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**BALLOON POWERED CAR**

Follow Up Experiments

**Watch the video of the car working here:** [**https://video.deakin.edu.au/media/t/1\_impfjgjt**](https://video.deakin.edu.au/media/t/1_impfjgjt)

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

You might investigate some or all of the following (*Note: it is advised to do the ‘Adding Weights’ experiment first*):

* Adding Weights
* Changing the Weight Distribution
* Changing Surfaces
* Changing Type of Balloon

## Adding Weights

**Questions:**

1. Do you think adding weight will increase the distance the car will travel? Why? Why not?
2. Do you think there will be a point where the added weight begins to reduce the distance the car travelled? Why? Why not?

For this experiment you must measure your car’s initial distance travelled, then add a small amount of weight (e.g 50g), fix weight in place via tape or blue-tack, and remeasure the distance travelled. Add more weight in even amounts (50g at a time) and enter data into table below.

Note: All other variables must remain constant. E.g. The surface the car travels on, the size of the balloon blown up to.

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| **Weight Added (g)** | **Distance Travelled (cm)** | **Observations** |
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1. Construct a graph below of your findings using appropriate titles and correctly labelled axes.



1. a. Explain what happened when you added more and more weight to the car.

 b. Is there an optimal weight for the car?

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

## Changing the Weight Distribution

For this experiment you will only use the optimal weight you found in the “Adding Weights” section and see how the location of the weight impacts how the car travels, e.g. veering left or right.

Note: All other variables must remain constant. EG. The surface the car travels on, the size of the balloon blown up to.

**Questions:**

1. Do you think changing the placement of the weight will affect the distance travelled by the car? How?

Using the optimal weight fix the weight to the back, front, left side, right side, and anywhere else you’d like to investigate. Input data and observations of the car in table below.

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| --- | --- | --- |
| **Weight Location** | **Distance Travelled (cm)** | **Notes**E.g. Spun, flipped up, veered left  |
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1. Did the location of the weight impact the distance travelled? Were some locations more or less effective? Please elaborate.

## Type of Balloon Used

For this experiment you will only use the optimal weight you found in the “Adding Weights” section and see if balloon types impact the distance travelled.

Note: All other variables must remain constant. E.g. Surface used, weight used etc.

**Questions:**

1. Do you think a certain kind of balloon (e.g. round [helium and non-helium], long, foil etc.) will increase the distance travelled? Why? Why not?
2. Do you think the size of the balloon blown up to will be detrimental to the cars distance travelled? Why? Why not

For this experiment you must measure your cars distance using only 1 balloon, then increase the size of the balloon blown up to and enter data and other observations into table below.

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

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| **Type of balloon used and size blown up to** | **Distance Travelled (cm)** | **Observations** |
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1. Construct a graph below of your findings using appropriate titles and correctly labelled axes.



1. Was there an optimal size of the balloon for the car? What was it?
2. a. Could you blow up the balloon car too much? What would happen?

b. What could you do to improve this?

## Changing Surfaces

For this experiment you will only use the optimal weight you found in the “Adding Weights” section. Experiment using the car on a variety of surfaces (e.g. carpet, linoleum, grass) and see if the distance travelled has been impacted at all?

Note: All other variables must remain constant.

**Questions:**

1. Do you think changing the surface the car is used on will impact the distance travelled? Why?
2. a. If a surface has a lot friction what do you expect will happen?

b. What if there is little to no friction?

Using the optimal weight fixed to one spot, blow the cars balloon up and use it on any surface you would like to investigate (e.g carpet, sandpaper). Input data and observations of the car in table below.

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| --- | --- | --- | --- |
| **Type of Surface** | **Surface Description**E.g. Slippery, rough | **Distance Travelled (cm)** | **Observations**  |
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3. Describe what happened when using different surfaces. Was the car always propelled forward? If not, where did the potential energy go?

4. Choose one surface and theorise how you could improve 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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