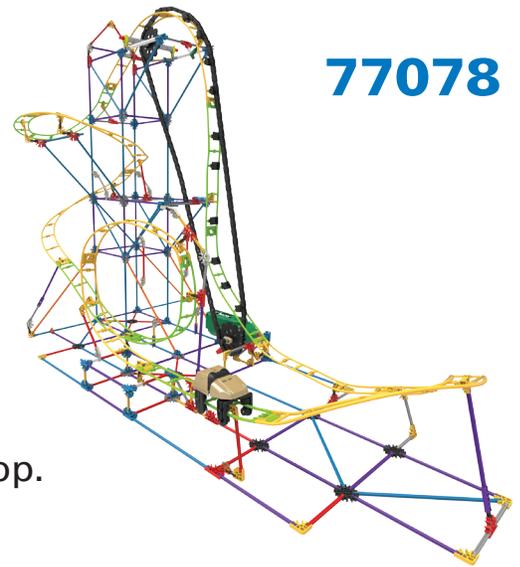


Experiment #1

77078

Making it Through the Roller Coaster Loop

Objectives: Determine the relationship between the mass of an object and the height above the ground at which it must be released in order to pass through a loop.



Materials You Will Need:

- built **ROLLER COASTER** model
- washers, paperclips or any other small item that can be weighed and taped to the coaster car
- scale
- ruler or tape measure
- masking tape
- pen or pencil
- regular paper or journal
- graph paper

PROCESS:

1. Build the **ROLLER COASTER** model by following the step-by-step building instructions.
2. Once your model is complete, do the following:
 - a. Using your washers, paperclips or other small items, determine a way to give the coaster car 4 different masses.

For example:

 - Mass #1 could be the coaster car without any additional objects.
 - Mass #2 could be the coaster car with 1 washer attached.
 - Mass #3 could be the coaster car with 2 washers attached
 - Mass #4 could be the coaster car with 3 washers attached.

b. Draw a table. You will use this table to record your data. Here is an example:

	Mass of coaster car configuration	Minimum height required for coaster car to make it through the loop
Coaster Car - Mass #1		
Coaster Car - Mass #2		
Coaster Car - Mass #3		
Coaster Car - Mass #4		

- c. Determine the mass of your 4 different coaster car configurations and record your data in the table.
- d. Predict which coaster car configuration will need to be released at the highest level on the tower in order to make it through the loop, then predict which will be the next highest, etc. until all the coaster car configurations are ranked in some order.

3. To test your predictions, you should:

- a. Determine the minimum height of release which allows a coaster car configuration to just pass through the loop. Once you have determined the appropriate position on the track, mark it with a piece of masking tape and measure the height of the tape above the surface on which the coaster stands. Record your data in the table.
- b. Remove the masking tape and repeat the measurement for the other 3 coaster car configurations.

4. Analyze your data:

- a. Were all of the heights attained the same? Different? Explain.

b. If the heights attained were different, do you think any property of the coaster cars may have contributed to the difference? Explain.

c. Draw a bar graph to compare the masses of the coaster cars and the heights they attained. Plot the mass of the coaster cars on the x-axis and the height on the y-axis.

d. Describe any pattern that you see when you graph the results.