**PERFORMANCE TASK**: You will construct simple racetracks each made of a different material. You will then race a car on each of these tracks while calculating the average speed the car. By measuring the average speeds and comparing them with one another, you can infer which of the tracks produced the most friction.

1. You will work in pairs, construct a simple racing ramp from an extra bookshelf or large sheet of corrugated cardboard. The ramp should be at least 24 inches long.

2. Once you have constructed ramps, divide the surface of the ramp into four equal sections.

3. Cover each section from top to bottom with a 2 inch wide strip of each of the following materials: sandpaper, waxed paper, aluminum foil and one material of your choice (it is okay if you use the ramp itself as the fourth material).

4. Use your backpack, books, or other objects to make a simple ramp. Elevate the ramp to a height where you think the car will move smoothly down the ramp.

5. Predict and record which of the four materials will allow your car to move from the fastest to the slowest speeds.

6. Measure the total distance that the car will move on each track.

7. Race the car at least 3 times over each of the different surfaces and, using a stopwatch, record the time taken to complete each race.

8. Calculate the average speed of the car on each of the four different surfaces.

9. Graph the race results showing the relationship between the average speed (vertical axis) and the track material (horizontal axis).

10. Complete the following questions:

   1) Why was it a good idea to race the car 3 times over each material instead of just once?
   2) Overall, did the cars move faster on the smooth surfaces or the rough surfaces?
   3) In your own words, explain how the type of the surface influences the amount of friction that is produced.

**Checklist**: Did you remember to...

- Make sure you have submitted these items in this order

  1. Question: Which of the tracks (sandpaper, waxed paper, aluminum foil and one material of your choice) produced the most friction?
  2. Hypothesis
  3. Data Table (complete all parts of the data table)
  4. Answer all the questions in complete sentences.
  5. Complete a graph based on your data
  6. Include the number range, labels, and a title for your graph.