# Let It Roll (Part 1)

You have been hired to design and build a shopping cart for a popular cable TV show that we can't name. This cart will be used to ferry a group of talented stuntmen down a ramp and into traffic, and you need help deciding what kind of wheels to use. They come with a lot of options for wheel design – you get to choose the material, shape, and size of the wheel rim. You wonder if any of these things will affect *how quickly* the wheels *accelerate* down the ramp.
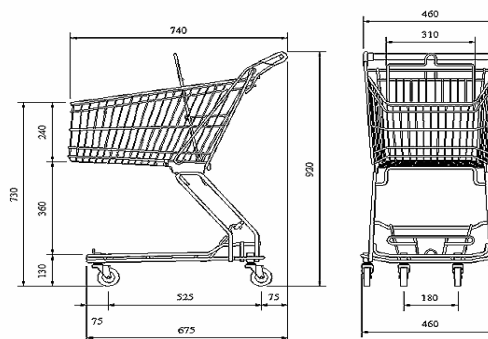
Question:

What affects the acceleration of a rolling object?
    Choose **one** property to investigate as a group.
    Pool your data as a class and try to decide which factors affect the acceleration and which don't.

Next week you will be doing a similar experiment, so work on *improving your measuring technique*.

I. Introduction   5 min   Whole class

II. Brainstorm and plan   15 min   Groups of 4
        *Make sure to show the TA your design before you start taking data

III. Carry out the experiment and analysis   45 min   Groups of 4

        Write the journal and data interpretation sections while you work. Observe any improvements in your measuring technique and note how they affect your data interpretation.

IV. Class discussion   40 min   Whole Class

        Pool your data as a class and try to decide which factors affect the acceleration and which don't.

V. Evaluate your experiment and analysis   15 min   Whole Class

        You will complete your lab report by applying your results to an example next week.

        Excel hint: Error bars
Sometimes, instead of plotting your data as single points, it is more useful to plot it as a *spread* of possible data points, based on how well you know your data. To do this, double-click on one of the data points on your graph, select **Y-Error Bars,** and choose the method most appropriate for your data.

MAJOR GOALS:
*   *Decide how much of a difference between measured values is significant in this context, and why.*
*   *Combine data sets from different experiments in a meaningful and valid manner to reach a well-supported conclusion.*