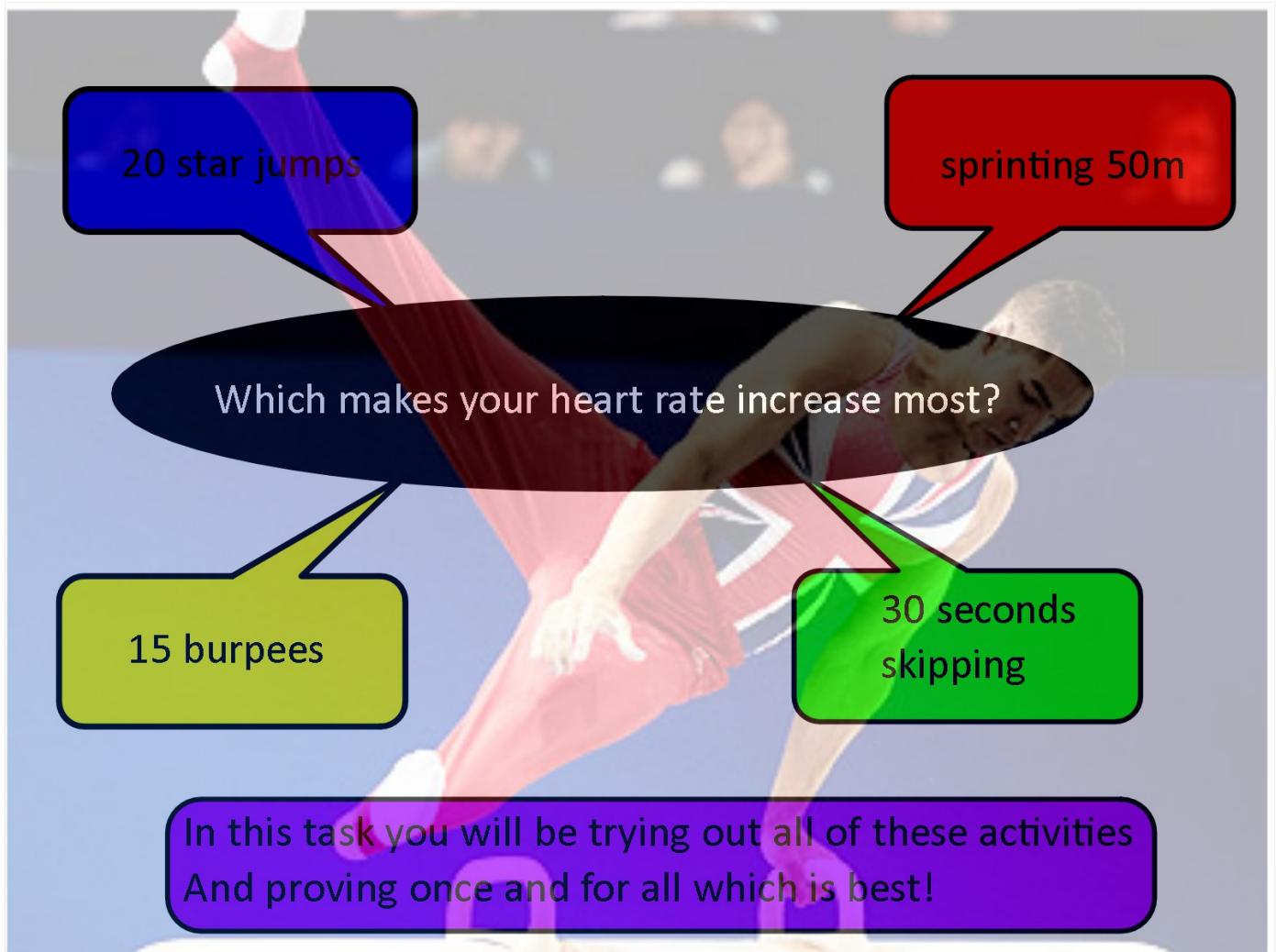


Intro - 5 mins



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?



Rocky Road
Cookie



Chocolate
Chip

Which combination of ingredients makes a better tasting cookie?



Oatmeal Raisin



Sugar Cookies



Double Chocolate
Chip

Could you be the next Enzo Ferrari?



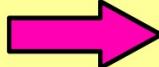
What challenges do a mechanical engineers face when designing the ultimate racing car?

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
- Carroll 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!

