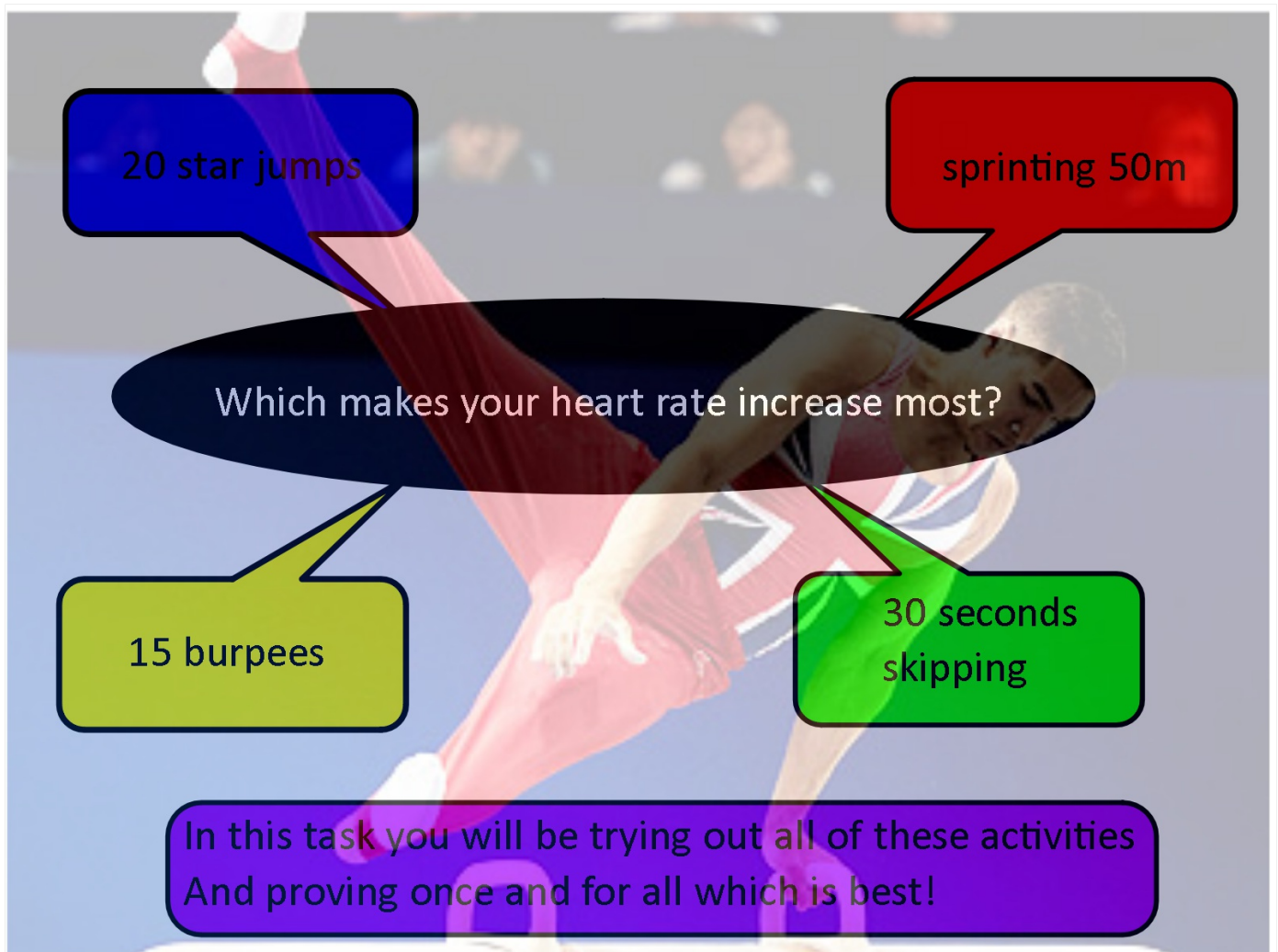


Intro - 5 mins



In this task you will design a cookie.

You will need to design a data collection sheet in preparation for the food tasting.

Just how tasty is your cookie?



Chocolate Chip



Rocky Road Cookie

Which combination of ingredients makes a better tasting cookie?

Double Chocolate Chip



Oatmeal Raisin



Sugar Cookies



Could you be the next Enzo Ferrari?



What challenges do a mechanical engineers face when designing the ultimate racing car?

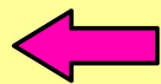
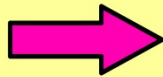
Your challenge is to design a car that will withstand the strains of race.

You will investigate factors which affect the speed of the car such as design, weight, friction and propulsion.

Can you design the ultimate machine?



What's this



got to do with this?



Imagine you have been asked to design a helicopter to drop supplies to people in a remote disaster area. A controlled descent and soft landing is essential - too fast might damage the load and too slow might blow off course!



You will experiment with your helicopter designs....



Does the helicopter always land in the same place?

Does it always rotate in the same direction?

Can you make it fly to particular places?



Students are required to consider different options, experiment with variables, keep records of results, make predictions, analyse and present data, develop convincing arguments, work collaboratively and work within constraints.

