

**CURRICULUM  
LINKS**

**and**

**KEY  
COMPETENCIES**

- Using mathematical ideas and techniques

- Design and Graphics

- Scientific knowledge and understandings

- Electronic systems

- Collecting, analysing and organising information.

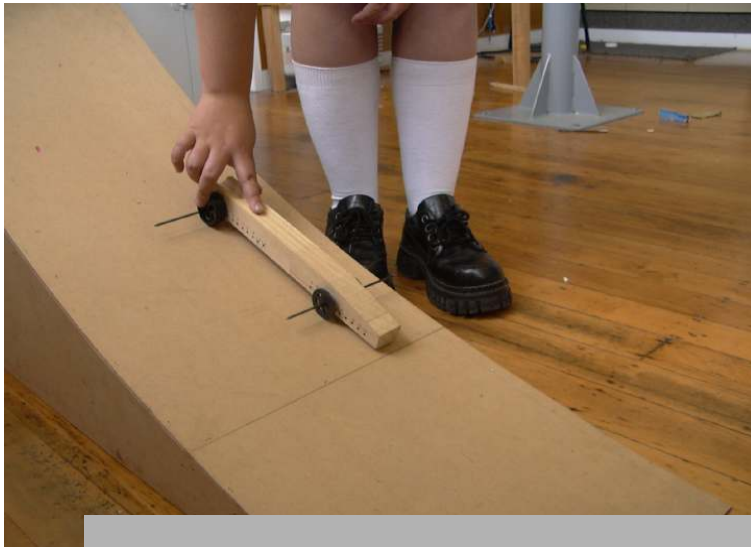
- Solving problems

- Working in teams.

- Communicating ideas and information

- Using technology

- Planning and organising activities



Testing systematically and modifying accordingly.



# Calculating Speed

- How do the speeds of our cars compare to the speeds of real car?
- $\text{SPEED} = \text{DISTANCE} / \text{TIME}$
- $\text{DISTANCE} = \text{TIME} \times \text{SPEED}$  etc...

# Spreadsheet Calculations

- Formula for conversion of seconds/20 metres to km/hr.
- Designing a spreadsheet to record results
- Sorting routines
- Converting the data into graphs

