

Experiment #3

Moving More with Height Using a Half-Pipe

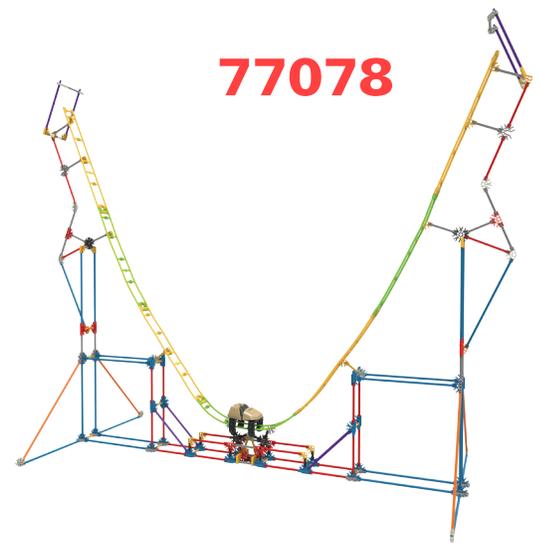
Objectives: Explore the concept of relationships between variables

Materials You Will Need:

- built **HALF-PIPE** model
- ruler or tape measure
- water-based marker
- pen or pencil
- regular paper or journal
- graph paper

PROCESS:

1. Build the **HALF-PIPE** model by following the step-by-step building instructions.
2. Once your model is complete, do the following:
 - a. Predict what will happen if you raise the coaster car to the highest point on one side of the half-pipe and then release it.



- b. Create a data table, such as the one shown below. The left column will be for the release height and the right columns for the number of passes through the center of the half-pipe system.

	Passes of the Car Through the Center of the System				
Release Height	Trial #1	Trial #2	Trial #3	Trial #4	Average

3. On one side of the half-pipe, determine 4 different release points at different heights along the track. Mark these points with a water-based marker and measure their height above the surface on which the half-pipe stands. These measurements should be recorded in the appropriate column in your data table.

4. Next you should:

- Release the coaster car from the lowest release point, with the front of the coaster car just above the mark.
- Count the number of times that the coaster car passes through the center of the half pipe before stopping in the center of the system.
- Record this number in your data table in the Trial #1 column and then complete two other trials before determining the average.
- Repeat the process for each of the release points.

5. You can then:

- a. Graph this data, plotting the release height on the x-axis and the passes through the center on the y-axis.
- b. Add a line of best fit for the data. This is the straight line that best fits the data point or that passes closest to all of the data points (in the vertical direction). It must be remembered that this line may not necessarily pass through any of the data points in order to be the line of best fit for the data.

6. Conclusion: Record any relationship you see between the release height of the car and the number of passes.