

RUBBER-BAND POWERED CAR

Follow Up Experiments



Once your car construction is complete you can work on improving the distance travelled by the car.

You might investigate some or all the following:

- Alter ratios of compounds
- Alter the nozzle
- Alter aerodynamic properties

An investigational video as to how the car works (variations inclusive) can be found at:

https://video.deakin.edu.au/media/t/0_gb1av5df

Changing the ratios of compounds

For this experiment you will change the ratios and volumes of bi-carb soda to vinegar to the given specifications and see how these changes impact the distance travelled.

Questions:

1. Do you think increasing the ratio of bi-carbonate soda to vinegar will increase the distance travelled? Why? Why not?

2. Do you think decreasing the ratio of bi-carbonate soda to vinegar will increase the distance travelled? Why? Why not?

For this experiment you must measure your cars distance using the given ratios in the table and enter data and other observations into table below.

Note: All other variables must remain constant. EG. The surface the car travels on

Ratio	Distance Travelled (cm)	Observations
1:1 1 cups of vinegar to 1 tablespoon of bi-carb soda		
1:2 1 cups of vinegar to 2 tablespoons of bi-carb soda		
2:1 2 cups of vinegar to 1 tablespoon of bi-carb soda		

3. Construct a graph below of your findings using appropriate titles and correctly labelled axes.



4. Was there an optimal number ratio of substances? What was it?

Changing the nozzle

For this experiment you will only use the standard build design and given ratio (1:2, 1 cup of vinegar to 2 tablespoons of bi-carb soda) of substances for your car.

Note: All other variables must remain constant. E.g. The surface the car travels on

Questions:

1. Do you think changing the change in nozzle will affect the distance travelled by the car? How?

Using the different nozzles, input data and observations of the car in table below.

Nozzle type	Distance Travelled (cm)	Notes E.g. acceleration, distance travelled, output

For this experiment you must measure your car's initial distance travelled, then add structural changes to alter the shape of the car using the hot glue gun to attach, then remeasure the distance travelled. Change the shape a number of times and enter data into table below.

Note: All other variables must remain constant. E.g. The surface the car travels on

Shape variation (brief description)	Distance Travelled (cm)	Observations

3. a. Explain what happened when you altered the shape and aerodynamics of the car.

b. Is there an optimal shape for the car?

c. What else could be impacting the distance travelled by the car?

Summarise

Using the experiments and data you completed above summarise what you have learnt. You should include such things as: constants and variables, friction, energy, energy loss, which activity you think had the most impact on the distance travelled? Could you combine modifications to keep improving the car?

Design Your Own Experiment

In the space below outline your own experiment and test accordingly. Be sure to include the variables you are measuring, changing and controlling. Display your data using tables, charts or graphs.

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