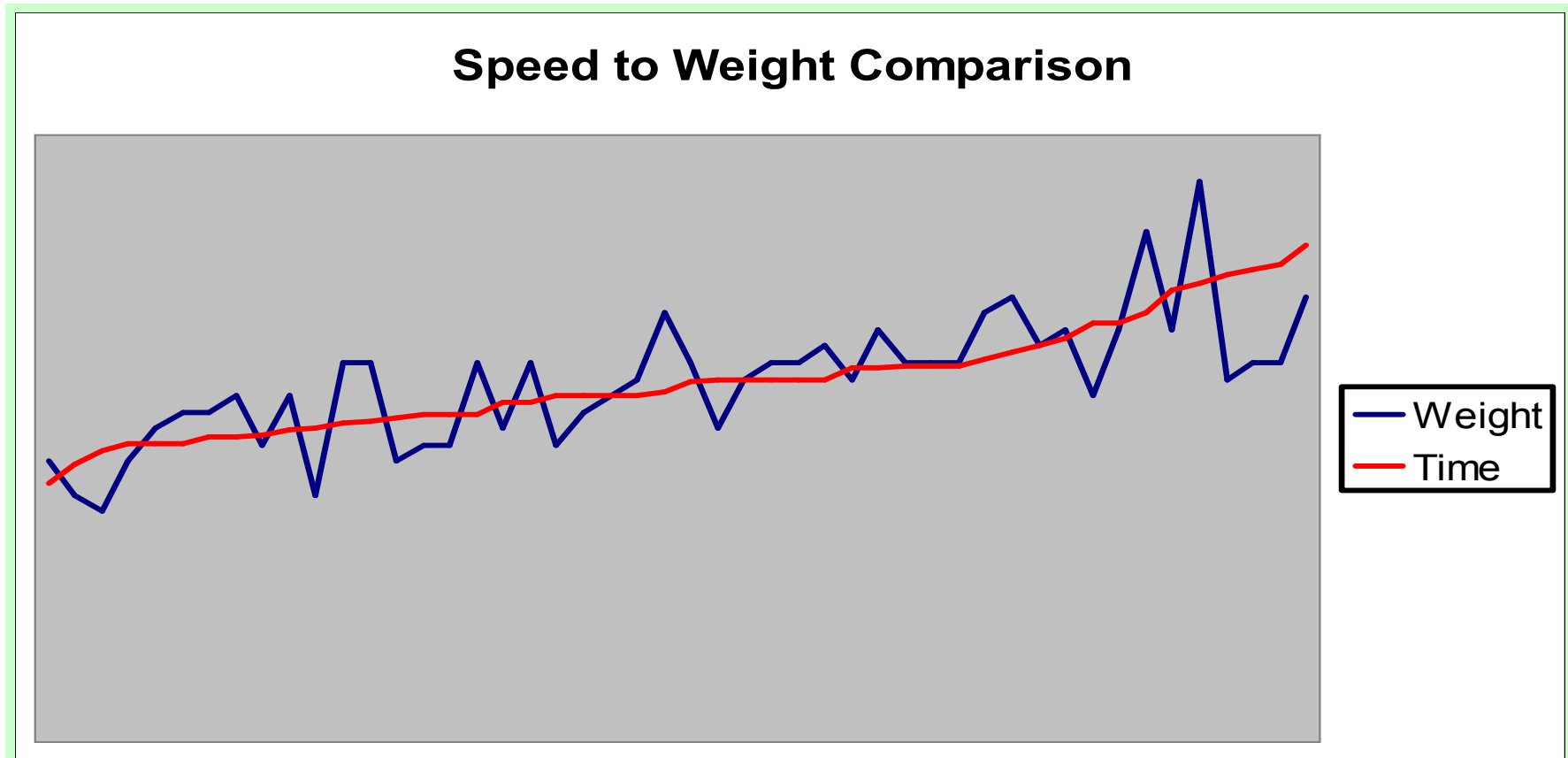
# Organising the Data

<u>PLACE</u>	<u>ROOM</u>	<u>DESIGNER</u>	<u>CAR NAME</u>	<u>WEIGHT</u>	<u>FRICITION TEST</u>	<u>km/h</u>
10th	2	LENA	HONEY	105	720	51.4
11th	2	JASON	2FAST2FURIOUS	75	650	51.1
12th	6	MIRANDA	BONNIE	115	720	50.3
13th	6	BEVAN	MACH 5	115	500	50.0
14th	3	GRAYSON	GEEVS	85	660	49.3
15th	2	JOSHUA	2FAST	90	700	49.0
16th	7	DAYNA	ZOOMER	115	710	49.0
17th	3	SIQUAN	BLAZE	90	600	49.0
18th	7	JASMINE	FLAME STAR	115	430	47.1