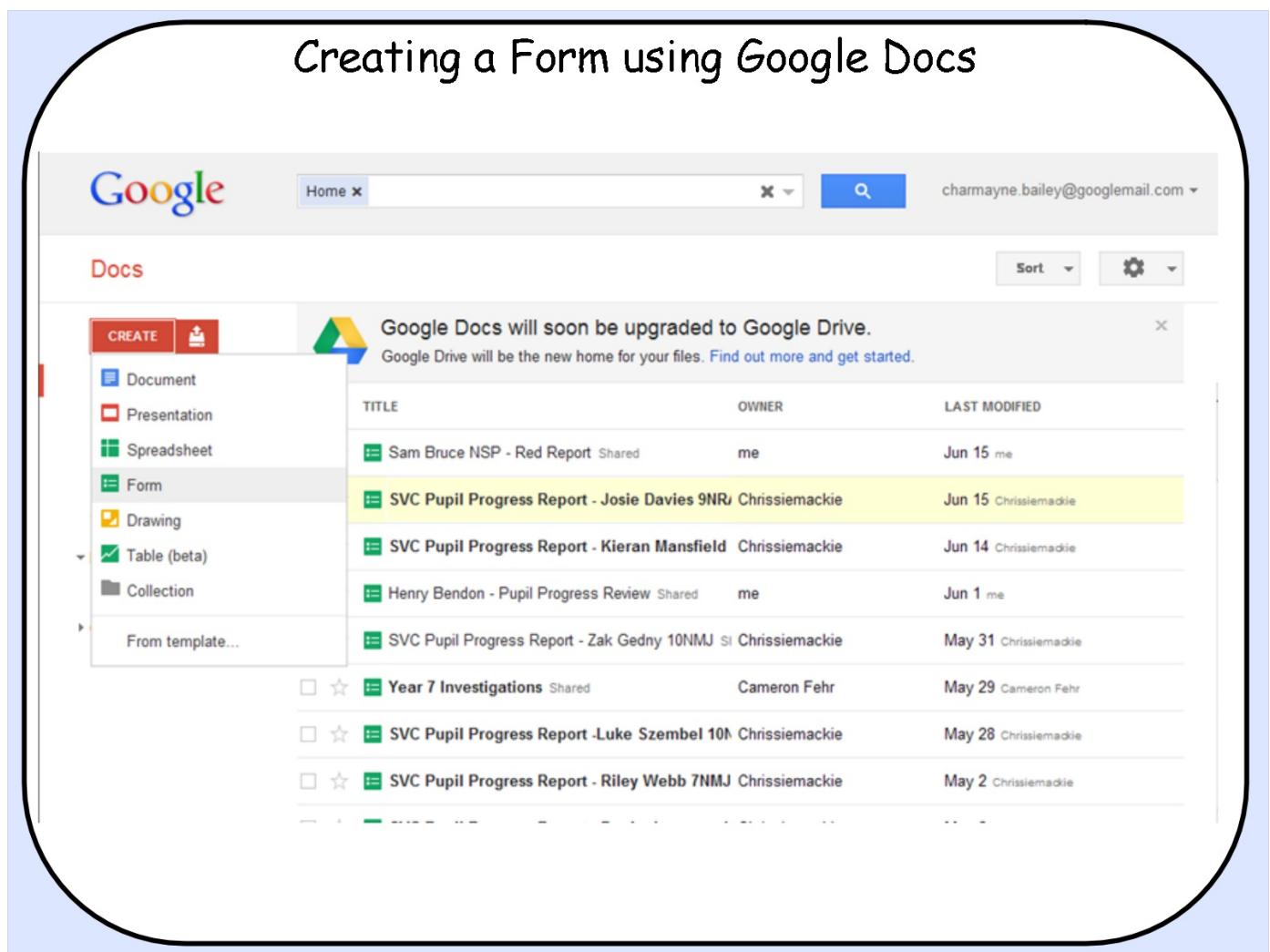
My first choice: *

My second choice: *

My third choice: *

My last choice: *

Creating a Form using Google Docs



Google Docs

Home x

charmayne.bailey@googlemail.com ▾

Sort ▾

Settings ▾

CREATE

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 10M | 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 Forms interface in a web browser. The title bar reads "Edit form - [Name your form here - this should be your hypothesis] - Google Docs - Windows Internet Explorer provided by Swaves". The main area is titled "Name your form here - this should be your hypothesis". Below it is a text area for instructions. The "Question Type" section is highlighted with a yellow background. A dropdown menu is open, showing options: "Multiple choice", "Text", "Paragraph text", "Multiple choice", "Checkboxes", "Choose from a list", "Scale", and "Grid". A checkbox for "Go to page based on answer" is checked. A pink arrow points from the text "Select the type of question you require here" to the "Text" option in the dropdown. Another pink arrow points from the text "Click here when you are happy with your question." to the "Done" button. A green box with black text "Select the type of question you require here" is overlaid on the interface. A pink box with black text "Click here when you are happy with your question." is also overlaid.

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.

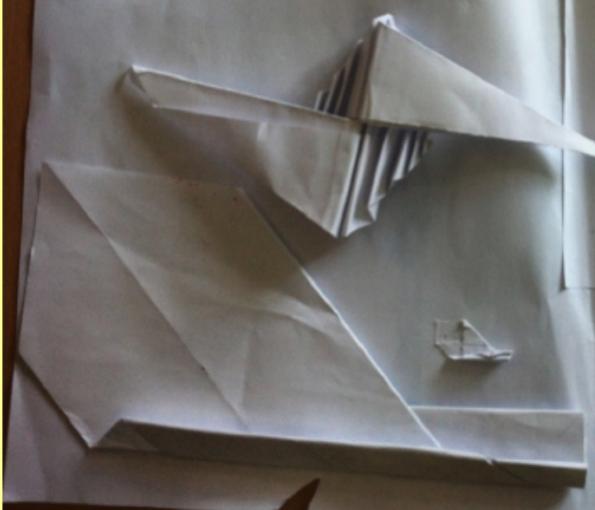
L/O: Use measures of average and range to **analyse** data collected from experiments