Objectives

- I can form and test a hypothesis
- Design a survey and data collection sheet
- Grouped data and frequency tables
- Analysis and Averages: Spread of data (range); Mean; Median; Mode
- Analysis and Graphs - pictograms; bar charts and composite bar charts;
- If appropriate: pie charts and scatter graphs; sorting and classifying data - Venn diagrams or
- Carol diagrams
- Measures - using scales and instruments

websurvey 

Year 7 Investigations

Very soon you'll be working on one of these very exciting long term projects! The best bit is that you can request the one you want to do!

Choose from...

- 1) Test which exercise has the greatest impact on your heart rate!
- 2) Figure out which ingredients make the tastiest cookie!
- 3) Learn about the challenges faced when designing race cars!
- 4) Does helicopter technology exist in nature? How and where?

**Required*

First Name *

Last Name *

Teaching Group *

Which one do you want to do?

Indicate your first choice first! You must choose all four different investigations.

Warning! If you choose the same investigation twice or more, you will be assigned what's left after everyone else has theirs!

My first choice: *

My second choice: *

My third choice: *

My last choice: *

Creating a Form using Google Docs

Google Docs interface showing the 'CREATE' menu and a list of documents.

CREATE menu options:

- Document
- Presentation
- Spreadsheet
- Form**
- Drawing
- Table (beta)
- Collection
- From template...

Google Docs will soon be upgraded to Google Drive.
Google Drive will be the new home for your files. [Find out more and get started.](#)

TITLE	OWNER	LAST MODIFIED
Sam Bruce NSP - Red Report Shared	me	Jun 15 me
SVC Pupil Progress Report - Josie Davies 9NR	Chrissiemackie	Jun 15 Chrissiemackie
SVC Pupil Progress Report - Kieran Mansfield	Chrissiemackie	Jun 14 Chrissiemackie
Henry Bendon - Pupil Progress Review Shared	me	Jun 1 me
SVC Pupil Progress Report - Zak Gedny 10NMJ	Chrissiemackie	May 31 Chrissiemackie
Year 7 Investigations Shared	Cameron Fehr	May 29 Cameron Fehr
SVC Pupil Progress Report - Luke Szembel 10A	Chrissiemackie	May 28 Chrissiemackie
SVC Pupil Progress Report - Riley Webb 7NMJ	Chrissiemackie	May 2 Chrissiemackie

Creating questions using Google Docs

The screenshot shows the Google Docs form editor interface. At the top, there's a header bar with the title "Edit form - [Name your form here - this should be your hypothesis] - Google Docs - Windows Internet Explorer provided by Swaves". Below the header, there's a toolbar with buttons for "Add item", "Theme: Plain", "Share", "Email this form", "See responses", "More actions", and "Save". The main content area has a text box for the form title, followed by a text box for instructions. Below that, there's a section for creating a question. The "Question Title" field contains "Write your question here". The "Help Text" field contains "If there is any extra information needed write it here". The "Question Type" dropdown menu is open, showing options: "Multiple choice", "Text", "Paragraph text", "Multiple choice", "Checkboxes", "Choose from a list", "Scale", and "Grid". A pink arrow points from a green box to the "Question Type" dropdown. Another pink arrow points from a red box to the "Done" button. Below the question creation section, there's a "Sample Question 2" field.

Question Title: Write your question here

Help Text: If there is any extra information needed write it here

Question Type: Multiple choice (selected)

Options: Type your options, Click to add option, Done

Sample Question 2: [Empty text box]

Select the type of question you require here

Click here when you are happy with your question.

Helicopters - 15 mins

What do you see?



The Project Plan - Your next few lessons:

1: Look at different data collection methods and when each should be applied. Decide which method will be appropriate to our project and begin to plan

2: Discuss methods of seed dispersal to help you to analyse and investigate three ideas for 'helicopter' seed design

3: Develop, plan and prepare three helicopter seed designs for testing

4: Data collection - we will conduct a class experiment and record the results

5: Start to plan how you will analyse your findings by looking at different types of averages and graphs.

6 - 8: Analyse your data with graphs and tables; decide the best averages to calculate and use them to compare data. Justify your choices and explain what you are doing.

9 - 10: Plan your presentation and decide who is going to say what. Create and design your posters or displays. What makes a good presentation? Techniques (remember to P.E.E.) Present your work to the class as a group. Peer and self assessment.

Final Lesson: Review and celebrate success with selected presentations

L/O: **Analyse** and develop helicopter seed designs in order to **create** your three models for testing your hypothesis.



L/O: **Analyse** and develop helicopter seed designs in order to **create** your three models for testing your hypothesis.

Open video from desktop!

L/O: **Analyse** and develop helicopter seed designs in order to **create** your three models for testing your hypothesis.

Hypothesis: Heavier seeds travel (disperse) further
from the parent plant
Seeds with two wings 'fly' further

As a team you have begun to test ideas.

You should have considered what you could change in order to improve the flight time of your helicopter design (enabling the seed to disperse further).

Discuss and note down (on mini whiteboards) a hypothesis that your team will be testing.



L/O: **Analyse** and develop helicopter seed designs in order to **create** your three models for testing your hypothesis.

