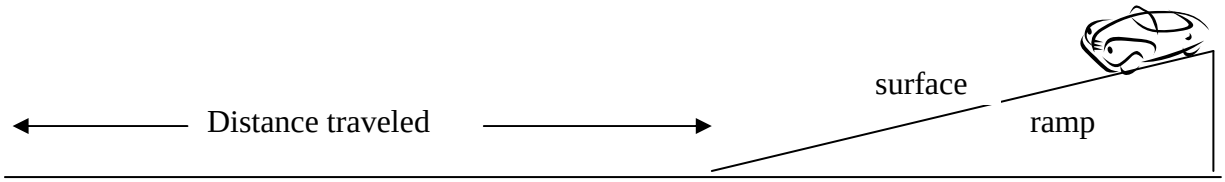
How Cars Roll

Carlos and Kim did a science project about friction, testing different surfaces on a ramp. They wondered if surfaces with more friction would slow toy cars down so that they would not travel as far. They decided to test three surfaces, sand paper, waxed paper, and painted wood, using the following procedure:

1. They made a wooden ramp and covered the ramp with paint.
2. They held a toy car at a starting line at the top of the ramp and then released it.
3. Using a metric ruler, they measured how far the car rolled after it left the ramp and recorded their results.
4. They repeated steps 2 and 3 using waxed paper on top of the painted surface.
5. They repeated steps 2 and 3 using sandpaper on top of the painted surface.



1. Write a reasonable hypothesis for the experiment that Carlos and Kim conducted.

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2. What is the independent variable in this experiment?

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What is the dependent variable in this experiment?

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Carlos and Kim recorded the data from their experiment in the data table below:

Table 1

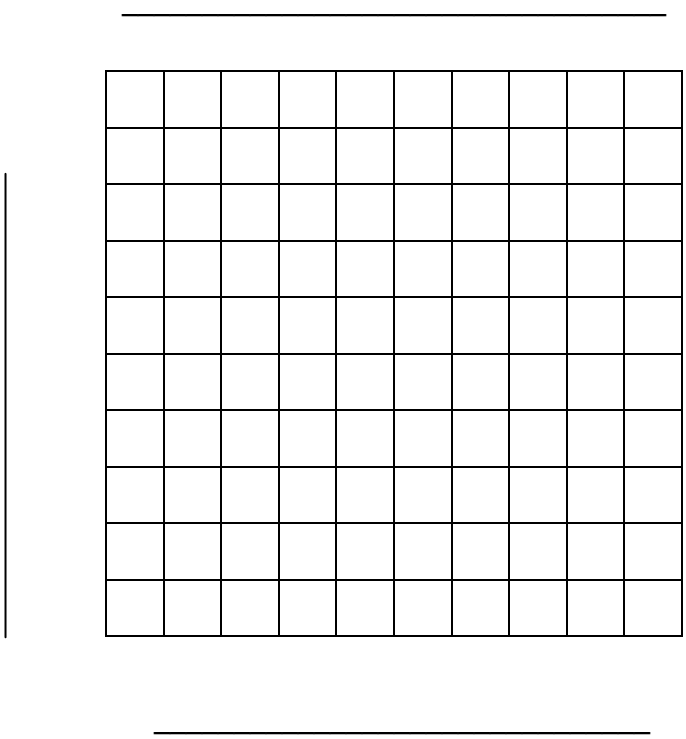
Surface of the Ramp	Distance Car Traveled (cm)					Average Distance (cm)
	Trials					
	1	2	3	4	5	
Sand paper	45	50	47	51	47	
Waxed paper	92	98	94	95	96	95
Paint	80	82	80	84	79	81

3. Calculate the <u>average</u> that belongs in the empty box and record it in Table 1.

4. Explain why conducting five trials instead of one will help Carlos and Kim reach a more reliable conclusion.

5. Use the data from Table 1 to construct a <u>bar</u> graph on the grid below. Graph only the <u>averages</u> of the distance measurements.

   Be sure to provide:
   - an appropriate title
   - a label for each axis with appropriate units
   - an appropriate number scale and category labels
   - correctly plotted data



6. Use the data from the data table and graph to write a conclusion for the experiment on friction.

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7. Identify two factors, other than those mentioned in the procedure, that should be held constant throughout the investigation.

1._____

2._____

Explain why these factors should be held constant.

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8. Carlos and Kim want to see if the mass of the car has an effect on the distance traveled.

Write a testable question for Carlos and Kim's new investigation.

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9. Complete the table below to show the tools and metric units used in the new investigation.

	Tools	**Metric Units**
Mass of object		
Distance object traveled		