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**

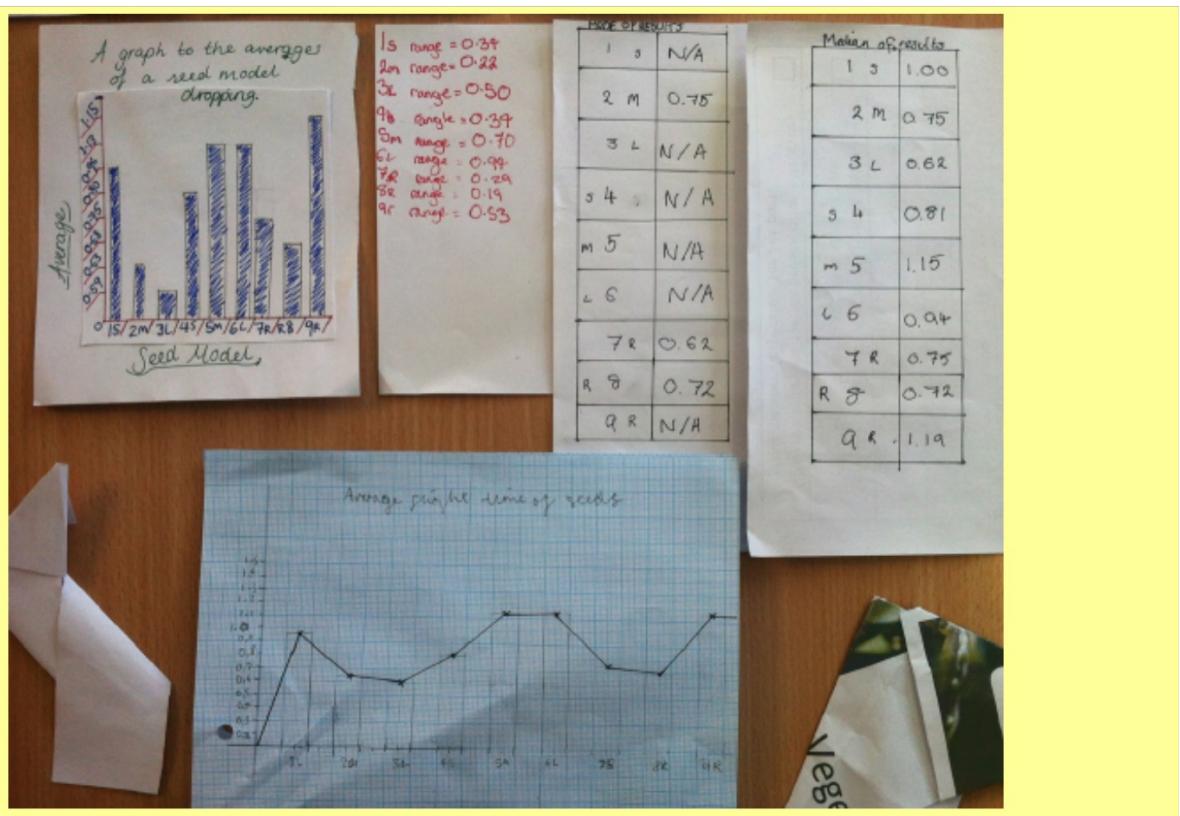
'Smaller seeds with wings' spin faster than larger seeds.'

