



Project Exploration creates transformative learning opportunities for youth underrepresented in the sciences –particularly students of color and girls – by equipping them with the skills, practices, and mindset needed for a lifelong pursuit of learning. STEM@Home makes activities around science, technology, engineering, and math accessible and fun to do at home. This STEMbook activity, resources, and more are available at [www.projectexploration.org/stemathome](http://www.projectexploration.org/stemathome).

## In this activity, you will:

Use the engineering and design process to construct a rollercoaster.

## Supplies Required:

- Graphic organizer
- 6 Paper towel rolls, toilet paper rolls
- 1 Newspaper \*fold and roll up to create a tube
- Masking tape
- 3 Marbles
- 4 Plastic cups
- Stopwatch

## Video

Learn more about the amazing engineering behind roller coasters: <https://tinyurl.com/y47coj9t>

## Overview

What is your favorite roller coaster or thrill ride? What characteristics made the coaster so much fun?

Project Exploration students have been chosen by a civil engineering company asked to submit a proposal for the next great roller coaster. They are going to choose the best design and will build it at Six Flags! Use the engineering and design process to build your coaster. They have only asked the following:

Your coaster should be fast, fun, and safe, and can only be built with the materials given.

The track must be free-standing; you cannot hold it up or in place.

The car (marble) must make it from beginning to end for 10 consecutive trials.

The track must include at least 1 loop and 1 turn.

The marble must land in or knock over a cup at the end.



## Instructions

1. Use the graphic organizer.
2. STEP 1: Problem: What do we want to solve? How do we build a roller coaster that is safe, fast, and fun?
3. STEP 2: Solutions: What are some ways to solve the problem?
4. STEP 3: Model: Build your design!
5. STEP 4: Test: Does your model work? Run the marble through the "track" at least 10 times. Does it hold up?
6. STEP 5: Reflect & Redesign: Was your model successful? Does it need to be redesigned?

## Additional Resources

1. Roller Coaster physics: <https://tinyurl.com/yctqvtea>
2. Roller Coasters are awesome! <https://tinyurl.com/y23rh3zv>

## Share It Out

**Share on social media:** Share the results of your design with your friends and family on social media! Explain the steps of the engineering design process in a video! Use the hashtags:

#EngineeringDesign  
#ProjectExploration  
#StemAtHome

**Share via PE's website:** Students who complete STEM@home activities and share what they learned with the PE team via our website will earn points which can be traded in for cash prizes at the Explore Store. Your project number is 307. Learn more at [www.projectexploration.org/explore-store](http://www.projectexploration.org/explore-store)



Call or text us for help: 312-772-6634

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