



Balloon Cars

Objective: Students will design and build a "car" that will successfully travel 2 meters (minimum displacement required for which students will earn maximum points).

Design Parameters:

- Car may either have four wheels like a car or three wheels like a tricycle.
- Propulsion can only be provided by the maximum of two nine-inch balloons.
- Wheels may be built out of any available materials of your choosing.
- Students will mount a straw to their car to which the balloon will be attached.
- The body of the car can be built out of any available materials.
- There are no height restrictions.
- Cars cannot be longer than 30 centimeters.

Requirements:

- Cars must have a minimum displacement of two meters.
- Additional points will be awarded for cars traveling further.

Grading:

1. Design: 25 points

- Students using wheels from toy cars or other commercially available wheels will lose 5 points.
- Students using commercially available bodies for their cars (such as toy cars) will lose 5 points.
- Cars longer than 30 centimeters will lose 5 points.
- Students building a car out of readily available materials will earn maximum design points.

2. Performance: 25 points

- Cars having a minimum displacement of 1.0 meters will earn 5 points.
- Cars having a minimum displacement of 1.5 meters will earn 10 points.
- Cars having a minimum displacement of 2.0 meters will earn 15 points.
- Cars having a minimum displacement of 2.5 meters will earn 20 points.
- Cars having a minimum displacement of 3.0 meters will earn 25 points.

3. Experiment Design: 25 points

- Students must submit (individually) an experimental procedure describing what steps they must take to collect data.
- All data must be listed.

4. Questions: 25 points

Questions are worth five points each. Students must submit their answers to questions individually.

- Describe your initial design. Describe how your design evolved into the one that you used. What did you alter about your original design and why?
- Describe the motion of your car. Did it run at a constant speed or accelerate constantly?
- Why do you feel that your car ran at constant speed or accelerated constantly? (In your explanation describe the forces involved.)
- Calculate the average speed of your car. State the distance your car went and the time that elapsed.
- Apply Newton's Third Law to your car.