Mouse Trap Car Final Calculations!

We need to find which car did the best in these 5 categories for each class and for all the 6^{th} 7^{th} grade. (and we need to learn a little bit of physics)

Category 1……Distance
This is easy, How far did your car go? Distance _____ft
We actually need this in Meters so….
First convert inches to feet. So if your car went 12 feet 5 inches
Take the 5 inches and divide it by 12 since there is 12 inches in
1 foot. (example 5/12 = 0.42feet)
Thus…the example car went 12.42 feet and….
1 foot is 0.305 meters. So multiply your total feet times 0.305meters.
(example 12.42 x 0.305 = 3.79 meters)

Distance in Meters_____m

Category 2……Duration of run.
Also easy, How long was it moving? Duration _____sec

Category 3……Maximum Speed.
A bit harder.
If we assume that Newton's second law of motion hold true….

"Newton's Second Law of Motion states that when a force acts on an object, it will cause the object to accelerate. The larger the mass of the object, the greater the force will need to be to cause it to accelerate"

That means that the car should be accelerating for as long as the mouse trap and string is pulling on the axle.
Sooo…That means all we have to do is wind the string around the axle as normal and carefully count the number of rotations the CD takes to unwind. The CD is 4.75 inches in diameter and the formula for calculating circumference is simply π times diameter or……3.14 x 0.120 meters That is 0.377 meters.

Now multiply your number of rotations times 0.377 meters. We'll call that the Force applied Distance or FAD.

FAD _____m
Excellent! Now locate your Stick time. Stick Time _____sec

Finally divide your FAD by your stick time to get Max Speed

Max Speed _____m/sec

Category 4….Momentum!
Momentum is defined as the product of an object's velocity and its mass.
So..this is easy simply divide the mass of your car by 1000 to convert it to kilograms

Kilogram mass _____kg

Multiply the kilogram mass of the car by the max speed. That should give you Momentum!

Momentum _____kg m/sec

Lastly
Category 5……..Average speed
Another easy one…Divide the Distance in Meters (from Category 1) by the Duration (from Category 2)

Average speed_____m/sec