Balloon Powered Race Cars

Objectives:
- To create a balloon powered race car for maximum speed and distance
- To learn how to use the formula speed = distance / time
- To practice writing pieces of a scientific lab report

Materials:
- 9 inch balloon is standard (1 is provided)
- Pen barrel or straw (1 straw is provided)
- Various materials to construct the racers
- Grading rubric (on the back of this sheet)

Rules:
- The car must be powered by no more than 2 balloons
- You can build the car out of anything
- It must have at least three wheels
- Wheels are defined as anything that is round and goes around
- The wheels cannot be wheels from a toy car; they must be made out of something that was not originally meant to be used as wheels
- The car may not leave the ground

Procedure:

Project day 1-3: car design and construction
- Materials are due on 2/25
- No construction may be completed at home
- You will have 3 class periods to design and construct your balloon car
- During this time you will also begin and solidify your lab report

Project day 4: race day
- A track will be set up in the lab room
- The track will be a hard surface, not carpet
- You will race in pairs against other classmates
- You will find and record your balloon car’s distance, time, and speed
- Much of the class period can be spent solidifying your lab report

Project day 5 & 6: lab report completion
- You will finish the lab report started during days 1-4 of the project
- The lab report will include the following pieces:
  1. Title
  2. Materials list
  3. 1 paragraph relating the following topics to the balloon car project
     a) Reference point
     b) Velocity
     c) Resultant velocity
  4. Conclusion paragraph: unplanned variables
  5. Conclusion paragraph: data analysis
  6. Conclusion paragraph: similar experiment
  7. Conclusion paragraph: real life significance
  8. Conclusion paragraph: opinions
BALLOON POWERED RACE CARS

RACER'S NAMES: ___________________________ PERIOD __________________

TEAM NAME: ______________________________

RACE STATISTICS

DISTANCE TRAVELED: _______ METERS

<table>
<thead>
<tr>
<th>Distance Traveled</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1 M</td>
<td>2 pts</td>
</tr>
<tr>
<td>1-2 M</td>
<td>4 pts</td>
</tr>
<tr>
<td>2-3 M</td>
<td>6 pts</td>
</tr>
<tr>
<td>3-4 M</td>
<td>8 pts</td>
</tr>
<tr>
<td>4-5 M</td>
<td>10 pts</td>
</tr>
<tr>
<td>&gt; 5 M</td>
<td>+2 EC</td>
</tr>
</tbody>
</table>

TIME from letting balloon go to car stopping or until the air runs out of the balloon (if car does not move or stops while air is still coming out): _______ SECONDS

SPEED calculate distance divided by time: _______ _______ (units)

5 pts

DESIGN checked by Mr. B!

CAR follows rules □ CAR IS DISQUALIFIED □ 10 pts 0 pts

CONCLUSION _______ POINTS (following the rubric on the back) completed together and saved in the X: drive by the end of class on Day 6!

OTHER (POINTS LOST)

□ LOSING THIS LAB SHEET AND NOT PRINTING ONE FROM MY WEBSITE (-10)
□ INAPPROPRIATE USE OF BALLOONS (-5 EACH OFFENSE)
□ MEMBERS OF GROUP NOT STAYING TOGETHER (-5 EACH OFFENSE)

TOTAL POINTS:    70
<table>
<thead>
<tr>
<th>Topic</th>
<th>5 points</th>
<th>3 points</th>
<th>1 point</th>
<th>0 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>Completely reflects the purpose of the lab and includes mention of both independent and dependent variables.</td>
<td>Reflects the purpose of the lab but is missing one or both variables.</td>
<td>Does not accurately reflect the purpose of the lab.</td>
<td>Not present</td>
</tr>
<tr>
<td>Materials list</td>
<td>Organized, bulleted list. Includes all materials needed for the project. Specifics, such as quantities or sizes.</td>
<td>List is missing one of the following: organization; bullets; all necessary materials; specifics.</td>
<td>List is missing two or more of the following: organization; bullets; all necessary materials; specifics.</td>
<td>Not present</td>
</tr>
<tr>
<td>Paragraph 1: vocabulary relation (reference point, velocity, resultant velocity)</td>
<td>Paragraph is of supreme quality and directly relates each vocabulary word to the project. 0-1 pronouns present.</td>
<td>Paragraph is of standard quality or partially relates each vocabulary word to the project, or 2 or more pronouns present.</td>
<td>Paragraph is of poor quality or does not relate one or more vocabulary word to the project.</td>
<td>Not present</td>
</tr>
<tr>
<td>Paragraph 2: unplanned variables</td>
<td>Paragraph is of supreme quality and discusses all unplanned variables that occurred throughout the experiment and mentions when they occurred, and what was done to overcome them. 0-1 pronouns present.</td>
<td>Paragraph is of standard quality or missing one of the following: all unplanned variables mentioned, when they occurred, or what was done to overcome them, or 2 or more pronouns present.</td>
<td>Paragraph is of poor quality or is missing two or more of the following: all unplanned variables mentioned, when they occurred, or what was done to overcome them.</td>
<td>Not present</td>
</tr>
<tr>
<td>Paragraph 3: data analysis</td>
<td>Paragraph is of supreme quality and discusses the balloon car’s total distance travelled, the recorded time, and the calculated speed. The paragraph also explains what directly helped or hindered the car’s data. 0-1 pronouns present.</td>
<td>Paragraph is of standard quality or is missing one of the following: distance, time, speed, or what directly helped or hindered the car’s data, or 2 or more pronouns present.</td>
<td>Paragraph is of poor quality or is missing two or more of the following: distance, time, speed, or what directly helped or hindered the car’s data.</td>
<td>Not present</td>
</tr>
<tr>
<td>Paragraph 4: similar experiment</td>
<td>Paragraph is of supreme quality and discusses one experiment that directly relates to this experiment. The experiment must be explained fully, including both independent and dependent variables. 0-1 pronouns present.</td>
<td>Paragraph is of standard quality or is missing one of the following: a discussion of a single experiment, and description of both the independent and dependent variables, or 2 or more pronouns present.</td>
<td>Paragraph is of poor quality, or is missing two or more of the following: a discussion of a single experiment, and description of both the independent and dependent variables.</td>
<td>Not present</td>
</tr>
<tr>
<td>Paragraph 5: real life significance</td>
<td>Paragraph is of supreme quality and explains how this experiment relates to real life. Prior knowledge and critical thinking is clearly evident and shows learning above and beyond the limitations of this experiment. 0-1 pronouns present.</td>
<td>Paragraph is of standard quality or is missing one of the following: relation to the real world, using prior knowledge, or showing critical thinking, or 2 or more pronouns present.</td>
<td>Paragraph is of poor quality or is missing two or more of the following: relation to the real world, using prior knowledge, or showing critical thinking.</td>
<td>Not present</td>
</tr>
<tr>
<td>Paragraph 6: opinions</td>
<td>Paragraph is of supreme quality and discusses any personal feelings about the project. Any opinions are acceptable as long as they are justified with an explanation. Each group member should have his or her own section.</td>
<td>Paragraph is of standard quality or is missing one of the following: each opinion is justified, or a section for each group member.</td>
<td>Paragraph is of poor quality or is missing two or more of the following: each opinion is justified, or a section for each group member.</td>
<td>Not present</td>
</tr>
</tbody>
</table>