
Part Three

Designing an Experiment to Test Your Hypothesis

Design and build a model roller coaster to test your hypothesis.

Follow these guidelines:

1. The roller coaster must be *reasonable and successful*.
2. Passenger safety (simulated by stainless steel marbles) is most important. It cannot come off of the track!
3. The roller coaster may not exceed construction base size.
4. Be constructed using only **approved materials**.
5. Be totally built in less than 3 days and completed in time to collect data on the performance of the roller coaster on **Thursday, May 22**.
6. Make up a unique name for your roller coaster
7. Name 2 important or interesting features like curves, hills, loops
8. Have an attached starting gate and ending gate to catch the "car"
9. Identify and label **on the roller coaster** the following **physics concepts**:
 - a. A pushing force
 - b. A pulling force
 - c. A combined force (pushing or pulling) in the same direction
 - d. A combined force in opposite directions
 - e. A change in speed
 - f. A change in velocity
 - g. A section of track showing mass decreasing speed (Newton's 2nd Law)
 - h. A section of track showing mass increasing speed (Newton's 2nd Law)
 - i. Two places in which inertia is overcome (Newton's 1st Law)
 - j. A point showing potential energy
 - k. A point showing kinetic energy
 - l. An example of action-reaction (Newton's 3rd Law)
 - m. A point showing momentum either increasing or decreasing

Construction materials and limits:

Your construction company of three – four will build a roller coaster using the following materials:

- ★ Tube insulation
- ★ Paper towel tubes
- ★ Masking tape
- ★ Duct tape
- ★ Glue (not hot glue)
- ★ Modeling clay
- ★ Popsicle sticks for additional support

Some of the materials used are limited (like tubes, track, and land). ***Time*** to build is limited.

Time Management and Teamwork are the keys here!

Any other materials needed by your company must be approved by the teacher first!

Materials lost because of ***poor management*** become the responsibility of the team.

All building materials will need to be accounted for on a daily basis. A written daily log is required.

The size of your roller coaster is limited. The base of the roller coaster will be 3' by 1' or 91.5 cm x 31 cm. The roller coaster cannot be more than 80 cm in height

