***Physics 11 Project***

Your task is to build/use a small car and provide some source of energy and force to make the car travel exactly 2m. You can build your own vehicle, or use an existing type of vehicle (like Hotwheels, or LEGO cars). You will have to provide some source of energy or force to move the vehicle, but remote controlled cars will be not allowed.

For this project you will have to submit a short report on your project. You will include a section on the car you used, a discussing how the car is powered and/or braked from a physics perspective and include approximate estimates for the possible sources of error.

Examples of car types (totally can do something different):

-Hotwheels

-LEGO

-Home-Made from popsicle sticks and bottle caps

Examples of energy sources (again, if you do something different: awesome):

-Small electric motor (needs some braking mechanism too)

-Wind-up elastics

-Pushing Spring mechanism

-Ramps

-Catapult

-A single push with your hand/foot 🡨(if you do this, you’re cruising for a 50% top mark)

Things not allowed (not all the things disallowed, but I can’t think of any other form of cheating at the moment):

-Pulling it with string

-Putting up a wall at 2m

-Attaching it to a 2m string

-Remote controlled cars

**Mark Breakdown:**

Marks

3 -Have a Car and Physics Analysis

5 -Have an Energy Source and Physics Analysis

2 -Analysis of possible sources of Error

10 -How accurate your car is. (-1 mark for every 20cm off 2m)

20 Total

BONUS: If your car makes it 2m exactly, you will receive 5 Points!

NOTE: An exemplary report will be able to make up for experimental error

Example of a Near Perfect project

Annie A-Grade submits a report on her car made from hair rollers and is powered by a rubber band coiled around an axle. She includes how her car is made, how it is expected to roll (hair rollers will have high friction with the ground, thus causing it to move when they turn). She researches Hooke’s Law (the law that governs force given by elastic energy) and includes calculations to show how much force (or Work) she will have to have applied to move the car exactly 2m. She analyzes error, including efficiency loss of non-perfect elastics and includes her calculations given by a couple test runs for an approximate force of friction that has to be overcome. She modifies her earlier calculations to include the results from the error.

Since she made her report clear, concise and easy to read/follow, as well as chock full of good physics I’d still give her 20/20 even if the car only went 1.6m (or 2.4m).

Example of a Near Fail project

Bob Barely-Passing submits a report that looks like this:

Car: Hotwheels

Force: Ramp. Gravity pulls the car down the ramp.

Error: Friction ‘N Stuff

The lack of discussion of how the gravity pulls it down the ramp and the lack of any form of formula to even TRY to estimate the amount of energy/force involved doesn’t bode well for Bob. The Error section identifies one possible source of error, but does nothing to try to explain what it will do and what he has to do about it.

If he manages to get lucky and get between 1.8m and 2.2m, he passes with 50%. Good job Bob Barely-Passing. (Note:Sarcasm)

If you need any help or ideas you may feel free to come to me for advice and help. Research things you don’t know, you have the technology.

July 13th is the day we will be testing all our cars. The reports will be due then too.