Hypothesis: Heavier seeds travel (disperse) further from the parent plant
Seeds with two wings 'fly' further

You have today's lesson ONLY to **create three helicopter designs**.

You need to be convinced that your chosen designs have been **adapted successfully** and that you have **recorded** these so that they could be reproduced exactly.

You should **attempt to justify** adaptations by referring to **mathematical properties** of the shape and **scientific ideas** for increasing flight time.

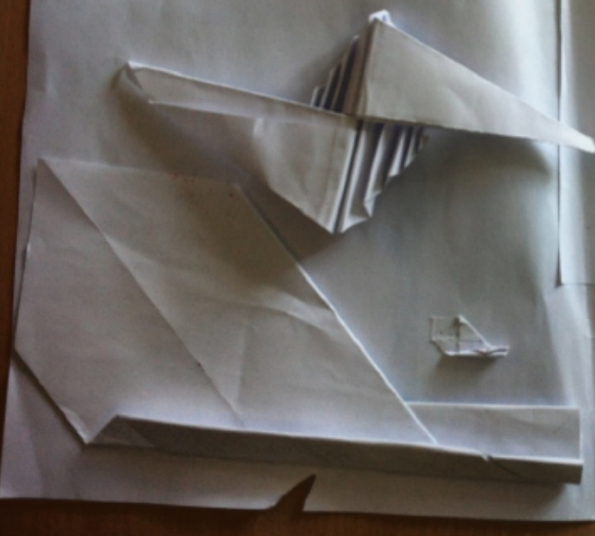
L/O: Use measures of average and range to **analyse** data collected from experiments

Understand how to represent our data using charts and graphs

- ★ You are preparing work that will be presented to the class and will be **peer assessed**.
- ★ You need to make YOUR **hypothesis** clear
- ★ Your work will be **convincing** the listeners whether or not you have found evidence to support your hypothesis
- ★ You must **demonstrate** that you can compare **averages and the range** of your experimental data.
- ★ You must make your work easy to interpret - use **a variety of charts and graphs** to help with this.
- ★ At a higher level, you should **justify** your choice of experimental methods (why didn't we use a questionnaire etc?) and use **KEY WORDS**

'Smaller seeds with 'wings'
spin faster than larger seeds.'

We should note that we can't actually
measure spinning



MODEL	Time (in seconds) to fall 1.5 m					Mean
	1	2	3	4	5	Average
1s	1.06	0.85	0.78	1.12	1.00	0.96
2m	0.75	0.54	0.75	0.53	0.62	0.63
3L	0.94	0.50	0.62	0.47	0.44	0.59
4s	0.81	0.66	1.00	0.69	0.87	0.80
5m	1.57	1.22	0.87	0.88	1.15	1.13
6L	1.69	0.94	1.34	0.97	0.75	1.13
7R	0.62	0.91	0.88	0.75	0.62	0.75
8R	0.72	0.69	0.75	0.72	0.56	0.68
9R	1.28	1.37	1.19	1.10	0.84	0.85 1.10
MADCLIFF, PETER, CORIG, KAI						



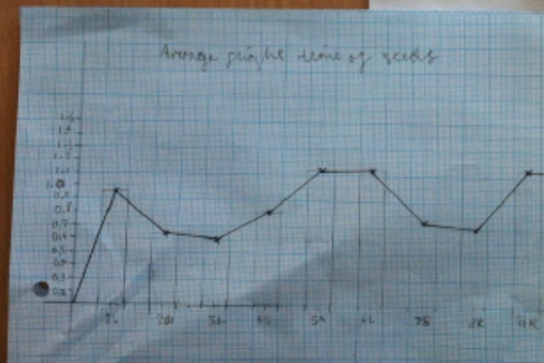
1S range = 0.34
 2M range = 0.22
 3L range = 0.50
 4S range = 0.39
 5M range = 0.70
 6L range = 0.99
 7R range = 0.29
 8L range = 0.19
 9R range = 0.53

