Form I
Science

Experimental Research Project

NAME: _____

MASTER: _____

Jeevan Vasagar
The Guardian, Tuesday 27 March 2007

Schoolgirls rumble Ribena vitamin claims

Two New Zealand schoolgirls humbled one of the world's biggest food and drugs companies after their school science experiment found that their ready-to-drink Ribena contained almost no trace of vitamin C.

Students Anna Devathasan and Jenny Suo tested the blackcurrant cordial against rival brands to test their hypothesis that cheaper brands were less healthy.

Instead, their tests found that the Ribena contained a tiny amount of vitamin C, while another brand's orange juice drink contained almost four times more.

"We thought we were doing it wrong. We thought we must have made a mistake," Anna told New Zealand's Weekend Herald. The girls were both 14 and students at Pakuranga College in Auckland when they did the experiment in 2004.

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GSK is in court in Auckland today facing 15 charges relating to misleading advertising, risking fines of up to NZ$3m (£1.1m).

In Australia, GSK has admitted that its claims about Ribena may have misled consumers. The Australian competition and consumer commission said last week that claims on the nutrition information panel of Ribena's ready-to-drink cartons implied that the product had four times the vitamin C of orange juice drinks, when this was not correct. The girls have since visited GSK to be thanked "for bringing it to our attention".

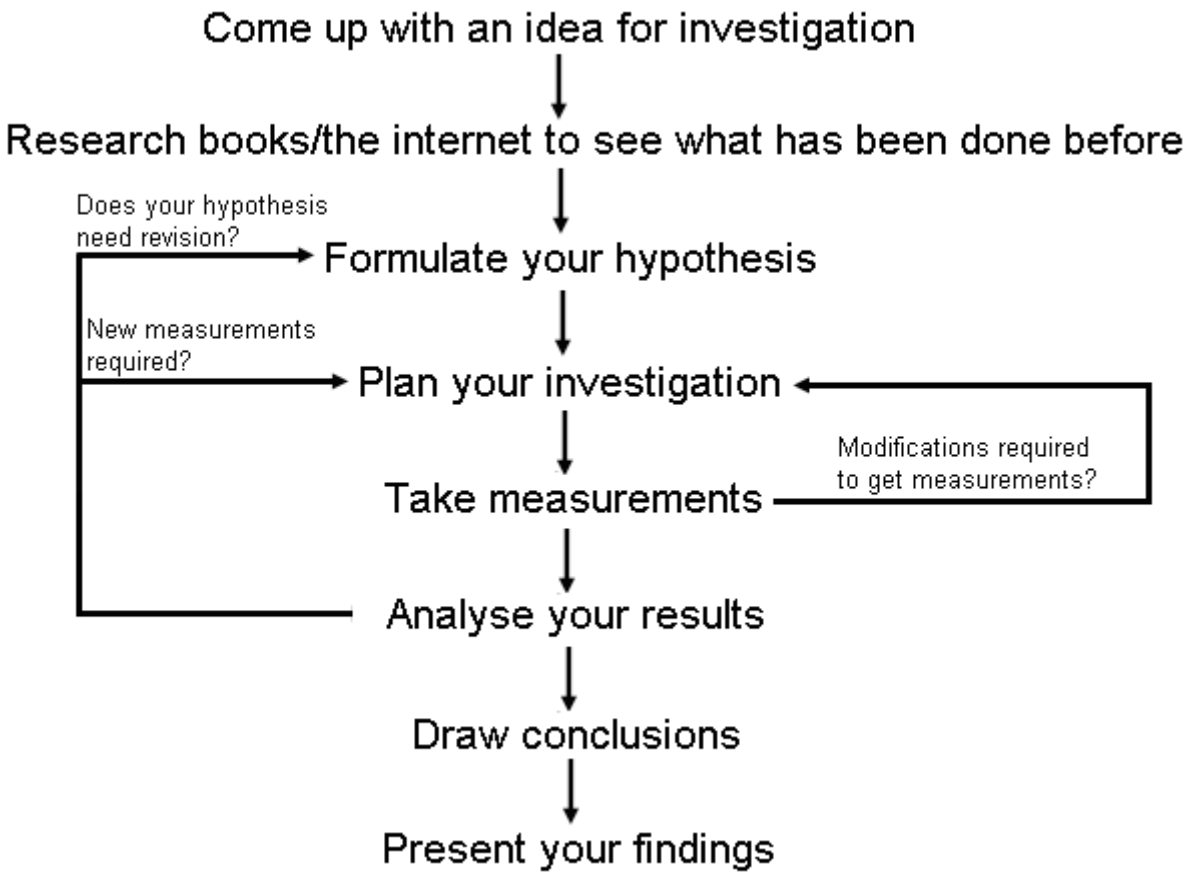
What: **Scientific Experimental Research Project**

You are to plan and complete an experimental research project on any Science topic of your choosing.

