

Rubber Band Car Challenge

Name: _____

Instructions

Date: _____

Overview: in this contest, you will try to build a rubber band-powered car that can go as far as possible. Your final score depends on how far the car goes and the amount of materials you use. Watch this video to learn about the project:

<https://sbgo.org/engineeringchallenge-video24>

Materials

- You can use the following materials to build your car.
- There is a limit on how many of each item you can use.
- Each material costs a certain number of points.

Material	Maximum amount	Points (each)
CDs or DVDs	4	2
Plastic bottle caps	4	2
Paper	10 sheets	1
Pencils	10	1
Straws	10	1
Wooden skewers	10	1
Paper clips	10	1
Sheets of cardboard	2	10
Rubber bands	10	2
Tape	1 roll	5

Scoring

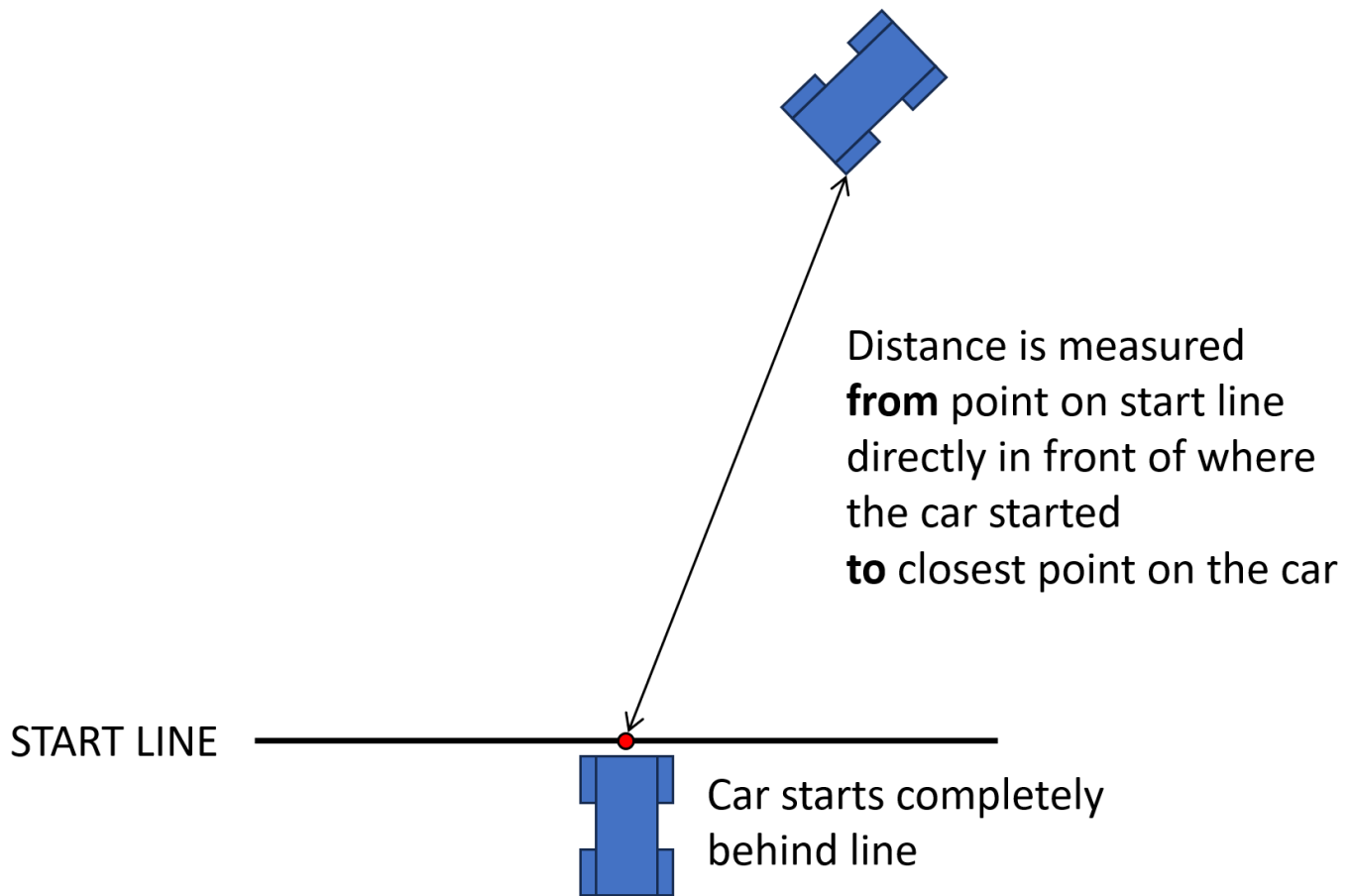
Your score is calculated using this equation:

$$\text{Score} = (2 \times \text{distance in centimeters}) - (\text{total materials points})$$

Rules

1. You must build a vehicle with a frame, at least one axle, and at least one wheel.
2. The car must be a single device. No parts of the car can intentionally or unintentionally detach, fall off, or otherwise separate during the test.
3. The car must be powered entirely by one or more rubber bands. No other sources of forward force or movement, such as pushing or blowing on the car, are allowed.
4. All rubber bands that power the car must be pulled/twisted/tightened etc. by hand by up to two people. No additional external tools or sources of leverage that are not part of the car (wrenches, power drills, etc.) are allowed to help tighten the rubber band.
5. The test must be conducted on a flat surface. Any surface (carpet, wood, concrete, etc.) is acceptable.
6. A straight start line must be marked on the floor, using any material that will not create a bump or impede the car's motion (tape, chalk, etc.). The car must start completely behind the start line.
7. After the car has been released, no one can touch the car, and it cannot touch or bump into any objects, until it comes to a complete stop on its own.
8. After the car has come to a complete stop, distance is measured from the point on the start line directly in front of where the car started to the closest point on the car (see figure on following page).

Measure the distance as shown below.



Directions: Fill out this worksheet as you work on your project.

1. **Background research.** Use this space (and extra paper if necessary) to write down your background research.

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2. **Design.** Use this page to draw design ideas for two different cars. Use the back of the page if you need more space.

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4. **Share.** If you are working in a group, share your ideas with others. Talk about which cars will do the best in the contest. Decide as a group what kind of car you will build. You can combine ideas from different people to make a single car.
5. **Build.** Once you have decided on a design, build your car. You might need to make some changes as you build. That is OK.
6. **Test.** Test your car by winding up the rubber band, putting it down, and measuring how far it goes. Record any observations about your test here.

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7. **Evaluate.** Based on the design criteria and constraints, what changes could you make to your car to improve your score?
8. **Iterate.** Based on your evaluation, try to improve your car to get a higher score.
9. **Final design.** What could you improve if you had more time to work on your car?