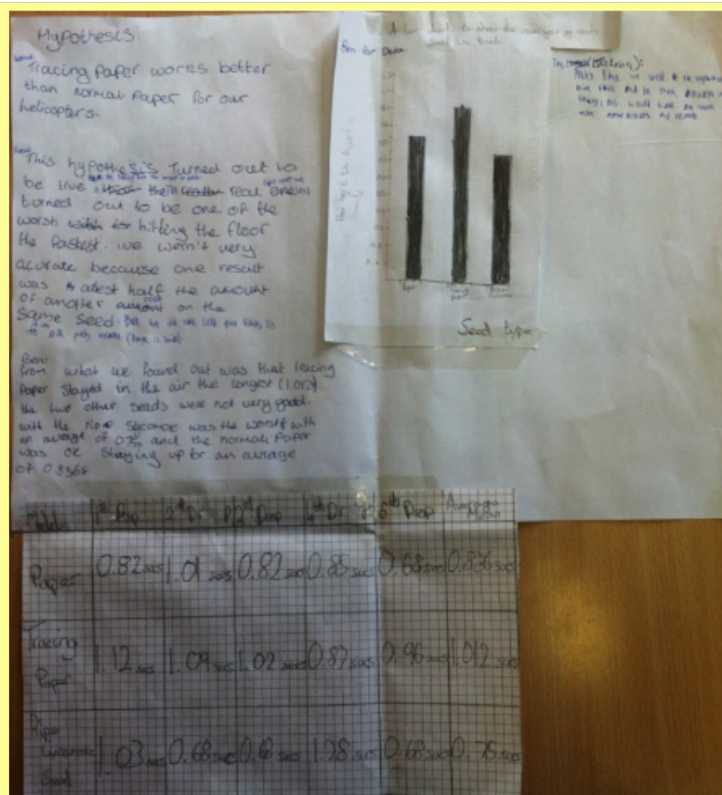
Part of results

1 S	N/A
2 M	0.75
3 L	N/A
4 S	N/A
5 M	N/A
6 L	N/A
7 R	0.62
8 L	0.72
9 R	N/A

Mean of results

1 S	1.00
2 M	0.75
3 L	0.62
4 S	0.81
5 M	1.15
6 L	0.94
7 R	0.75
8 L	0.72
9 R	1.19





Model	1 st Drop	2 nd Drop	3 rd Drop	4 th Drop	5 th Drop	Average Mean
Paper	0.82 secs	1.01 secs	0.82 secs	0.85 secs	0.68 secs	0.836 secs
Tracing Paper	1.12 secs	1.09 secs	1.02 secs	0.87 secs	0.96 secs	1.012 secs
Ripe Gyromata Seed	0.3 secs	0.68 secs	0.6 secs	1.28 secs	0.68 secs	0.75 secs

Cookies - 15 mins
including practical!

The cookie tasting ...

What equipment might we need to set up the cookie tasting?



Will you take any measurements?

How can we make it a fair test (unbiased)?

What data do you need to collect to test your hypothesis?

What type of questions will you ask?
(E.g. closed, response box, likert scale
(Strongly agree to strongly disagree))

spot the mistakes!



L.O - To **investigate** the nutritional content of different cookies, to **analyse** this content to decide which cookie(s) to taste

A higher fat content makes for a tastier cookie

Nutrition

Typical Values	100g contains	Each cookie (typically 80g) contains
Energy	1860kJ (445kcal)	1490kJ (355kcal)
Protein	5.4g	4.3g
Carbohydrate	60.9g	48.7g
Sugars	40.5g	32.4g
Fat	19.8g	15.8g
Saturates	9.0g	7.2g
mono Unsaturates	7.5g	6.0g
Polyunsaturates	2.3g	1.8g
Fibre	2.8g	2.2g
Sodium*	0.3g	0.3g
*Salt Equivalent	0.9g	0.7g



Triple Chocolate Chip Cookies

Per 100g

Energy (kcal)	465
Protein (g)	6.8
Carbohydrate (g)	60.7
Sugars (g)	47.9
Fat (g)	21.7
Saturates (g)	11.6
Fibre (g)	2.2
Salt (g)	0.25

Tasks for today:

1) Make sure your group has a clear, agreed hypothesis

2) List two to three types of cookies that will form your cookie tasting (use what you found from the nutritional information last time to decide)

3) Write down any information you want to gather and record about the cookies before the taste testing

4) Design your questions for people to complete at your cookie tasting station.

Write these ideas on your group's guide sheet.

L.O - to **collect** data using **efficient** methods, making sure that **fair testing** has been considered. To begin to **collate** and **analyse** data **effectively**, **evaluating** whether it supports your **hypothesis**.

Cookie Tasting

There are _____ people present today for cookie tasting.
You will be given your allocation of cookies, you must:

- Cut them into equal portions - ensuring you have enough for everyone

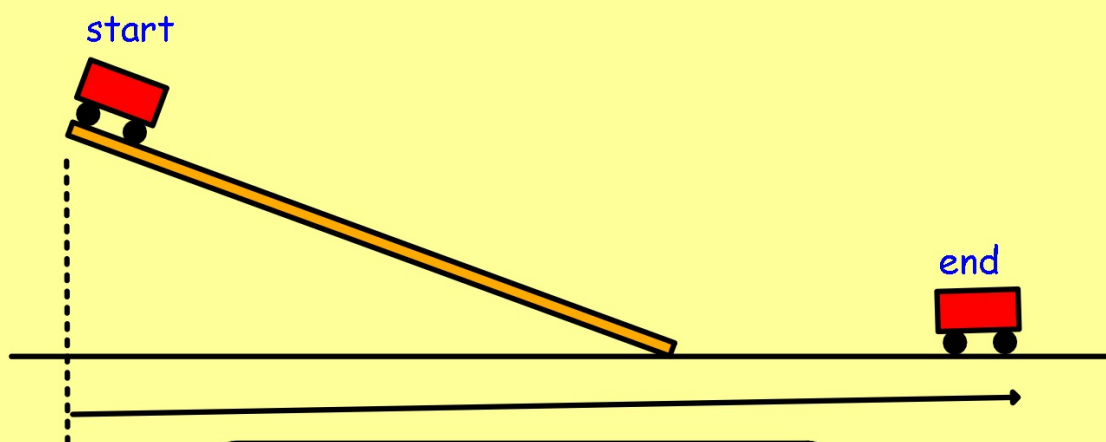
Equipment available:

- Rulers
- Plastic knives
- Tape Measures
- Serviettes
- Protractors
- Paper Plates
- Scales

Remember

- Make sure you label your cookies to help the tasters
- You leave instructions about how to fill in your data collection sheet
- You have enough data collection sheets for everyone.

