the semester ends

Assessment

- Maintain a journal, roughly one per week, and a third of this will be on recreating Galileo’s work
 - These journals will be analyzed using an inductive coding process and a combined qualitative/quantitative content analysis methodology, to look for evidence of the following maker competencies:
 - expresses curiosity about how things are made and how they work
 - analyses the problem and breaks it into component parts
 - brainstorms for a variety of solutions & chooses the best one
 - solicits advice, knowledge and specific skills succinctly from experts
 - creates 3D models using appropriate software
- Incorporate review in final paper
- Present findings and work in final presentation