

**Introduction**

Have you ever been on a roller coaster? Why do roller coasters almost always start with a big hill?

Does the speed change or remain the same during the ride? Did you feel like you might fall out?

In this activity, you will build a roller coaster to explore the kinetic and potential energy of the ride.

**Materials**

Masking tape small rubber ball

Meter stick insulation track

Small objects for making hills

**Procedure**

**Part A**

1. You should be in a group of 3 or 4 students.
2. Tape the track to a hard surface 20 cm above the floor. The concave side of the track should face upward. Try to keep the track as straight as possible with no sagging as it slopes toward the floor. The track should form a short inclined plane to the floor and then continue flat in contact with the floor.
3. Hold the ball so it lines up with the top of the track against the wall. Place a pencil across the track just beneath the bottom of the marble. To release the ball, pull out the pencil.
4. Release the ball and measure how far away from the wall the ball stopped.
5. Brainstorm a list of factors that might have affected how far the ball rolled.
6. Repeat the test changing the height of release three more times. As you adjust the height, the marble MUST stay on the track.

**Part B**

1. Make a prediction. Pick a location on the track and mark it with masking tape. Measure your spot from the wall. Using your data, choose a height to release the ball so that it will stop at your chosen location. Test your hypothesis.

**Part C**

1. Choose one of the initial heights and keep it constant for all the trials in Part C.
2. Change the shape of the track by putting a small book or other object under the track to make a hill. Observe where the ball stops in each of three trials. Place the second hill at different distances from the initial hill and note any differences.
3. Keeping your initial height the same, add a third hill.
4. Experiment with making a loop in the track. Change the shape, size and position of the loop until the ball is able to make it completely around the loop and continue until the ball rolls to a stop.
5. Complete all questions on lab sheet.
6. Clean up and return all materials to proper places.

Based on activity “*Homemade Roller Coaster”* from Exploring Energy with Toys , Beverly A.P. Taylor.