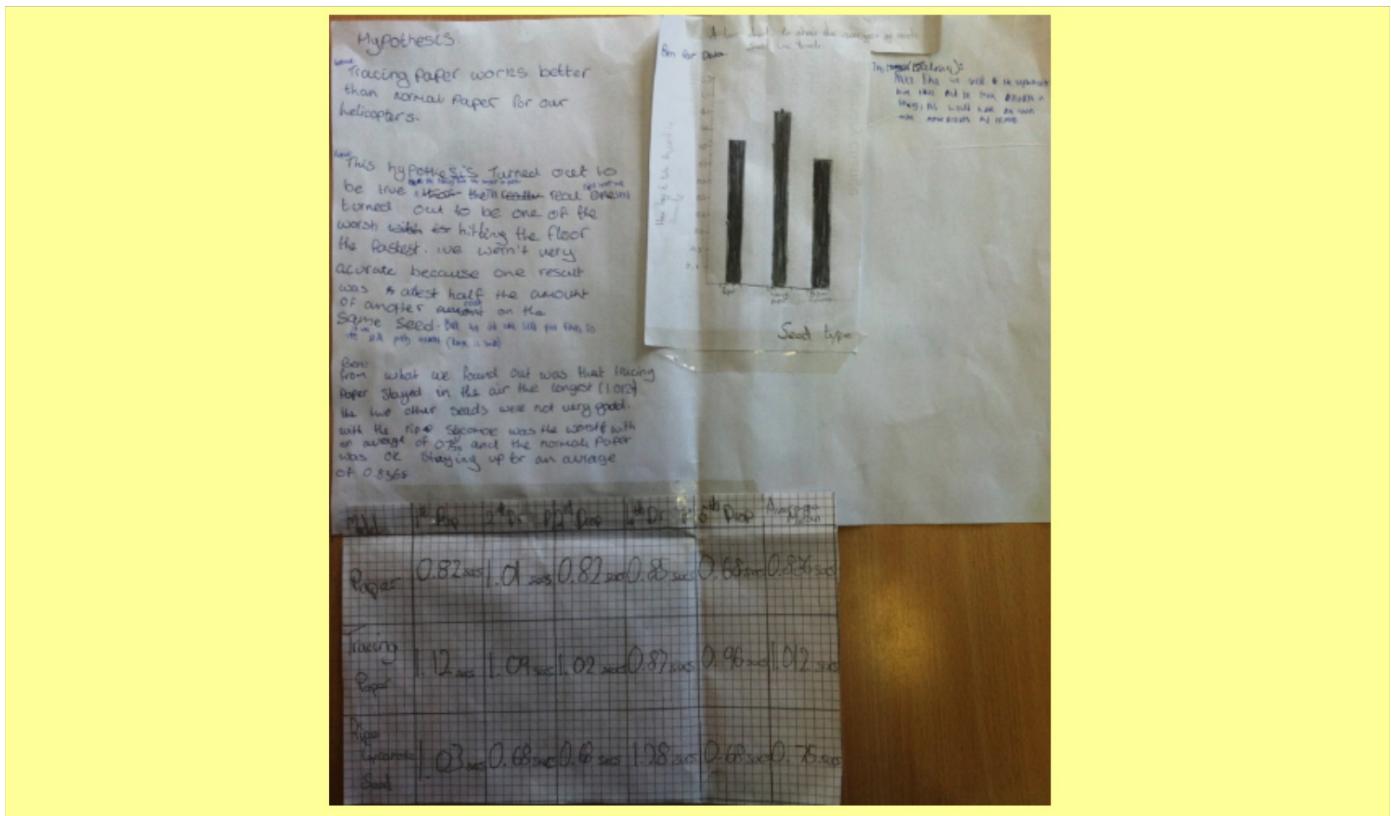
We should note that we can't actually measure spinning



| MODEL | Time (in seconds) to fall 1.5 m | | | | | Mean |
|-------|---------------------------------|------|------|------|------|------|
| | 1 | 2 | 3 | 4 | 5 | |
| 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 | 1.16 |

MADELIEF, PETER, CORIE, KAI





| 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 | 0.826 secs | |
| Tracing Paper | 1.12 secs | 1.09 secs | 1.02 secs | 0.87 secs | 0.96 secs | 1.012 secs | |
| Ripe Gycanore Seed | 0.23 secs | 0.68 secs | 0.48 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

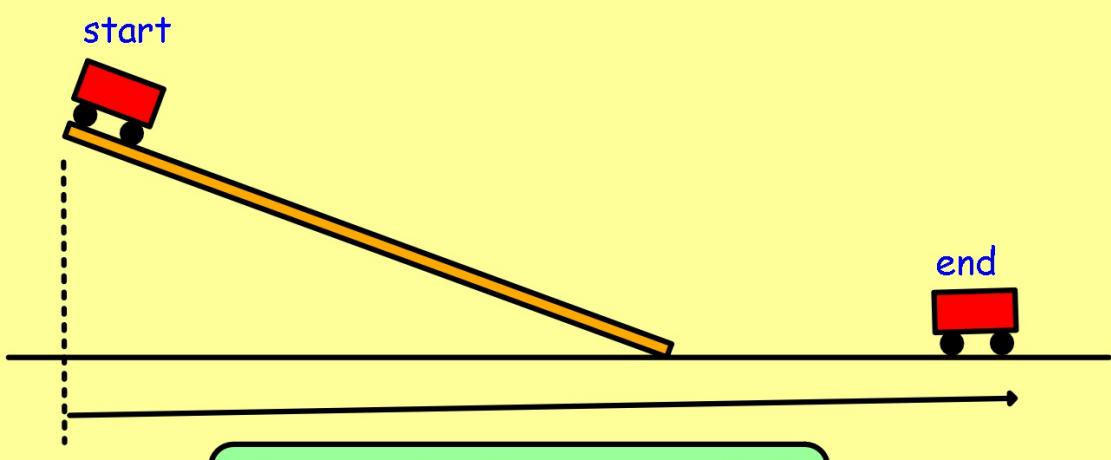
Equipment available:

| | |
|-----------------|------------------|
| • 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



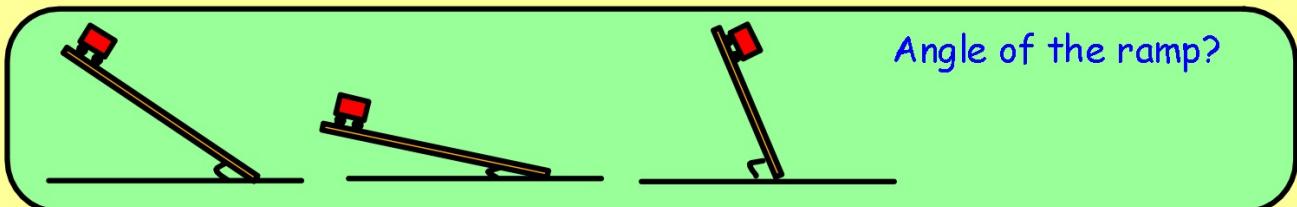
Measure the distance travelled

How long did it take to get there?



How does these affect the travelling distance and time?

Variations to try...



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 axle to length (longer than the straw)



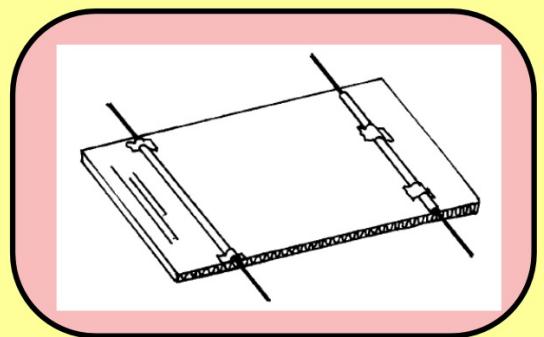
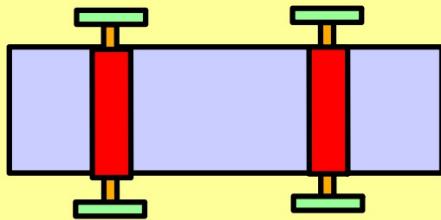
3. Feed axle through the straw



4. Attach Wheels to axle



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



new
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 ~

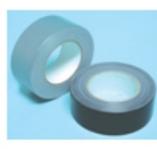
86207 - STRAWS, Drinking, Jumbo, Pack of 250

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.