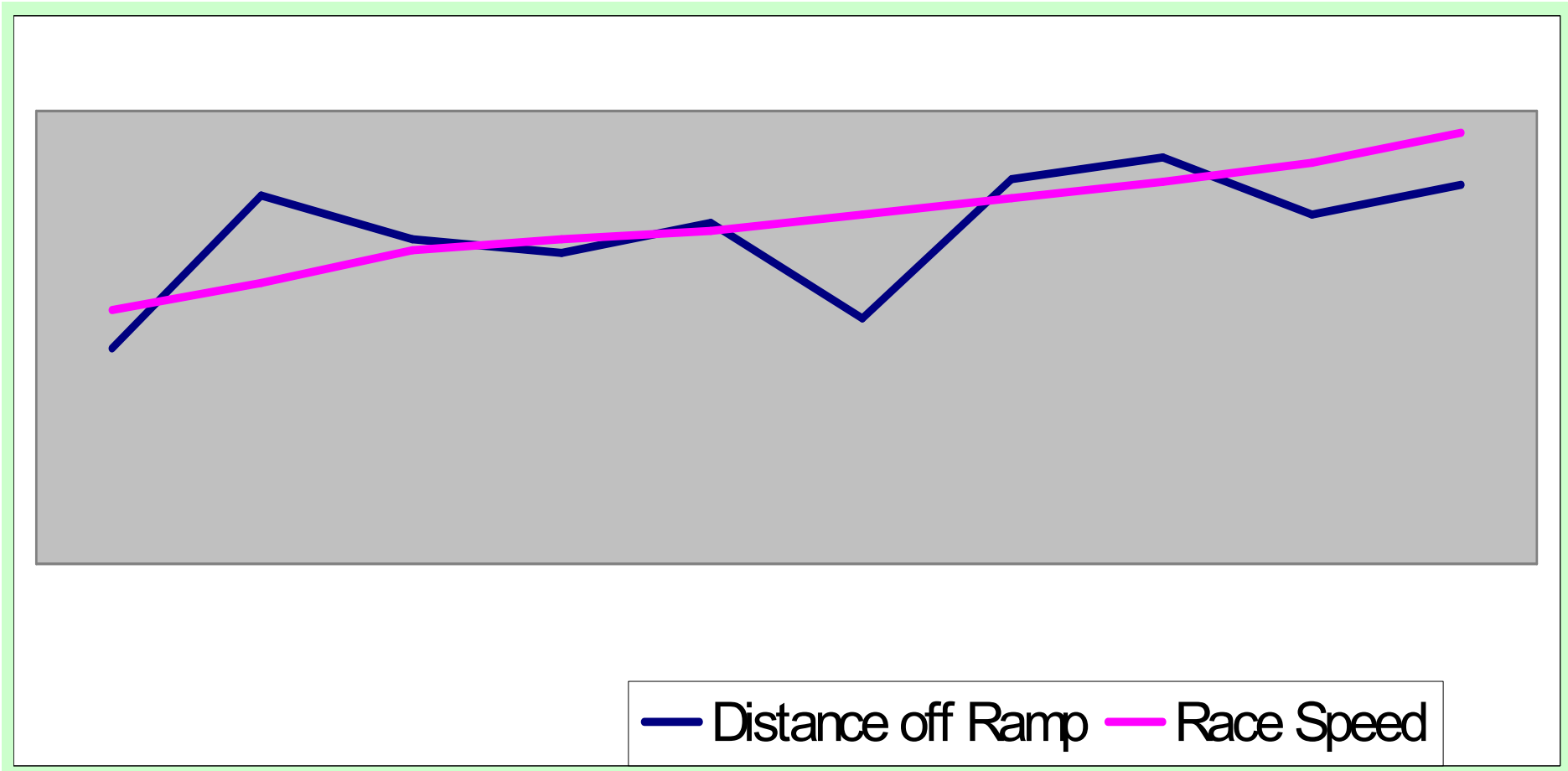
- What do you want to know from this?
- More importantly, why?
- How should we set this out so that it is useful?

# Interpreting Data

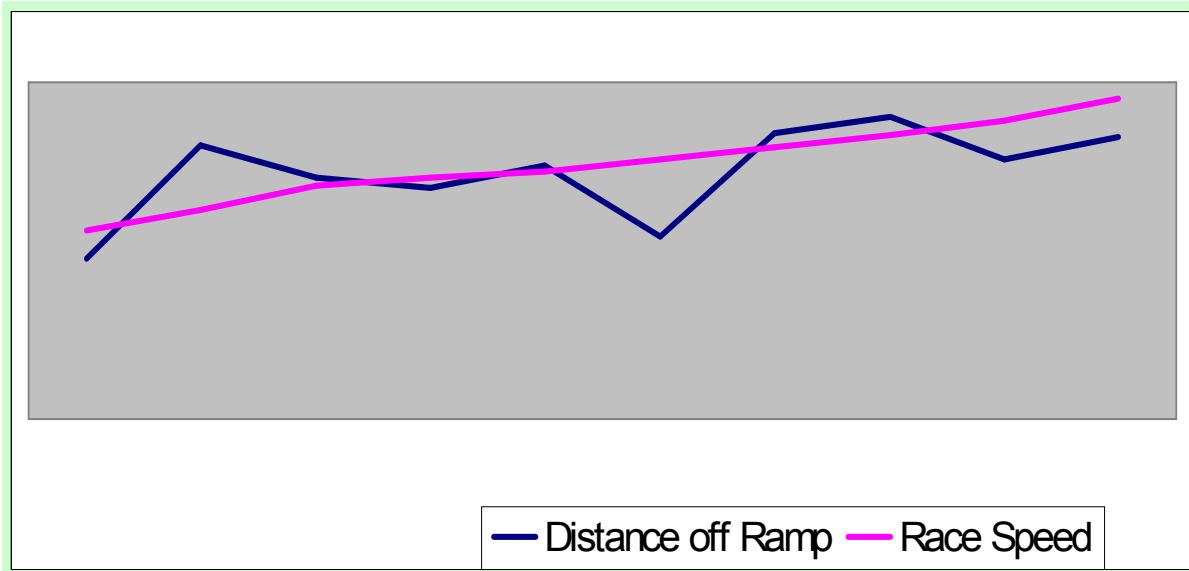
- What does this graph tell us?



