Name: ___________________________

Pool Noodle Roller Coasters

Challenge: Students will design, construct, and test a roller coaster, using a marble, that contains at least two loops.

1. Identify key words

Gravitational Potential Energy:

Kinetic Energy:

Speed:

Average Speed:

2. **Research** roller coasters, their tallest height, and top speed

Roller Coaster Name/Location	Top Height in Feet	Top Speed in MPH

3. **Brainstorm -** Use the space provided to complete the following:

   a. Draw a few rough sketches of various roller coasters that you would like to construct.
   b. Each roller coaster must include two loops
   c. Your roller coaster will be tested from three different heights using a marble. Each height must be successful.

4. Find a partner to compare sketches and ideas with. You and your partner need to decide on a final product. Be sure to sketch your final product in the space below.

5. **Design & Create** - With your partner, begin constructing your design. Your project must include the following:

   a. Two loops along the track
   b. Three different starting heights from which your marble can travel successfully through the roller coaster

6. **Adjustments/Improvements** – During the design process, adjustments to the roller coaster may need to happen in order for the marble to travel successfully along the track. Please record any issues that occurred and how those issues were resolved.

Issue/Problem	Solution

7. **Data** – After the marble successfully travels through the track, you will be timing the marble to later calculate its speed. The "Height of Starting Point" is the measurement from the floor to the location at which you are dropping the marble. The distance of the track is the distance of the pool noodles when measured. The time recorded should reflect the time from when the marble is dropped to when the marble reaches the end of the track. For each starting height, you must time your marble five times. You will continue this process with two additional starting heights.

Height of Starting Point	**Distance of Track (inches)**	**Time (seconds)**	**Speed = distance/time**

Average Speed of Starting Point #1: ____________________________

Average Speed of Starting Point #2: ____________________________

Average Speed of Starting Point #1: ____________________________

8. **Data Organization** - Once all speeds are calculated, you will be sharing your three average speeds and starting heights with your classmates. Record your data, as well as you classmates' data in the table below.

Height of Starting Point	**Average Speed**

9. **Data Organization** – Using the classroom data, create a scatterplot to reflect the average speeds and starting heights. Be sure to include the following: graph title, x and y axis labels, and all corresponding points from the table.

10. **Reflection** - Once all projects are complete, you will be reflecting on your design by answering the following questions. Remember to answer the questions in their entirety and use complete sentences with correct capitalization and punctuation!

· Analyzing the data from your classmates, do notice any trends in the starting height and average speed recorded? Do you recognize any correlations in the scatter plot? Be sure to explain.

· Do you think it is better to look at the average speed over multiple trials or a single recorded speed from one trial? Which speed do you think would provide a more accurate representation on the speed of the marble? Be sure to explain