Drag car racing - 15 mins



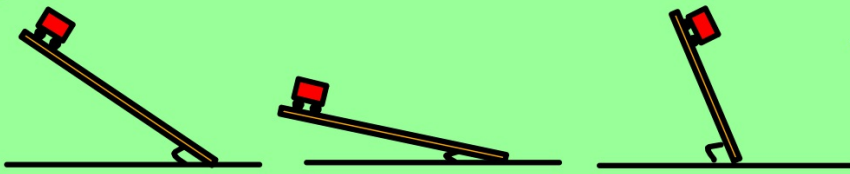
Measure the distance travelled

How long did it take to get there?



How does these affect the travelling distance and time?

Variations to try...



Angle of the ramp?

Surface material
of the ramp?



Car Design
& materials

What happens if the weight of the car is altered?



Basic wheel assembly design

1. Cut straw to length



2. Cut wooden axel to length (longer than the straw)



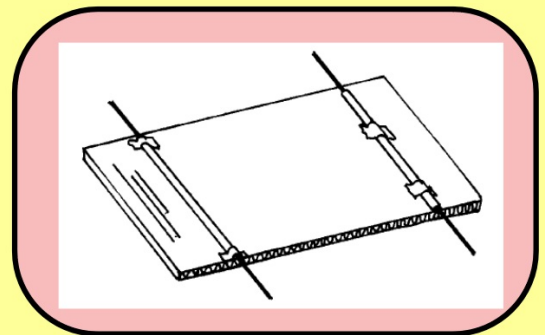
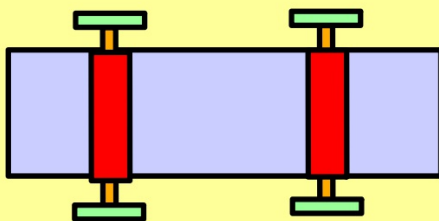
3. Feed axel through the straw



4. Attach Wheels to axel



5. Stick Wheel assemblies to base board



Equipment available

013935 - DOWELLING, 4mm Ramin Dowels, 600mm Long, Pack of 100
List Price £ 6.50

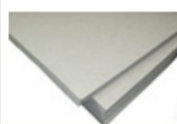


173428 - GENERAL MODELLING, Wheels, Resource Pack, Pack



Pack contains: 20 x 300mm Axles (4mm dia. wood), 100 x 30mm Card Wheels, 100 x 50mm Card Wheels and 40 x Economy Plastic Wheels. A sheet of notes is included. Suitable for Key Stages 1 and 2 (ages 5 to 11).

96890 - GREY BOARD UNLINED, 635 x 762mm, 1000 micron, Pack of 40



37017 - COROBUFF®, 304 x 406mm, Bright Colours, Pack of 12 sheets

1 sheet each of White, Black, Brown, Flame Red, Canary, Orange, Nile Green, Apple Green, Azure Blue, Rich Blue, Pink and Violet.

These sheets with their unusual corrugated surface add both texture and dimension to all kinds of art activities. Ideal for construction projects.

~ Page number(s) in current ESPO catalogue 1083 ~

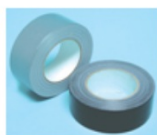
86207 - STRAWS, Drinking, Jumbo, Pack of 250

Plastic 6mm diameter. Great for milkshakes and useful for art and design work.



12564 - TAPE, GAFFA, Silver, Each

50mm wide, 50 metres long. Ideal for marking, fixing, repairs, cable securing application and carpet underlay joining. Sticks well to most surfaces. Also appropriate for container sealing. It is a waterproof fabric laminate with rubber resin glue. Easy to tear.



66737 - DOUBLE SIDED CARPET TAPE, Each

50mm wide, 50 metres long. White polypropylene tape with a pressure sensitive white rubber adhesive. Has excellent initial tack and adhesion, but limited shear properties. Especially suitable for fixing foam backed carpets and temporary fixing of other floor covering.



~ Page number(s) in current ESPO catalogue 1313 ~

HALT! ALL WILL STOP!

Will be used if there is a health and safety issue.

