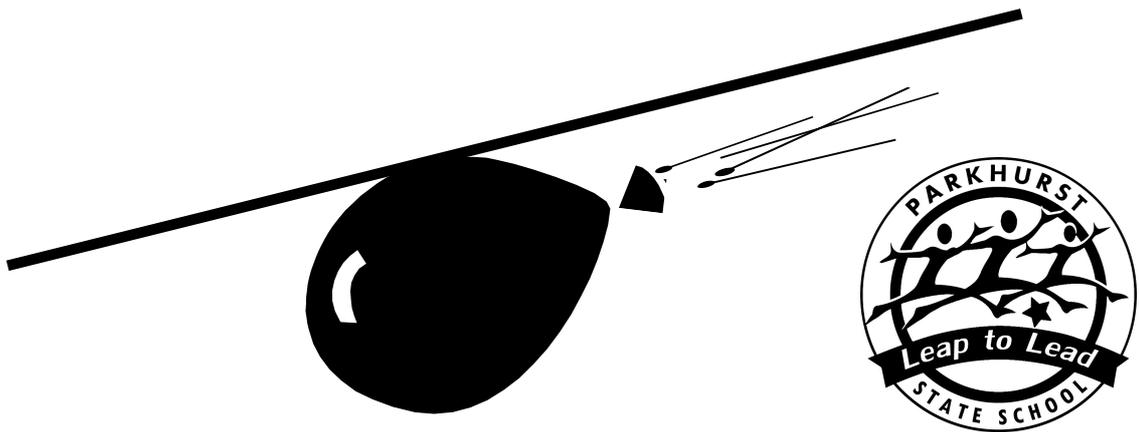


# Balloon Rocket Challenge



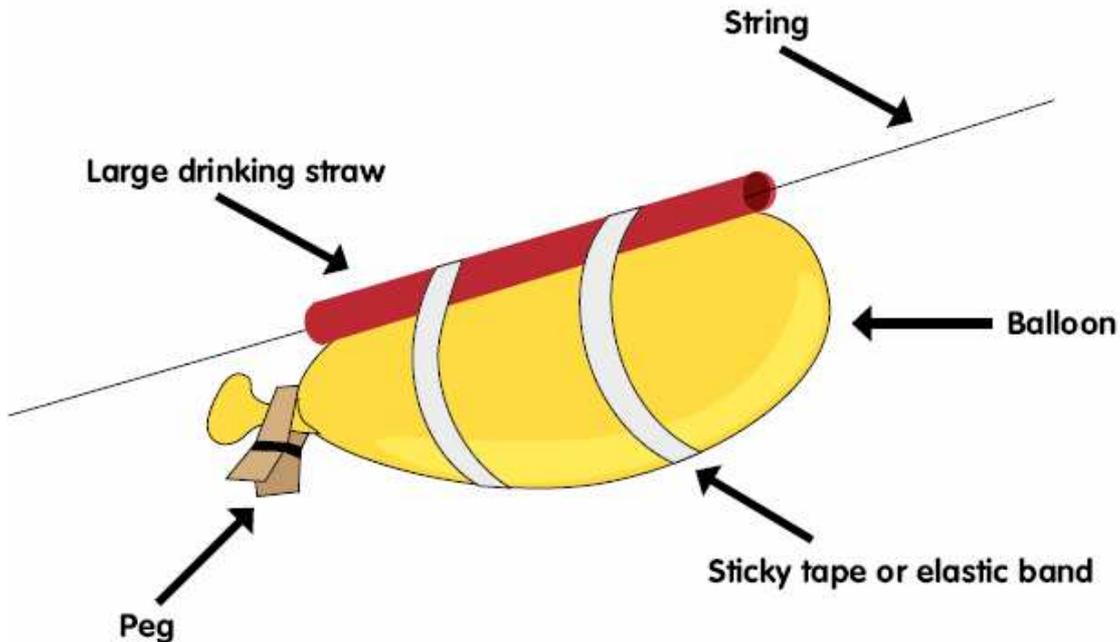
## Your Task

To design, construct and evaluate balloon rockets, selecting **one** rocket from each class to be judged as either the **fastest rocket** over a **ten metre** distance or the rocket that can travel the **furthest distance**.