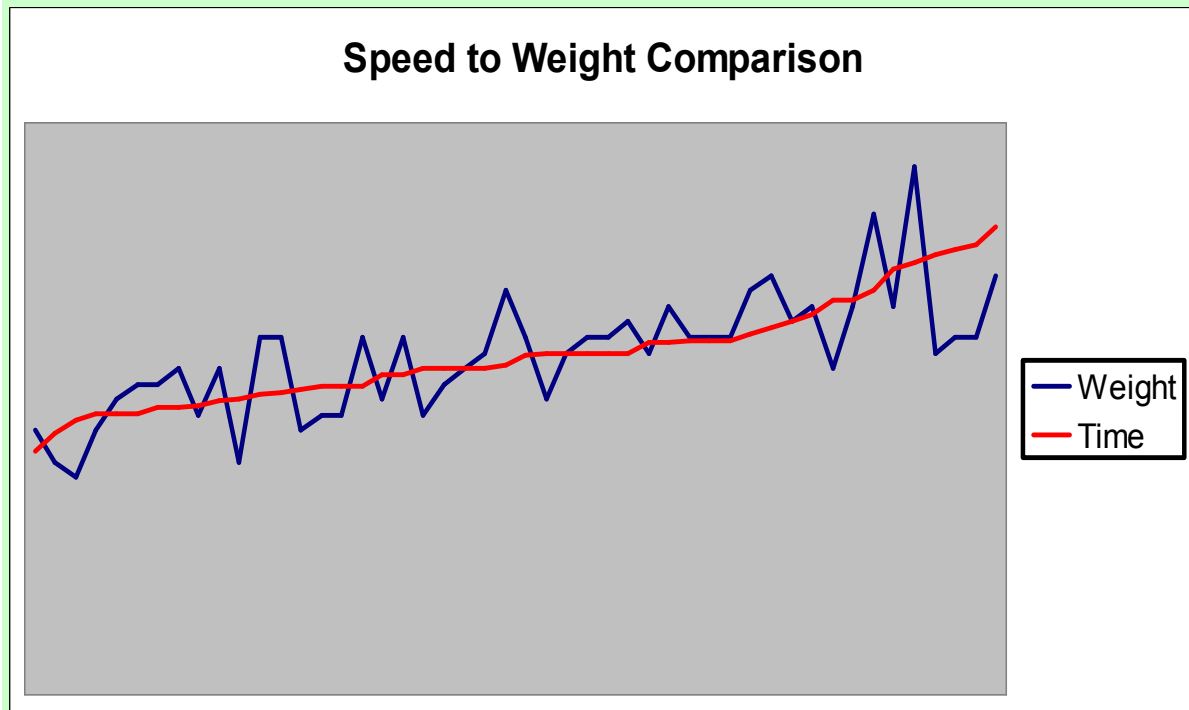




- **What does this graph tell us?**



- Which graph is more likely to influence the design of your next dragster?

