**The Great Paper Roller Coaster Challenge**

Six Flags is looking for a designer to build their next roller coaster. You’ll need to prove that you can make an exciting roller coaster that meets their requirements, using as little money as possible.

**Requirements:**

1. Coaster blueprint – you must design your coaster on paper before actually building
2. Height of coaster must be between 30 cm and 100 cm
3. Track length must be at least 100 cm
4. Coaster must include at least one loop
5. Coaster must include at least five turns
6. Marble must fall into a bucket at the end of the run

**Procedure:** Design and build a Paper Roller Coaster using the supplies you purchase. The roller coaster should be exciting, reliable, and take a long time for the marble to travel from the start to the finish. Look at the scoring chart before you begin.

**Group Checklist/Scoring Chart:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Category** | **Criteria** | **Possible Points** | **Points Awarded** | **Comment** |
| Coaster blueprint | Plans are detailed and demonstrate understanding of coaster design | 10 |  |  |
| Record Keeping | Roller Coaster Group Worksheet completed and accurate | 10 |  |  |
| Reliability | Marble completes the course  (2 points for each time the marble completes the course – 5 trials) | 10 |  |  |
| Height Requirement | Between 30 and 100 cm Subtract 1 point for each 5 cm off | 5 |  |  |
| Track length requirement | At least 100 cm Subtract 1 point for each 5 cm off | 5 |  |  |
| Loop requirement | One Required | 10 |  |  |
| Turn requirement | Five required  (4 points for each turn) | 20 |  |  |
| Construction quality | Coaster stands alone; construction is sound; aesthetically pleasing  (Points deducted for sloppy construction) | 20 points |  |  |
| Excitement | Funnel (+5), extra loops (+2), turns (+1), or uphill sections(+2), Well-developed theme (+5), jump (+5) | Up to 30 points |  |  |
| **Total Points Awarded** | | |  |  |

**Roller Coaster Group Worksheet**

**Materials: You will have to buy all of the material you use!!! If you “mess up” you must purchase replacements.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Type** | **Unit Cost** | **Number Purchased** | **Cost** |
| **Column** | **$0.50** |  |  |
| **Beam** | **$0.50** |  |  |
| **Diagonal Support** | **$0.10** |  |  |
| **Shelf** | **$0.05** |  |  |
| **Bracket** | **$0.05** |  |  |
| **Straight Track** | **$1.00** |  |  |
| **Sharp Curve (turn)** | **$1.25** |  |  |
| **Wide Curve (turn)** | **$1.25** |  |  |
| **Funnel** | **$2.50** |  |  |
| **Loop** | **$1.50** |  |  |
| **Tape** | **$5.00** |  |  |
|  |  |  |  |

**TOTAL COST OF MATERIALS\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Theme (optional):**

**Time Trials:**

**Length of track\_\_\_\_\_\_\_\_\_\_\_\_\_\_ mm**

**Average speed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_mm/s**

**Average Time (sum of all five trials divided by 5)**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Seconds

|  |  |
| --- | --- |
| **Trial** | **Number of Seconds** |
| **1** |  |
| **2** |  |
| **3** |  |
| **4** |  |
| **5** |  |

**Group Members:**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Categories:**

* Best Looking \_\_\_\_\_\_\_\_\_\_\_
* Longest Ride\_\_\_\_\_\_\_\_\_\_\_
* Fastest Speed\_\_\_\_\_\_\_\_\_\_
* Best Theme\_\_\_\_\_\_\_\_\_\_\_\_
* Most Economical\_\_\_\_\_\_\_\_
* Highest Score\_\_\_\_\_\_\_\_\_\_\_
* Most exciting\_\_\_\_\_\_\_\_\_\_\_

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Individual Roller Coaster Project Grade**

**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Category** | **Criteria** | **Possible Points** | **Points Awarded** | **Comments** |
| Roller Coaster Webquest | Webquest complete, answers checked and reviewed by peer | 50 |  |  |
| GPE Worksheet | Worksheet complete, checked for errors and corrected | 10 |  |  |
| Calculating speed, time, distance, and acceleration worksheet | Worksheet complete, checked for errors and corrected | 15 |  |  |
| Participation Pie | Carried fair share of the workload for the group project as reported by peers. | 10 |  |  |
| Group Score | From the group checklist |  |  |  |
|  | **TOTAL** |  |  |  |

***After completing the Great Paper Roller Coaster Challenge, complete this Participation Pie. Determine what percentage of the work was done by each group member and fill in below. If all group members contributed equally, each piece of the pie should be the same size. Don’t forget to write the group member’s name and percentage of contribution on the piece of pie that corresponds to his/her contributions.***

**Name % of Work**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_

For group members who contributed less than their fair share, provide specific comments below: