

## Gravity and the Laws of Motion

Until Galileo's famous experiments with gravity, the predominant view of motion was that of Aristotle. He explained that lighter objects fell more slowly than heavy objects. It was a more "elemental" view of the world, where rocks, containing more earth and water, fell faster than lighter objects that contained more air and fire. Aristotle also maintained that the natural state of any object was to be at rest, so an object should stop moving when the force acting upon it is removed.

Galileo performed a series of experiments to test the laws of motion, discovering the principle of inertia, and showing that gravity causes an acceleration that is constant for all objects. As a result of constant acceleration, the velocity of a falling object increases continuously.

### Problem:

- A) Objects rolling down an inclined plane.
- B) Acceleration of gravity – using an air track to take friction out of the equation.

### Available Equipment:

Balls of different materials & sizes  
Scale for weighing the balls  
Ramps and air tracks (inclined planes)  
Stopwatch  
Ruler

- 1.) Before coming to lab on Tuesday, read Chapter 4, and answer the following questions.
- 2.) What was wrong with Galileo's experiment? Why isn't rolling a ball down a ramp the best way to measure the acceleration of gravity? What other physical phenomena are ignored?
- 3.) What are some ways to improve upon Galileo's experiment? How do you intend to measure the acceleration due to gravity?
- 4.) Draw a diagram of your intended apparatus – how will the geometry allow you to measure the acceleration due to gravity?