Room set up



Teachers desk

GROUP ROLES

Door

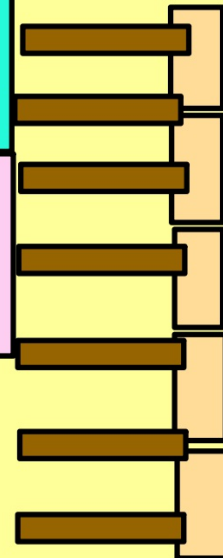


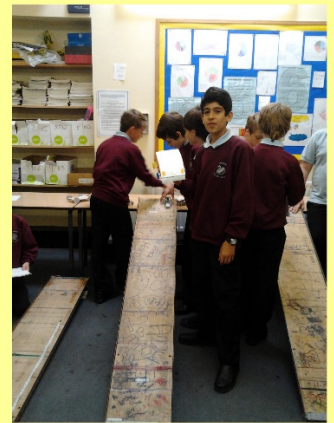
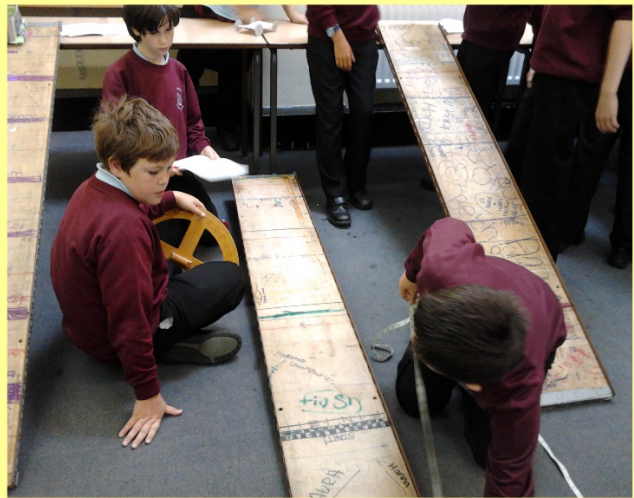
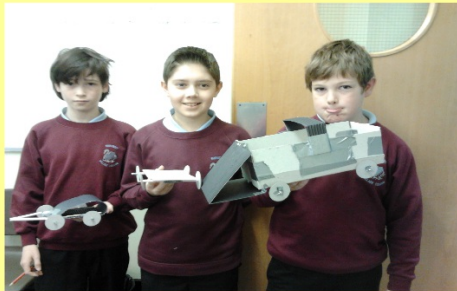
Experiment
set up

Distance
measurer

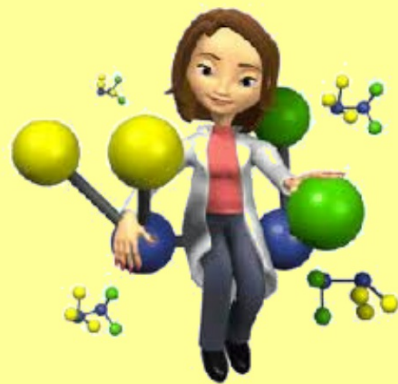
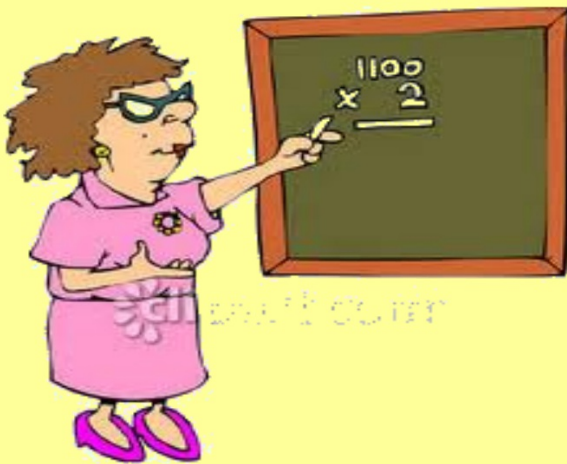
Stop watch
controller

