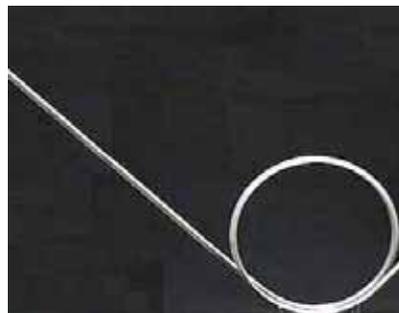


## Lab 8: Roller Coaster of Statistically Likely Doom (Part 1)

Your circus is making a ton of money. Crowds are lining up every night for a chance to see the launching clowns. Every child loses a great deal of money on your new penny-launching game (they come *so close* to winning each time, but not quite). The head clown approaches you for a new idea: design a roller coaster with a loop in it. Now, you won't be able to build a full track to experiment with. *Using just a section of roller coaster track, you have to figure out how high to make the track so the car will make it around the loop.*



### Question:

What is the minimum height at which you can release the ball in order for the ball to *just make it* around the loop? Extra credit will be awarded to the group that comes up with the lowest height that actually makes it over.

This week will be devoted to data-taking.

- Brainstorm some ideas of what might affect the speed of the marble.
- Determine which factors are important enough to consider.
- Design an experiment to test the effects of these factors

Next week you will be able to test out your roller coaster prototype using the information your class has accumulated.

<b>I. Introduction</b>	<b>5 min</b>	<b>Whole class</b>
<b>II. Brainstorm and plan</b>	<b>15 min</b>	<b>Groups of 4</b>
<b>III. Carry out the experiment</b>	<b>85 min</b>	<b>Groups of 4</b>
<b>IV. Evaluate your experiment</b>	<b>15 min</b>	<b>Groups of 4</b>

Next week, you will apply your results to make a prediction about a real apparatus. Don't submit a lab report today.

#### MAJOR GOALS:

- *Be able to estimate the uncertainty in data that you are not actually taking, based on your experience with similar experiments. Use that knowledge to compare experimental methods without implementing them.*
- *Identify the kind of uncertainty that can be minimized with experimental design or technique, and minimize it.*
- *Determine the uncertainty in a calculated result based on the uncertainty in experimental data.*