

## Speed Lab

Name \_\_\_\_\_ Date \_\_\_\_\_ Group \_\_\_\_\_ Period \_\_\_\_\_

**Problem:** As the distance that a car rolling down a ramp increases, what effect does this have on the speed of the car?

**Hypothesis :** If \_\_\_\_\_

**Variables:** By the time you finish this experiment, you will need to identify the different types of variables present in this investigation. Consult your notes for definitions of the types of variables.

**Independent Variables:** \_\_\_\_\_

**Dependent Variables:** \_\_\_\_\_

**Controlled Variables:** \_\_\_\_\_

**In this activity you will calculate the average speed of the Car as it rolls down the Ramp.**

### Procedures

1. Attach the Ramp using the threaded knob. Use the 5th or 6th hole from the bottom of the Physics Stand.
2. Put one or two of the square silver weights on the Car and fasten them down with the wing nut.
3. Plug the Clamp closest to the top of the ramp into input A of the Timer. (see diagram below)
4. Plug the second Clamp into input B.
5. Put the Timer in interval mode.

### Measuring the distance traveled

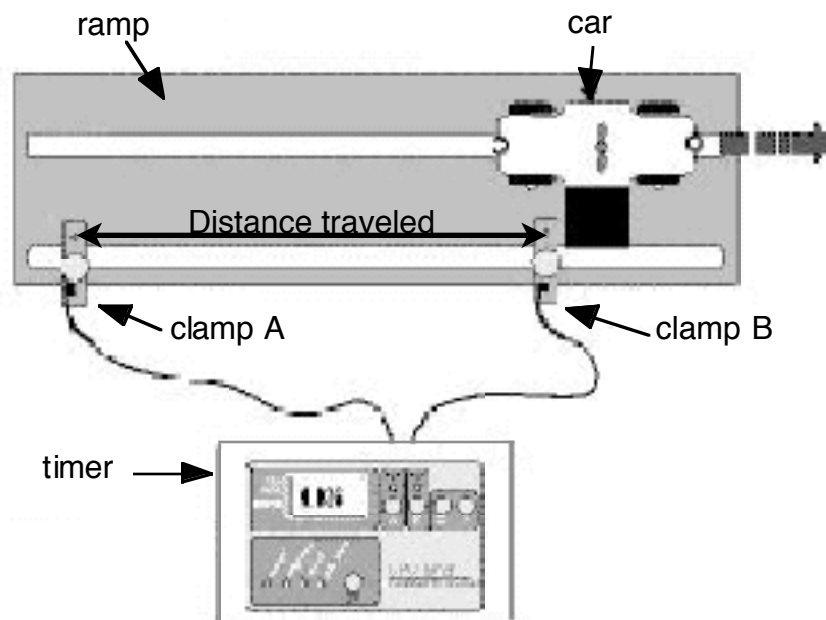
6. Use a meter stick to measure the distance between the center of Clamp A and the center of Clamp B. Record this distance to the nearest 0.1 cm in the data table.

### Measuring the time taken

7. When both the A and B lights are on, the Timer will show the time it takes the Car to go from Clamp A to Clamp B.

### Doing the Experiment

8. Hold the car at the highest point on the ramp and quickly release it.
9. Have a partner catch the car near the bottom of the ramp. **DO NOT LET THE CAR HIT THE END OF THE RAMP!**
10. Record the time on the timer to 4 decimal places in the chart below.
11. Now move **only the B clamp** a few inches down the ramp. Remember to measure the new distance between clamps A and B.
12. Repeat steps 8-11 until you have done a total of 5 trials.



Trial	Distance from Clamp A to Clamp B (to the nearest 0.1 cm)	Time from Clamp A to Clamp B (to the nearest .0001 seconds)	Speed (cm/sec) (round to nearest 0.1 cm / sec)
1			
2			
3			
4			
5			

The average speed of the car is equal to the distance traveled divided by the time taken. Calculate the speed of the car for each of the trials using the formula below and enter it into the table above.

$$\text{speed} = \frac{\text{distance traveled}}{\text{time taken}} = \frac{\text{distance from Clamp A to Clamp B}}{\text{Time from Clamp A to Clamp B}}$$

**Question**

1. Compare the changes in distance with the speed of the car. Is this a direct or indirect relationship?

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**Overall Conclusion :** 1-State if your original hypothesis was correct or incorrect. This should be based on the best information collected from the experiment. 2-If it was incorrect, give the correct answer, again based on the best information collected from the experiment. 3-Include a brief numerical summary and comparison of the data collected during the experiment telling how it supports your answer for the hypothesis.

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**Sources of Error:** Identify two things that people may have done incorrectly that would have caused them to get totally different answers from the rest of the class. These errors must be unique, in other words they have not been applicable in previous labs. They must be new sources of error. Be specific about what might have been done.

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