Results
recorder





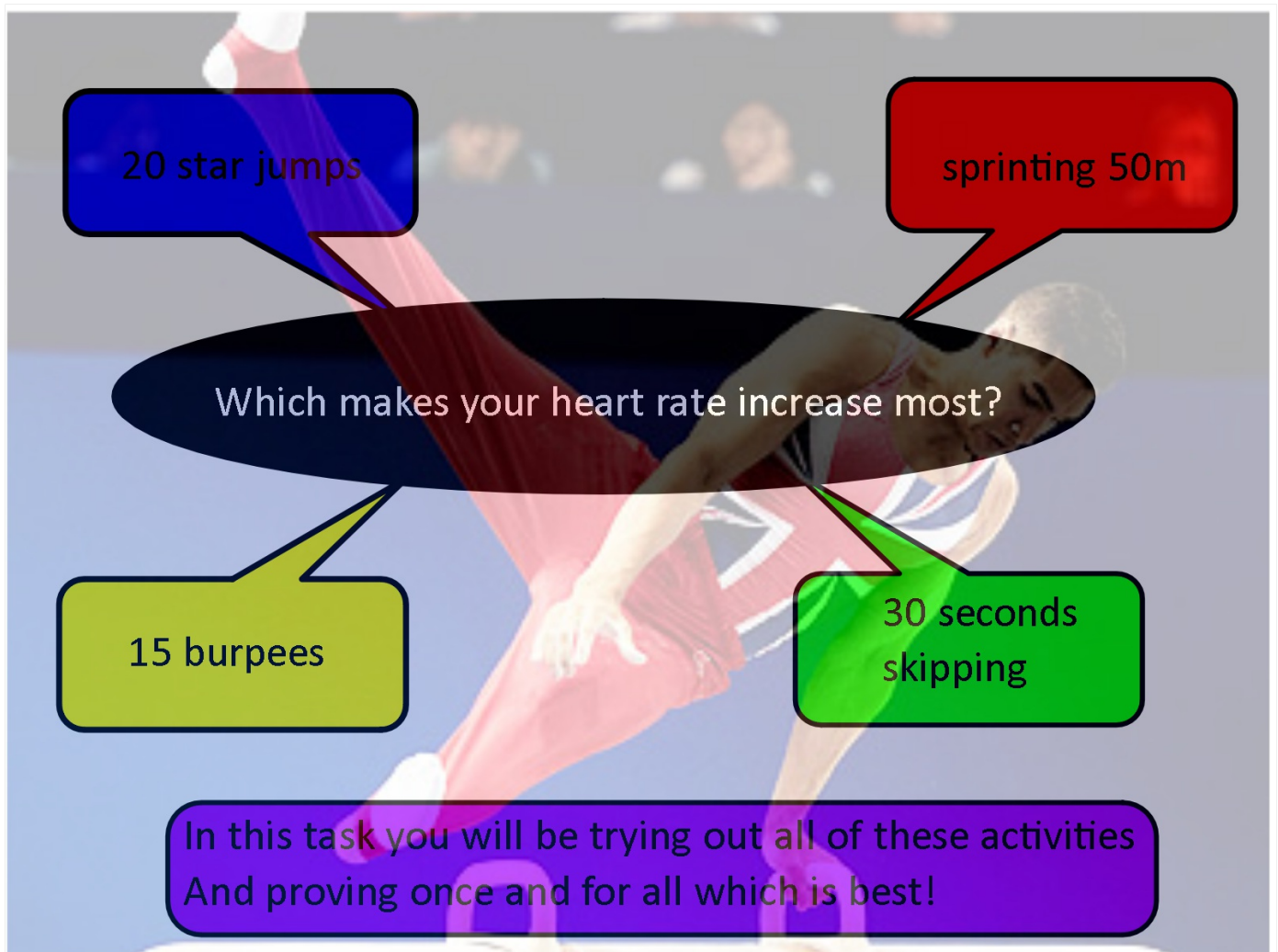
The visiting expert



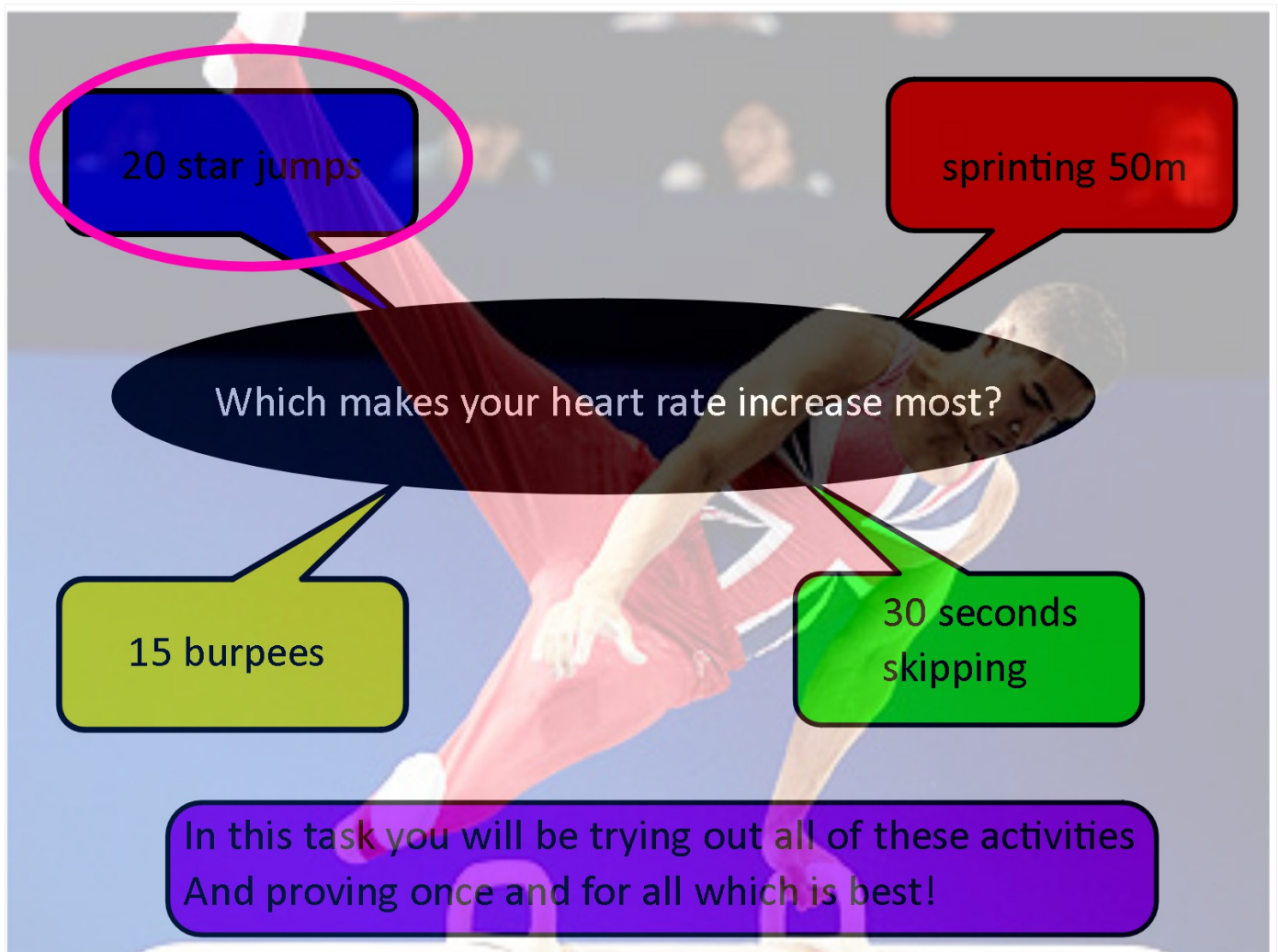
Create a list of questions to ask the scientist. These questions should help you work out what has happened in your experiment