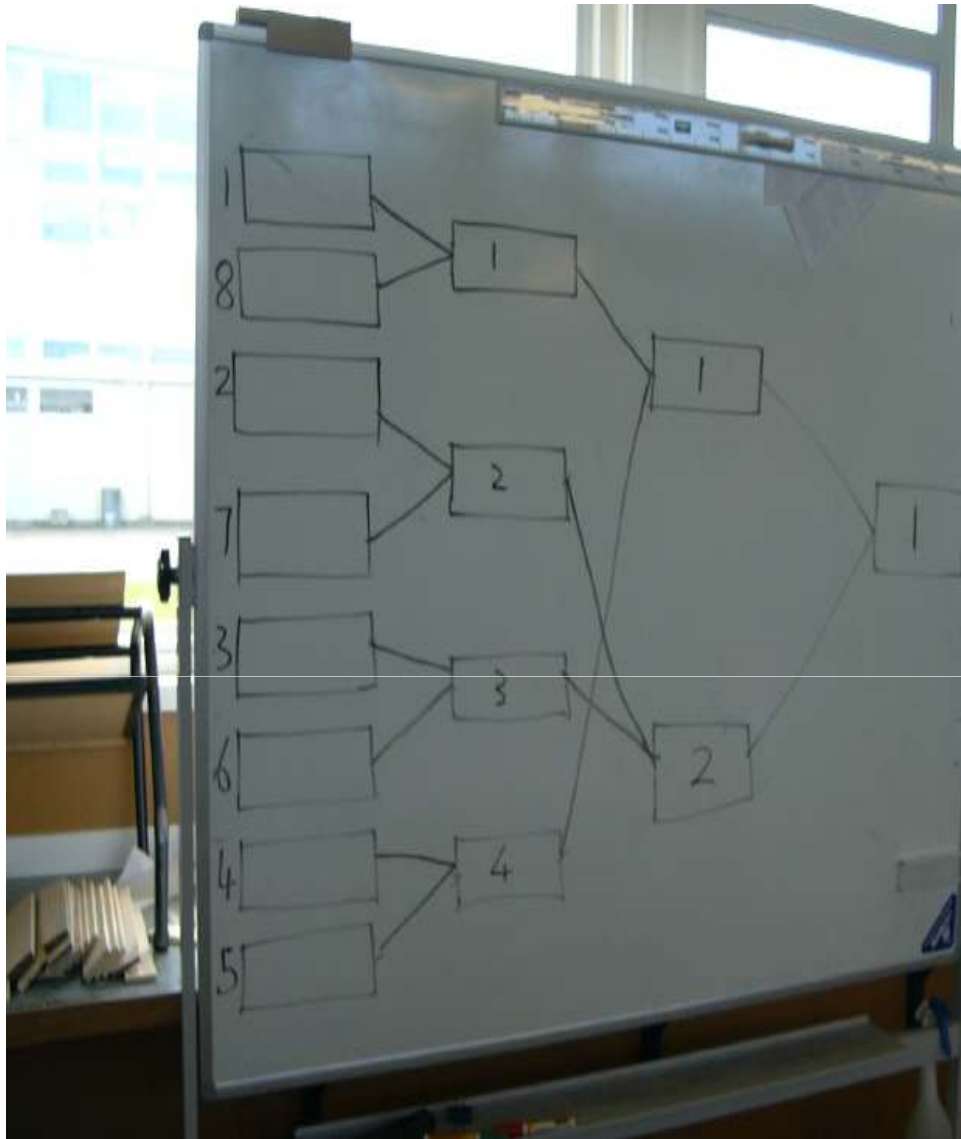


- Why?

# Measurement

- Does my car meet the criteria for racing?
- Design a tool for others to measure their cars against to check that they are legal.





- What is the fairest way to run the race-offs, and use a few gas canisters as possible?

# Extensions

- Acceleration – devise a way of measuring it on the race track.
- $F = M \times A$
- Friction – what is friction and how do we overcome it?

- The size of the hole pierced in the canister – does it affect the results?
- Designing a better timer? – PICAXE
- Laws of motion – Newton

- Work = force x distance.
- Power – measuring how quickly work is done.
- Power = work done/ time taken
- Watts, joules, kilowatts, (horsepower??)

- Improving the design of the start mechanism.



- Testing a variety of ways to reduce damage at the stop barrier.





# Shine and Show Judging

- Opinions vary (subjectivity) - therefore need a wide range.

Shape, proportion

Quality of construction

**FOUR  
CRITERIA**

Finish  
including paint and  
decoration

Originality

**CO2 CARS - SHINE AND SHOW JUDGING FORM**

	<b>SHAPE:</b>	<b>ORIGINALITY:</b>	<b>CONSTRUCTION:</b>	<b>FINISH:</b>		
	Does it look like a car or a racing dragster? Does its shape appeal to the eye? (10)	Is it an imaginative design? Has it that element of surprise? (10)	Is the body smooth or bumpy? Can you tell its made of wood? (10)	How good is the paint work and decoration? (10)		
<b>CAR</b>					<b><i>TOTALS</i></b>	
<b>1</b>						
<b>2</b>						
<b>3</b>						
<b>4</b>						
<b>5</b>						

Number the cars so that they are not identifiable.