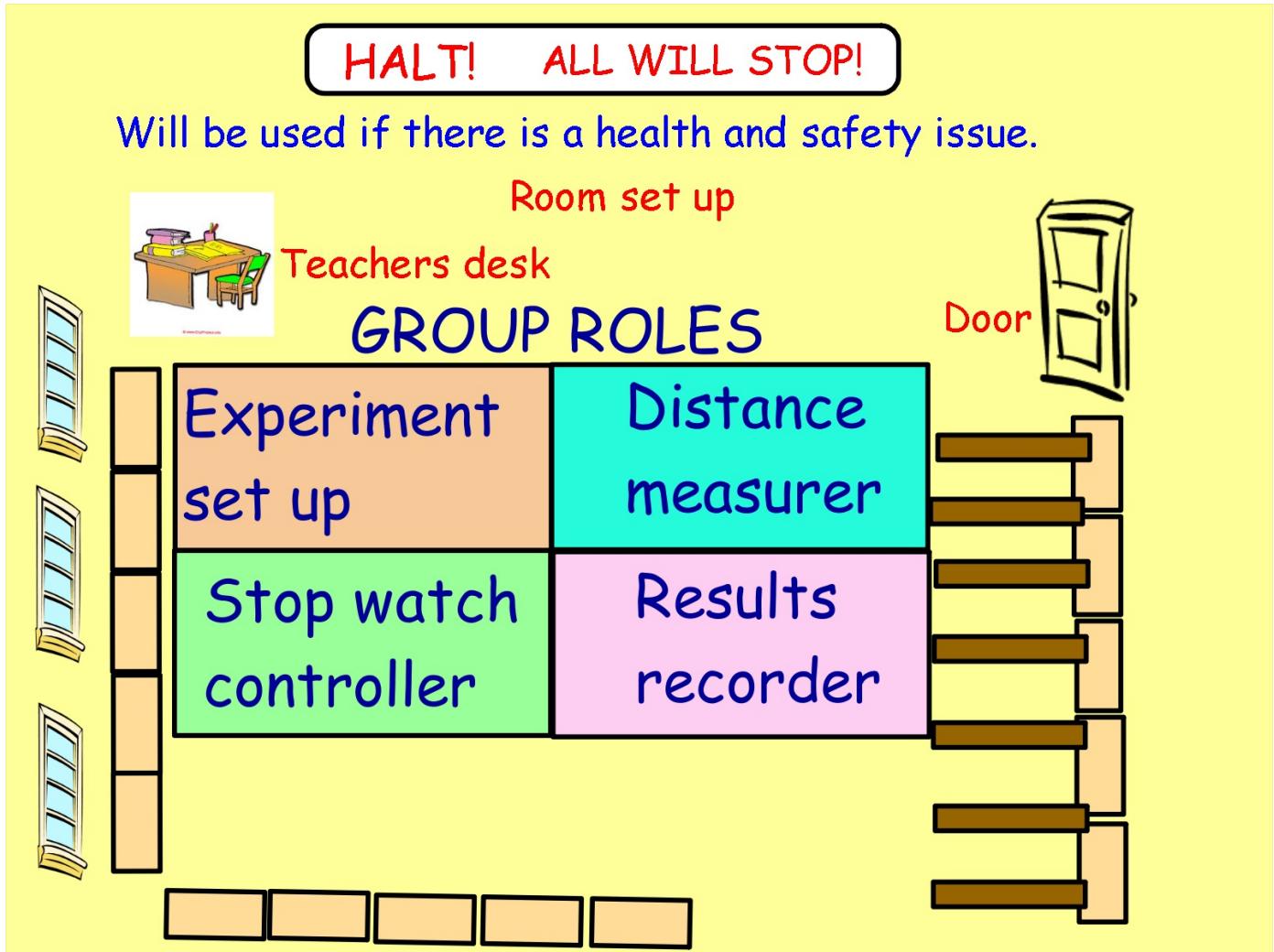
66737 - DOUBLE SIDED CARPET TAPE, Each

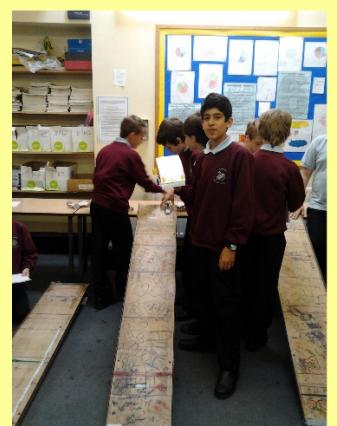
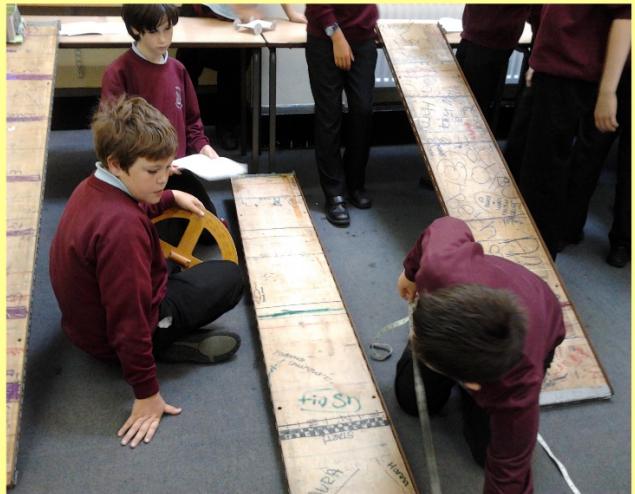
50mm wide, 50 metres long. White polypropylene tape with a pressure sensitive white rubber adhesive. Has excellent initial tack and adhesion, but limited shear properties. Especially suitable for fixing foam backed carpets and temporary fixing of other floor covering.

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

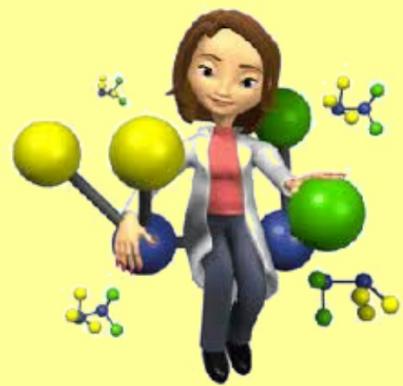
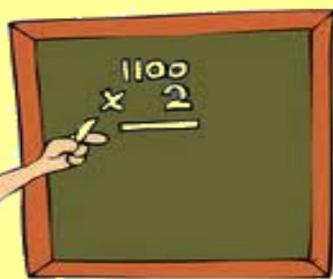
HALT! ALL WILL STOP!