Create a conjecture about why you have got the results that you have. Convince me that your hypothesis was true/false

Heart rate - 15 mins
including practical!

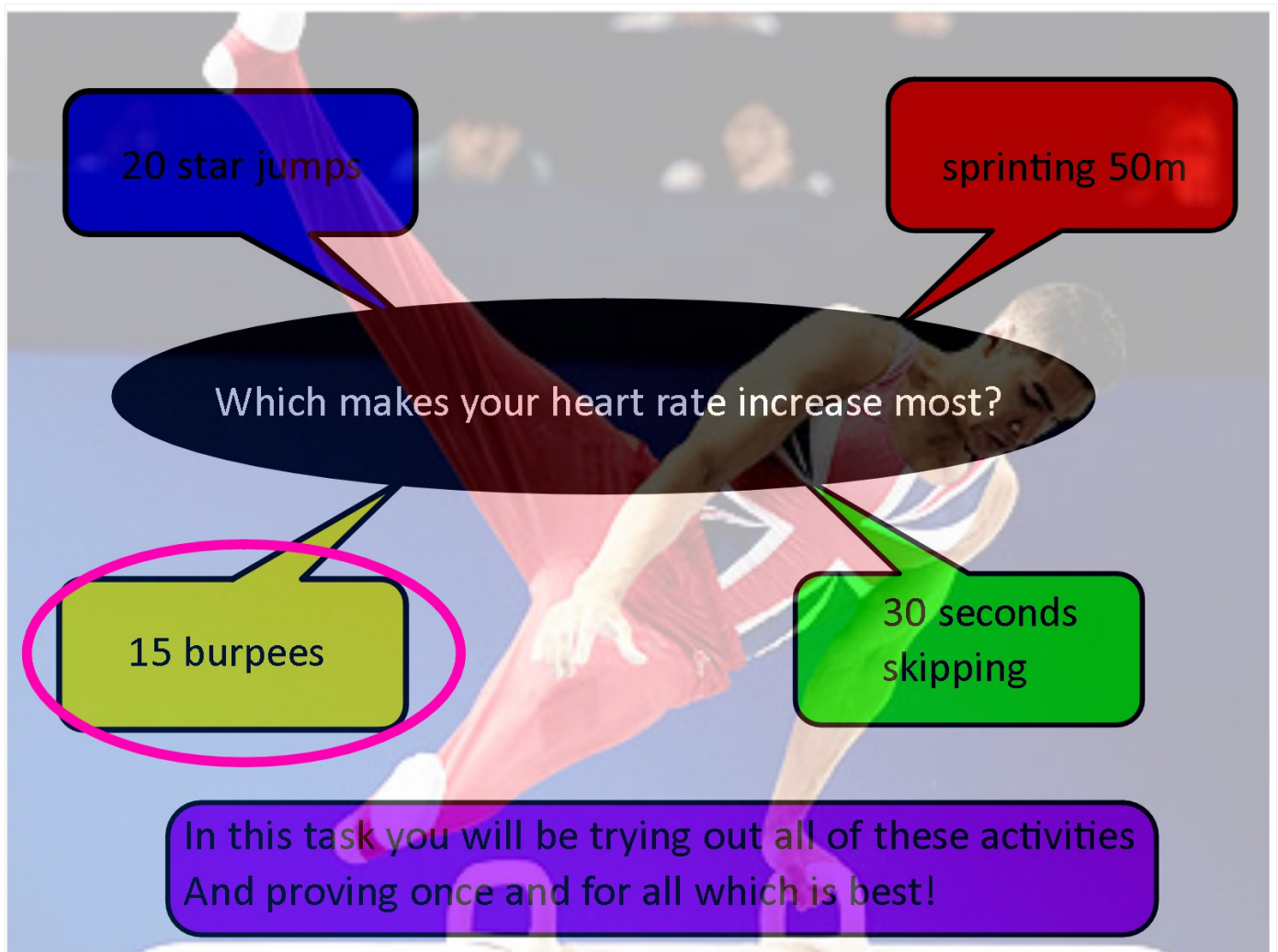


Name	Resting Heart Rate (BPM)			
	1	2	3	Mean



Name	Heart Rate (BPM) after 20 star jumps			
	1	2	3	Mean

Rest! (View powerpoint presentation)



Name	Heart Rate (BPM) after 15 burpees			
	1	2	3	Mean

So... what do you think at this point?!

plenary - 10 mins

Project assessment

- In class presentations and peer assess
- Whole Year presentations in Hall





Where is the STEM?

Christmas