# The Challenge in Detail ...

Can you make a balloon rocket travel **as far as possible** or **as fast as possible** along a line stretched between two chairs ?

You can build your balloon rocket using the diagram below ...



## Procedure

1. Have your flight path ready .
2. Blow up the balloon and use a peg to keep the air in.
3. Use tape or elastic bands to fix the balloon to the drinking straw. Tape the long side of the balloon along the length of the straw.
4. Thread a long length of string through the straw, stretch the string tight and secure .
5. Release the clothes peg and release the balloon.
6. Record your observations
7. Reinflate the balloon and repeat.
8. When you have tried the rocket balloon a few times, consider **what you could change** about the balloon or string that would affect how far the balloon goes along the string. In your group make a list of as many as you can. You may wish to consider the type of string or how much air is in the balloon.
9. When you have recorded as many ideas as you can, decide on one idea from the list to investigate.

# Design Considerations

- What things will you need to think about in planning your balloon rocket ?
- What might you need to consider if you were to plan and create the **fastest possible** rocket ?
- What might you need to consider if you were to plan and create a rocket to go the **greatest distance** ?

## Make a List of Questions

# Designing Your Rocket

The CD in your package contains a number of videos about creating and racing balloon rockets. View the videos and you may wish to google the internet to assist you to **plan** your own unique balloon rocket.

**Draw a picture** of how your balloon will look.  
**Label** all the parts.

Some materials have been provided to you. However, you may wish to make your rocket very unique in its appearance in order to become the rocket that travels the **fastest** or **greatest distance**.

- Make a list of the materials your group will
- need to be able to make the balloon.

# Making Predictions

Write your ideas down as questions.

For example ... 'How far will the balloon rocket go when we use thicker string ?'

Make a prediction and give a reason for your prediction.

For example ... 'With thicker string the balloon rocket will not go as far. We think that thicker string will rub more against the straw and this will stop the balloon rocket going as far.'

**Write your own question and prediction in the spaces below.**

<b>Question</b>	<b>Prediction</b>

# Fair Tests

A fair test is an experiment in which a group of people decide and agree upon the conditions that will be used. It is important for an experiment to be a **fair test**. You conduct a fair test by making sure that you change one factor at a time while keeping all other conditions the same. Conducting a fair test is one of the most important ingredients of conducting good, scientifically valuable experiments.

To ensure that your experiment is a fair test, you must change only **one factor at a time** while keeping all other conditions the same. Scientists call the changing factors in an experiment **variables**.

Imagine, for example that we want to measure which is the fastest toy car to coast down a sloping ramp. If we gently release the first car, but give the second car a push start, did we do a fair test of which car was fastest ? No ! We gave the second car an unfair advantage by pushing it to start. That's not a fair test ! The only thing that should change between the two tests is the car; we should start them down the ramp in exactly the same way.

As a group brainstorm your suggestions for a **fair test**

# Our Rules for a Fair Test

The **rules** we have negotiated for a **fair test** include ...

# Making Predictions

Now it is time to create your very own balloon rockets and make some predictions as to what might happen. Don't forget to remember the rules you created for a **fair test** !

What do you predict will happen ?

# Testing Predictions

Now it is time to do test your rockets and test and confirm your predictions. Again, don't forget to remember the rules you created for a **fair test** !

Take some **measurements** and write your results down in the table below. Record the things that you change about your rocket or the string.

Now think about what your results tell you ...

- What did you **find out** ?
- Was your prediction **correct** ?
- Is there a **pattern** in the results ?
- Could you **improve** your investigation?
- What might you change ?



