Balloon Rocket Car

Partner Project

Race Day:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**The Challenge:** Students will design and build a balloon powered rocket car that will travel the greatest distance possible.

We will apply what we have learned about mechanical interactions by building a rocket car that minimizes friction and moves forward using Newton's third law of motion.

**The Rules:**

1. The vehicle may not exceed 12 inches in length and 7 inches in width.
2. The vehicle must have at least three wheels.
3. The vehicle must be powered by one balloon provided by the teacher.
4. The vehicle must be made from simple household materials - nothing prefabricated or taken off of a toy or model cars!
5. The vehicle must travel on its own.
6. The vehicle may not leave the ground.

**The Materials:**  You may use any commonly found household items, including, but not limited to, bottle caps, straws, cardboard, tape, containers, boxes, cartons, empty juice boxes, spools, craft sticks, sting, coat hangers, etc.

**The Timeline:**

Date assigned: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Materials due on: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

We will work on the cars in class on: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Race day: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**The Procedure:**

1. With your partner, design your Balloon Rocket Car on graph paper - consider both top and side views.
2. Brainstorm a list of materials you will need to bring from home. What materials will you bring? What materials will your partner bring? Keep it equal! Bring your materials to SCHOOL!
3. Make your wheel and axle system.
4. Make the body of your car. Think about how you are going to attach your axles.
5. Attach the wheels.
6. Make and attach the propulsion system. This is the balloon rocket engine!
7. Test your Balloon Rocket Car. Fix any glitches!
8. Race your car on race day and record your data.
9. Complete a project summary as directed by your teacher.

Sketch your car here:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Balloon Rocket Car Grading Rubric

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

Partner’s Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
| Requirement | PossiblePoints | Points Earned |
| Vehicle measures less than 12 inches in length. | 5 |   |
| Vehicle measured less than 7 inches in width. | 5 |   |
| Vehicle had at least 3 wheels. | 5 |   |
| Vehicle was made only from commonly found household items. | 20 |   |
| Distance Traveled: \_\_\_\_\_\_\_\_\_\_\_\_1 meter = 5 points; 2 meters = 10 points; 3 meters = 15 points; more than 3 meters = 20 points | 20 |   |
| Participation – Student fully participated in the designing, building and testing of the balloon rocket car. | 10 |   |
| Effort -= Student worked to his/her ability in order to complete the project in a timely manner. | 10 |   |
| Student completed the required data collection worksheet. All data and answers were acceptable and well written.  | 10 |   |
| Total Points | 85 |   |

 77-85 =A 68-76 =B 60-67= C 51-59=D Below 51= F

 Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Balloon Rocket Car Data Collection Sheet

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Car Name | DistanceTraveled Trial #1 | Distance Traveled Trial #2 | Average Distance Traveled | Reflect:What worked well? What didn’t? |
|    |   |   |   |   |
|   |   |   |   |   |
|   |   |   |   |   |
|   |   |   |   |   |
|   |   |   |   |   |
|   |   |   |   |   |
|   |   |   |   |   |
|   |   |   |   |   |
|   |   |   |   |   |
|   |   |   |   |   |
|   |   |   |   |   |
|   |   |   |   |   |
|   |   |   |   |   |
|   |   |   |   |   |
|   |   |   |   |   |
|   |   |   |   |   |
|   |   |   |   |   |

Think of all of the cars that raced today. What trends did you see? What worked? What didn’t?

What worked well for your car?

What could you improve?

How would modify your car to improve its performance?

Exit Slip Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Rocket Balloon Car Reflection**

You have had a few days to design and build your car. So far, what has gone well? What has worked?

 Has there been anything that has not worked? Have you had to change part of your design or the materials that you chose? Explain.

Will you be ready to race tomorrow?