

Name: \_\_\_\_\_ Period \_\_\_\_\_ Due Date: **Thursday, September 6, 2018**

### **Honors Physics Balloon Car**

Each student will design and build a toy car which is powered by a 10-inch (or smaller) diameter round balloon. Each student will perform measurements in class and determine how long her/his car takes to travel one-meter from the start line to the finish line. Each student will calculate the average acceleration and final velocity of the car over the one-meter distance.

#### **Materials:**

1 – 10 inch or smaller round balloon  
Additional “add-on” materials as needed

#### **Construction Requirements, Rules, and Remarks:**

1. The vehicle must maintain at least 3 points of rolling contact with the floor at all times.
2. The vehicle can only be powered by one 10 inch or smaller round balloon.
3. The wheels and axle used on the vehicle cannot have been professionally manufactured for that purpose.

#### **Grading:**

- 1 point will be awarded for building a car which meets all the rules.
- 2 points will be awarded for building a car which can move across the floor from the start line to the finish line one-meter away.
- 1 point will be awarded for the calculation of the car’s acceleration over the 1-meter distance.
- 1 point will be awarded for the calculation of the balloon car’s final velocity at the end of one meter.
- Cars which do not cross the finish line will use a time of 10 seconds for calculations.
- A bonus of 0.5 points will be awarded for the cars with the top five average accelerations (for the full 1 meter) in the class.
- **This form must be submitted with the project to receive credit.**

#### **Project Turn-in:**

- Absent students should arrange to have projects dropped off in the front office with student name and teacher’s name attached to it; otherwise, a zero will be earned on the project grade. The project must arrive in the front office **prior to the tardy bell** vis-à-vis honors physics class and must be time/date stamped by front office personnel.
- Projects are due when the tardy bell rings; any projects not in class or not complete at that time will **not be accepted**.
- Any student earning a zero on the project may take the 9-weeks comprehensive retake to replace the zero on the major project.

Name: \_\_\_\_\_

**Score**

**0 1 Car meets all construction requirements**

**0 2 Car crosses the finish line**

**0 0.5 1 Calculation of acceleration**

<b>Given</b>	<b>Formula</b>	<b>Substitution</b>	<b>Answer with Units</b>
$V_i =$ $d =$ $t =$ $a = ?$			

**0 0.5 1 Calculation of final velocity**

<b>Given</b>	<b>Formula</b>	<b>Substitution</b>	<b>Answer with Units</b>
$V_i =$ $a =$ $t =$ $V_f = ?$			

**0 0.5 Bonus**

\_\_\_\_\_ / 5.0 Total Points