# Recording your Findings

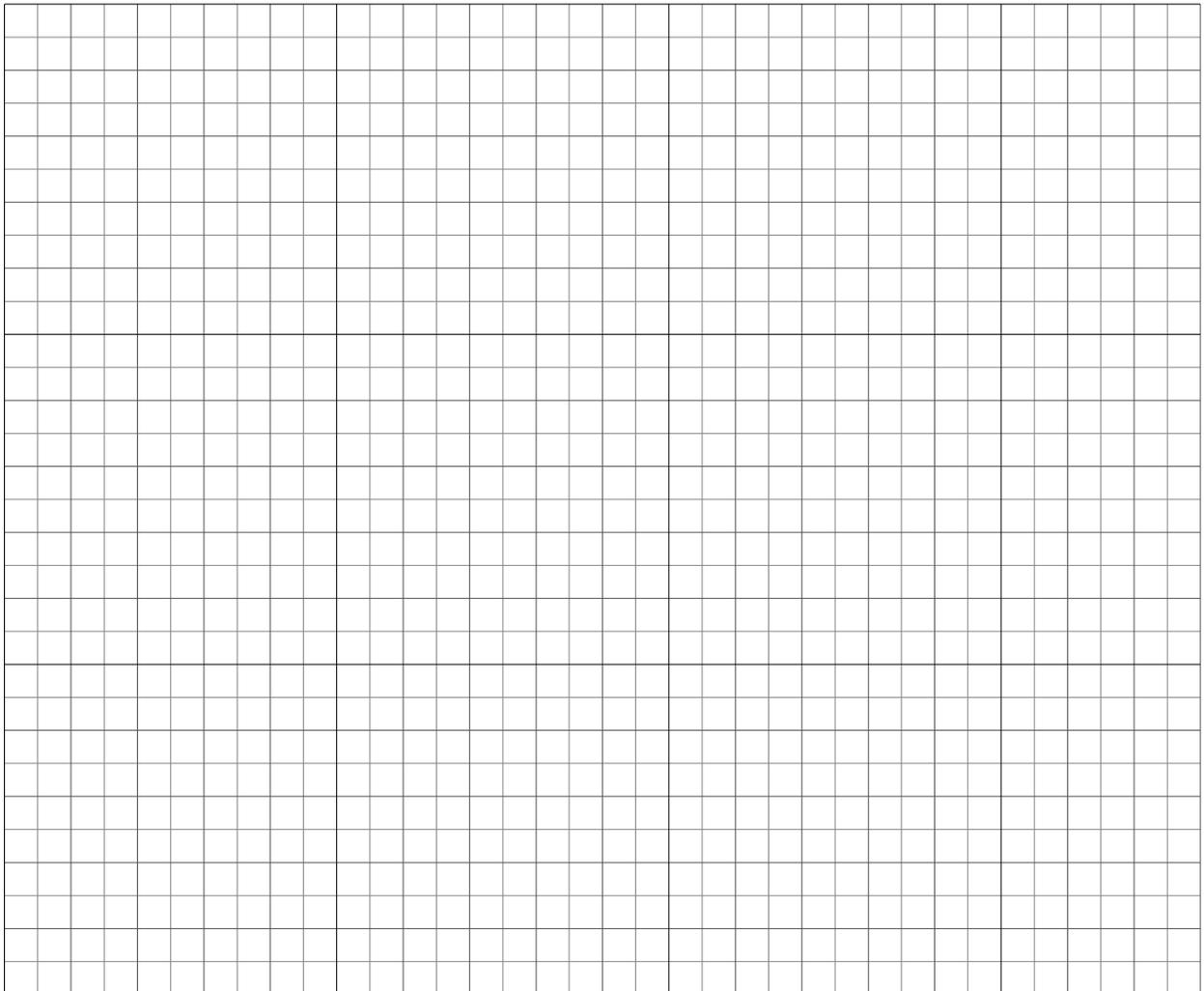
<b>Trial</b>	<b>Distance Travelled</b> (in metres)	<b>Time in Seconds</b> (to the nearest .10)	<b>Average Speed</b>	<b>Comments</b>
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
<b>Average</b>				

# Graphing Your Results

You may wish to **graph** your data and findings. Please graph your data using the average speed for each trial using a line graph.

