



## Mechanical Engineering: Race Car



### Badge Overview

Design, build, and test your own race car to explore how science can make a faster race car! When you've earned this badge, you'll have designed a race car and a race track and carried out "fair tests" to learn how design affects speed.

### Badge Components Part 1

#### 1. Learn how design can affect speed

NASCAR engineers have the job of designing the cars so they can go as fast as possible.

- Go to this [website](#) and watch the videos on 'Aerodynamics on the Racetrack' and 'Drag' to learn a little bit more about race car design.

#### 2. Design and build your race car

Get your creative juices flowing! Design and build your race car. Here are some ideas to inspire you:

- **Paper cut out car** — Materials: Car template, Plastic straw, Scissors, Ruler, Four round candies with holes in their centers, Tape, and Markers
- **Milk Carton car** — Materials: Milk carton, Straws, Dowels/Bamboo skewers, Glue gun, String/Yarn, Paint/Markers, etc. for decoration
- **Water bottle car** — Materials: Water bottle, Sandpaper, Cutter/Craft knife, Straw, Scissors, String/Yarn, Dowels/Bamboo skewers, Bottle lids and Paint/Markers, etc. for decoration.
- **Styrofoam car** — Styrofoam, Dowels/Bamboo skewers, String/Yarn, Buttons, Plastic lids, Styrofoam or Plastic cups or maybe old Lego wheels, Cutter/Craft knife, Glue gun, and Paint/Markers, etc. for decoration.

#### 3. Design your racetrack

Now you need to design where your car is going to go by making your track! Think about:

- The type of surface you want to use
- Creating a slope so your car can go at least a yard without you having to push it
- How you are going to keep your car on the track

#### 4. Conduct a fair test and record results

A **fair test** is an experiment which controls all but one variable (the things you can change) when trying to answer a scientific question. Only changing one thing allows you to know that no other variable has affected the results of the experiment.

- Mark out a finish line on your track
- Time how long it takes for your race car to reach the finish line
- Try changing one thing on your race car and time it to see if it makes your car go faster or slower

#### 5. Share what you learned

Tell someone in your house or another girl scout about your race car design process and what effect any changes you made to it had.

### Materials

- Materials for making a race car (See Badge Components step 2)
- Stop watch or a phone
- Materials to make a race track

### Florida Educational Standards

The content of all Girl Scout national proficiency Badges and Journeys have been correlated by grade level to national and state learning objectives.

**Click here** for more information on how Girl Scout Badge-work supports Florida's educational standards.



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