**Gravity Racer**

**Engineering Design Project**

**Challenge 1 (test 1):** to get your vehicle to travel as far as possible with only the gravitational energy provided by the ramp height.

**Challenge 2 (test 2):** to have it stop at the One Meter goal line that will be marked on the floor.

**Materials:**

-consider constraints because these limit your design! You cannot substitute other items. This list is all that is available to you.

Required:

* At least a 25 cm2 piece of cardboard or a 25 cm2 piece of plastic bottle
* Minimum of 3 wheels
* One 3-D designed and printed item of the minimum size 5 cm2  and maximum size of 100 cm2; the printed item MUST be part of the structural integrity of your car; design MUST be approved before printing (no cost)
* Additional 3-D printed items will cost $15 (size minimum and maximum apply)
* Must purchase one set of each wheel type
* No new materials are handed out, you use what you purchase on auction day

Optional Materials: Budget is $100

| **Item** | **Unit Cost** | **Max. Quantity** | **Item** | **Unit Cost** | **Max. Quantity** |
| --- | --- | --- | --- | --- | --- |
| Bottle caps | $10 each |  | plastic bottle | $30 | max. of one |
| Toilet paper tubes | $5 each |  | Nuun bottle | $15 | max. of two |
| Drinking straws | $10 each |  | Popsicle sticks | $5 each |  |
| Skinny wheels | $20 per pair | 1 | Cardboard | $10 per piece (30cm x 30 cm) | max. of 2 pieces |
| Fat wheels | $20 per pair | 1 |
| 3-D item | $15 per item |  | Required 3-D element 2 - 10 cm2 | | Free |

Equipment/Tools (not part of car)

Hot glue & glue gun scissors tape- for prototypes ONLY

triple beam balance craft knife (with Mrs. Gallivan) rulers

ramp books

**Record your Shopping List here:**

| **Item** | **Quantity** | **Unit Cost** | **Total Cost** |
| --- | --- | --- | --- |
| Skinny wheels | 1 pair required | $20 | $20 |
| Fat wheels | 1 pair required | $20 | $20 |
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**Procedure:**

1. In your lab journal, record the steps of the Engineering Design Process and the actions your group took at each step. See rubric for details.
2. All entries should include dates and lots of details about what was done that day, what successes were achieved and what failures occurred. The journal should also include ideas for changes and reasons changes were made linked to background research.
3. Make sure to draw or sketch ideas and label all drawings.
4. Take final measurements of your final car and add to a final drawing. Make sure to draw and label the TWO final designs: one for each test/goal. You have 5 minutes in between tests to modify your car.