**Title**

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# Evaluating Your Balloon Rockets

- Did your rocket travel up the line ?
- Describe how your balloon travelled.
- What **problems** did your group have with your balloon rocket ?
- How **far** did your balloon rocket travel the **first** time ?
- How **far** did your balloon rocket travel the **second** time ?
- What was the longer distance ?
- By how much ?
- How **quickly** did your balloon rocket travel ?
- What **category** will your group enter your rocket in later this afternoon ... **greatest** speed or **greatest distance** ?
- **Whose balloon rocket** will you use ? What will determine this ?

# Scoring Your Balloon Rockets

Score **10** points if your group made a balloon rocket.

Score **10** points if the balloon did not burst.

Score **100** points for every metre of your best distance and **1** point for every centimetre past your whole metres length.

Score a mark out of **20** for teamwork. Remember not sharing the jobs and not working together as a team should lose points.

Score a mark out of **10** for creative and different ideas your team used. **2** points for each thing that is different to most other teams. (Use your Green Hat Thinking !)

Score **5** points if you can think of two different ways to **improve** on your balloon rocket. (Synthesis)

1. \_\_\_\_\_
2. \_\_\_\_\_

Score **2** points each for everyone who enjoyed the balloon rocket activity. (Red Hat)

**TOTAL**

# Some Questions to Think About ...

**What makes the balloon rocket go ?**

(Knowledge/Comprehension)

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**What things worked well on your balloon rocket ?**

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**What things need improving or changing ?**

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**How might you do that ?**

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**Would more air inside the balloon make it travel further ?** (Knowledge)

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**Why do you think that is so ?** (Analysis)

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**What are two good points about balloon powered rockets ?** (Yellow Hat)

1. \_\_\_\_\_

2. \_\_\_\_\_

**What are two problems or weaknesses of balloon powered rockets ?** (Black Hat)

1. \_\_\_\_\_

2. \_\_\_\_\_

**What else might you be able to power with the use of balloons ? (Green Hat)**

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**Can you think of things you might have to change to your balloon rocket to design it so that it could carry a message from your classroom to the classroom next door ?**

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## **Some Further Investigations**

**Write questions to investigate a change you may wish to make to the balloon rocket.**

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**You may wish to change the design of your balloon rocket so it pushes a small object. Once designed and created, consider carrying out some further investigations.**



# PARKHURST STATE SCHOOL

## Balloon Rocket Challenge Day

CRITERIA	DODGY BROTHERS' STANDARD	LOCAL SCIENTIST STANDARD	'NASA' STANDARD
Rocket Designs	Rocket designs showed <b>very few details</b>	Rocket designs showed <b>some detail and</b> considerations	Rocket designs were <b>very detailed</b> and well considered
Thinking/Creativity	There was <b>little indication of imagination and creativity</b>	<b>Some imagination was shown but lacked creativity and thought.</b>	<b>Much creativity, imagination and thinking</b> were evident
Predictions	<b>Some basic predictions</b> were made prior to the rocket launch	Predictions made prior to the rocket launch were <b>satisfactory</b>	Many <b>clever</b> predictions were made prior to the rocket launch
Finished Rockets	Final rocket presented <b>still required much work</b>	Final rocket presented was of a <b>satisfactory standard</b>	The final rocket presented to race was of a <b>very high standard</b>
Fair Test Rules	<b>Very little thought</b> was evident in the fair test rules formulated	Rules formulated showed <b>some though and consideration</b>	An <b>excellent</b> list of rules was formulated and utilised
Participation	Work <b>appeared to be dominated by individuals</b>	<b>Most group members</b> made meaningful contributions	<b>All group members</b> had equal and meaningful roles
Collected Data	<b>Some basic elements</b> of data were collected and recorded	Data collected <b>was accurate with some fine details</b>	Collected data was <b>very accurately measured and well detailed</b>
Reflection	<b>Very little reflection</b> was used to improve rocket designs	<b>Some reflection</b> was evident to improved rocket designs	<b>High levels of reflection</b> were used to informed rocket designs

**Things We Did Well**

**Things We Would Do Differently Next Time**