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





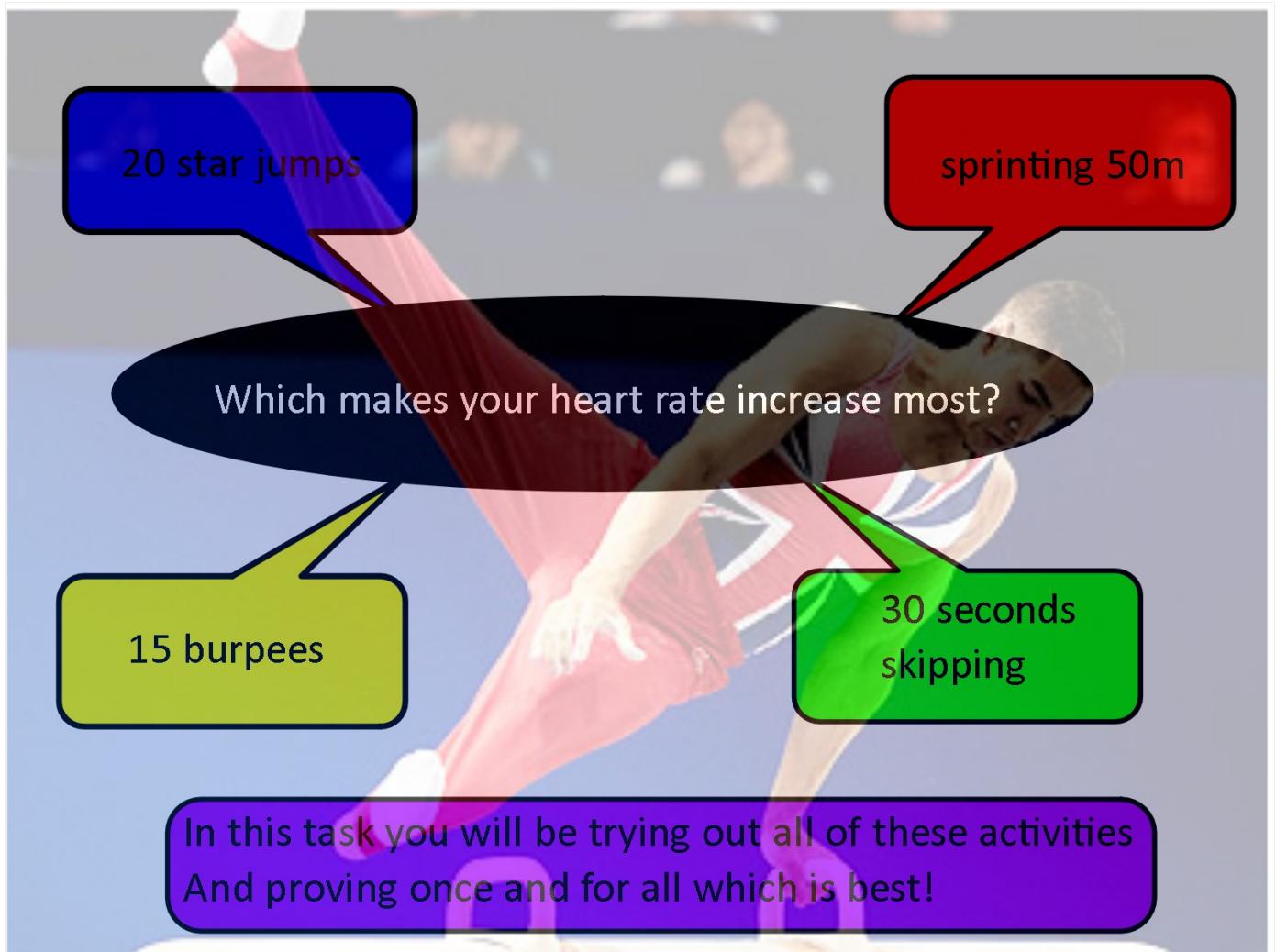
The visiting expert



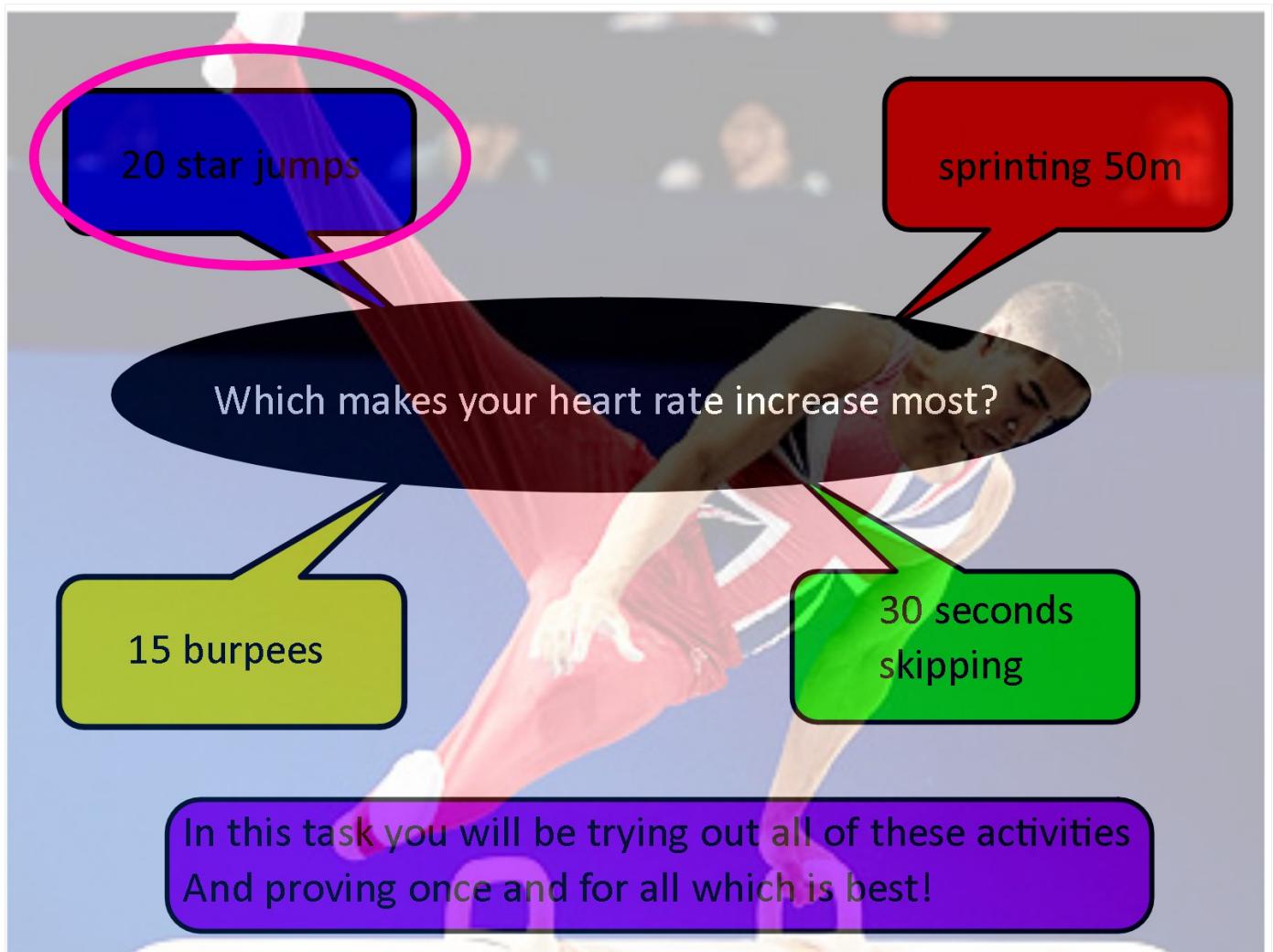
Create a list of questions to ask the scientist. These questions should help you work out what has happened in your experiment