Let -

CLASS A JUDGE CLASS B

CLASS B JUDGE CLASS C...

etc etc



- *Be fair*
- *Keep your scores to yourself*
- *Judge on appearance not on how well you think it will race.*

<b>co2 CARS</b>		<b>COMPETITION ENTRY FORM</b>			Date:	
NAME:		CLASS/SCHOOL:				
CAR REGISTRATION NUMBER:		WEIGHT IN GRAMS (without power plant):				
Car Name:		Inclined plane test for FRICTION. (Distance in cms):				
<b>SAFETY and PRODUCTION SPECIFICATIONS</b>						
		<i>passed</i>			<i>passed</i>	
Axles are at least 3mm in diameter:			Thickness of entire power plant housing at least 3mm:			
Wheelbase at least 200 mm:			Diameter power plant housing less than 20mm			
Depth of power plant hole at least 45mm:			Power plant centre to ground between 30 and 45 mm:			
PASSED INSPECTION: YES / NO <small>(classes committee check)</small>			APPROVAL GIVEN TO RACE: YES / NO <small>(Office use only)</small>		10	a.
<b>Division 1: SHINE AND SHOW - Class Judging.</b>						
<b>SHAPE:</b>	Does it look like a car or a racing dragster? Does its shape appeal to the eye? (10)					b.
<b>ORIGINALITY:</b>	Is it an imaginative design? Has it that element of surprise? (10)					c.
<b>CONSTRUCTION:</b>	Is the body smooth or bumpy? Can you tell its made of wood? (10)					d.
<b>FINISH:</b>	How good is the paint work and decoration? (10)					e.
<b>Division 2: DRAG RACE - SPEED</b>						
	My car clocked in at:				10	
<b>Qualifying Run Entry:</b>	The class average was:					f.
<b>SUDDEN DEATH KNOCK-OUT</b>					<i>total:</i>	
<b>1</b> <i>in final 8 (10 pts)</i>						g.
<b>8</b> <i>in final 8 (10 pts)</i>	<i>semi finalist (10pts)</i>					
<b>4</b> <i>in final 8 (10 pts)</i>			<i>finalist (10 pts)</i>			

- Students organise the event.

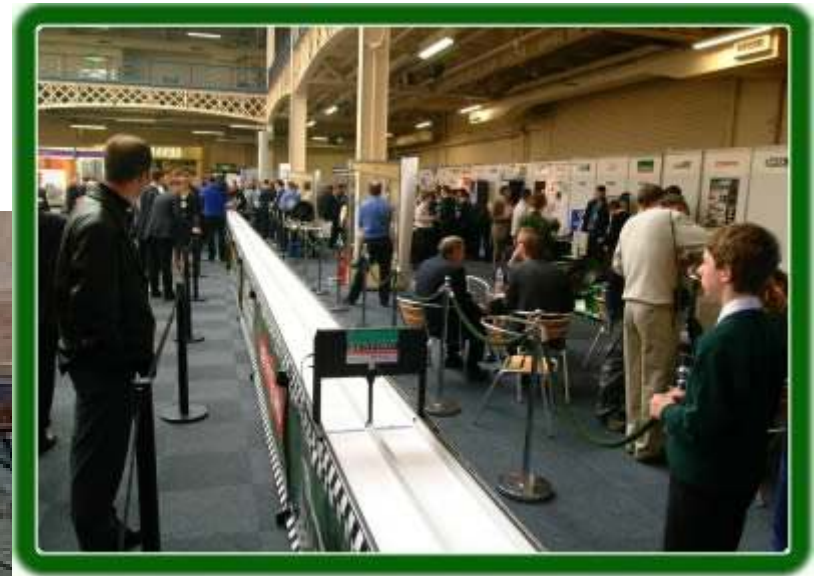


# PERSONNEL – Who does what?

<b>TRACK MARSHALLS</b>	<b>STARTER</b>	<b>TIME KEEPER</b>	<b>RECORDERS</b>
<b>PIT CREW</b>	<b>TRACK MAINTENANCE</b>	<b>SOUND EFFECTS</b>	<b>INSPECTORS</b>
<b>RESULTS ANALYST</b>	<b>CROWD CONTROL</b>	<b>POWER PLANT CONTROLLER</b>	<b>?</b>

Small beginnings...

A VISION FOR THE FUTURE  
FOR New Zealand KIDS



**If they can do it...**

