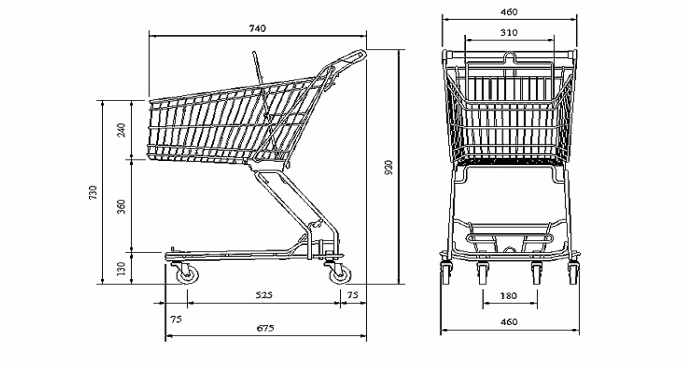
Lab 4: Let It Roll

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

Turn in your lab report.

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.*