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!

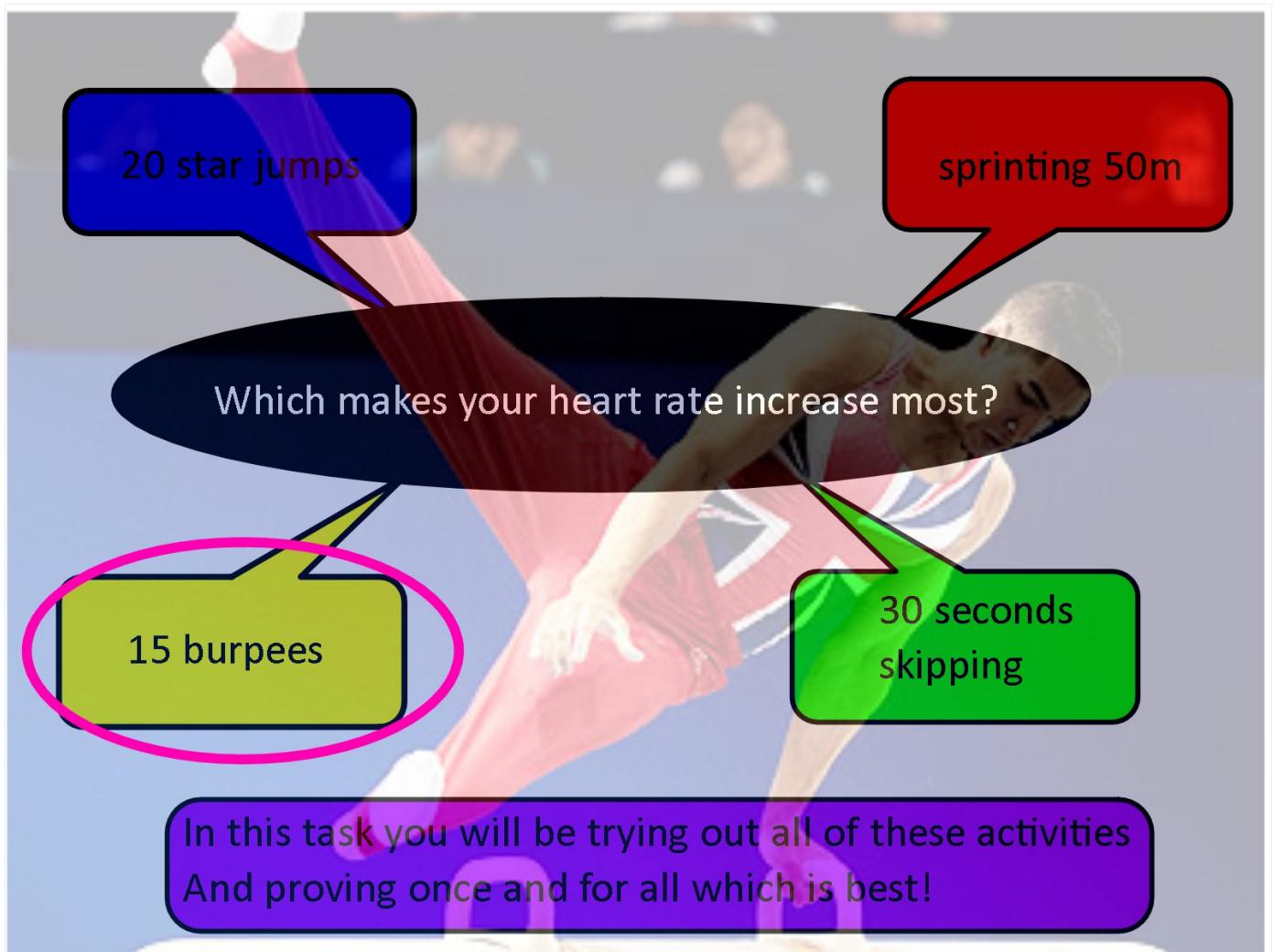


| Name | Resting Heart Rate (BPM) | | | |
|------|--------------------------|---|---|------|
| | 1 | 2 | 3 | Mean |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |



| 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

