The **objective** of your crash cushion is to reduce the force experienced by the car.

What will your crash cushion need to do during the crash in order for it to reduce the **force** experienced by the car?

Procedure for Control: Crash Without Cushion
Your group will conduct a control crash without a crash cushion.

Control Crash

1. Set up the control crash as shown in the setup diagram.
2. Sync the PocketLab to your device, select the Acceleration Scalar graph, and check that the data rate is fastest available.
3. Begin recording data and release the car down the ramp.
4. Stop the recording and as a group, discuss which "spike" in the graph was the actual collision. (*Hint: there will be a distinctive "bump" or "spike" in the graph when the car moves from the ramp to the flat ground/table. This should happen just before the crash.*)
5. Record the results of each trial in a data table and average the trials. Conduct 3 trials.
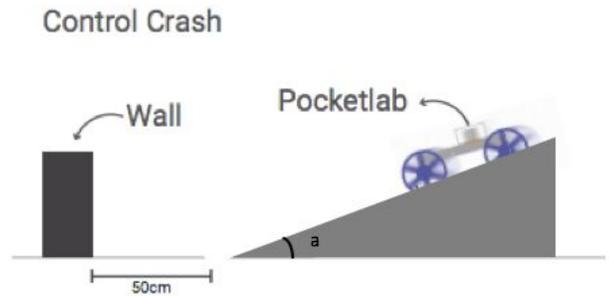
Procedure for Design:
Using no more than 3 pieces of paper, build a crash cushion that will reduce the force experienced by the cart as it crashes into the wall. Re-design for a second cushion.

You will test your models with your group by collecting acceleration data with PocketLab. Using the data collected from your crash cushion models, you will then draw a conclusion about how to design optimal crash cushions to prevent traffic fatalities.

CAR CRASH WITH **NO** BARRIER	
TRIAL	**MAX ACCELERATION (m/s^2)**
Trial 1	
Trial 2	
Trial 3	
Average	

CAR CRASH WITH _____ BARRIER	
TRIAL	**MAX ACCELERATION (m/s^2)**
Trial 1	
Trial 2	
Trial 3	
Average	

CAR CRASH WITH _____ BARRIER	
TRIAL	**MAX ACCELERATION (m/s^2)**
Trial 1	
Trial 2	
Trial 3	
Average	

Analyzing Data and Drawing Conclusions:
1. Which of your designs was most effective at making the most optimal crash cushion and why?

2. How does the evidence that you gathered from the lab and scientific reasoning that explains why the data supports your conclusion?

3. If you wanted to make cars safer during head-on collisions with other cars, what would you design the front of the car to do at impact?