

## Two-dimensional Motion Model Validation Lab

In this lab you will be utilizing the modeling tools you already have to make predictions, which you will then test.

Your challenge is as follows: Create a model which predicts where to place a paper coffee cup so that when you roll a small marble down a track and off the lab table the marble lands in the coffee cup.

In order to complete this, each group will be restricted to the following equipment:

- a small metal marble,
- a track,
- a stopwatch,
- a meter stick.

You will get only one shot at the coffee cup, when you feel confident that your model predicts where to place the coffee cup let your instructor know and then complete your trial.

**BE ADVISED, THIS LAB WILL BE EVALUATED NOT ON WHETHER THE BALL LANDS IN THE CUP, BUT INSTEAD ON THE DEVELOPMENT OF THE MODEL WHICH GENERATES THE PREDICTION, AND A POST-LAB EVALUATION OF THE MODEL. REPEATED TRIALS OF ROLLING THE BALL OFF THE RAMP DOES NOT MAKE FOR A GOOD MODEL!!!** (is that loud enough and clear enough?)

Pre-lab question #1. What will this lab write up be evaluated on?

Because this is your first formal lab write up, it is important to provide you with our expectations for what the write up should include.

Keep in mind that the goal is to establish a model which predicts where to place the cup so that a marble rolled off the ramp/table will land in the cup. To this end you should utilize the tools that you have to describe all elements of the motion of the marble.

*Describe the model set up:*

If you measure things, you should describe what you measure, how you made the measurements and how you are using the measurements.

If you are making assumptions, identify them.

Include all diagrams/representations that you are

Explain how your model predicts the placement of the cup.

Identify where you decided to place the cup.

*Describe the results of the trial:*

What did you do?

Did the marble land in the cup or not?

*Describe how your model predicted accurately/inaccurately the results of your trial:*

If your prediction was accurate, describe why you think it was so.

If your prediction was inaccurate, try to identify what elements of your model led to the inaccurate prediction.