You may be able to think of a good project related to one of the topics you have already studied in Science this year. You are encouraged to choose anything that interests you, but some possible suggestions are given below:

- How big a fish can a fishing line hold?
- Do plants in black pots wilt more compared to those in white pots?
- Which batteries last the longest?
- Determine the speed of sound in air.
- What is the strength of sticky tape?
- What factors affect the growth of mould on food?
- How much weight can a plastic bag hold?
- Are tissues really strong as their advertising claims?
- Does soft drink really rot your teeth?

Your investigation should roughly follow the format of the following flowchart.



Note: this is a scientific investigation - it is not a survey or a research exercise. You must draw conclusions from data you have taken yourself.

Safety Considerations:

All good scientific investigations have to take into account safety and ethical considerations. Therefore, at least the following restrictions apply:

- You MUST be able to complete the experiment safely without supervision.
- No live animals can be involved.
- Your planned experiment MUST be approved by your Science master AND by a parent.

Where: This research project needs to be completed **at home** throughout Term III. This means that you should choose an experiment that does not require the use of any specialised equipment. Some planning may be done in class.

Who: All Form I boys will complete this project. You may choose to complete it by yourself as an individual project or by working in pairs with ONE other boy from **your Science class**. If you choose to work in pairs, it is essential to remember that the experimental work is to be completed at home, so both of you will need to live close to each other.

When: Your plan needs to be completed by the end of week 3 in Term III – Friday 4 August. Your plan MUST be signed off by a parent before submission to your Science master. Your plan MUST be submitted to and approved in writing by your Science master before you commence any actual experimental work.

Throughout Term III (9 weeks), experimental work should progress at home. You must complete the enclosed log book to show your progress. Your Science master may check on this during the term. Note that this log book can be downloaded from the SGS Shared Science directory/Form I or from the Schoology page if you wish to add more pages for your experiment. Your completed log book is due in the last week of Term III – week starting 11 September.

Your final submission will be after the Annual Examinations. It will be done via an in-class presentation. This presentation can be supported by a poster, a detailed scientific report or a PowerPoint presentation. It should cover the following:

- What did you do and why?
- What was your hypothesis?
- What happened?
- What was your conclusion?

As a guide, it is expected this entire project will take approximately **8 hours** over Term III.

Use the checklist below to help you work your way through the investigation…

Planning your experiment

Think about some ideas that interest you…… ☐
Use the library/internet to find out any work already done …… ☐
Turn your choice of an idea into a form that can be investigated…… ☐
Carry out trial runs, as necessary…….……. ☐
Make predictions and formulate a hypothesis…….……. ☐
Decide what the key variables are……. ……..…. ☐
Plan how to control or vary the key variables……. ……. ☐
Decide on the range and numbers of measurements needed ……. ☐
Select equipment and plan how to use it safely…… ……. ☐
Write the planned method…… ……. ☐
Write a risk assessment…….…… ……. ☐

Perform the experiment

Using the equipment safely and with skill, make accurate measurements…….. ☐
Note any changes to the method required……..……..…… ☐
Repeat measurements as necessary……..…..…..…. …… ☐
Record measurements below (using a table *as appropriate*)…….…..…..…….. ☐

Analysis and Evaluation

Present the data clearly……..…….. ☐

Draw a graph with a line of best fit, *as necessary*…….…….. ☐

Identify trends or patterns in your data..……..…….…….... ☐

Decide if any results should be rejected, and if so, why…..…….…..…..…… ☐

Decide if you have enough evidence to reach a firm conclusion…….…..…..…….……..….. ☐

Explain whether or not your results match your original hypothesis.…..…..……...……..... ☐

Explain your conclusion, if you can, using your knowledge of Science..…..…….…… ☐

Suggest improvements to the methods you have used……...…..…….……..... ☐

Suggest further work that could provide extra evidence or take your procedure further……..……..……..... ☐

Presentation

This presentation can be supported by either a poster, scientific report or a PowerPoint presentation. It should cover the following:

What did I/we do and why?……..……. ☐

What was the hypothesis?…….……. ☐

What happened / what were the results?……..……. ☐

What was the conclusion?…….……. ☐

Log Book

Planning your experiment

1. Think about some ideas that interest you.

   Possible ideas:

2. Use the library/internet to find out any work already done.

   (Attach any printouts to the back of this booklet.)

3. Decide on a specific area to be investigated.

4. Carry out trial runs, as necessary.

5. Make predictions and formulate a hypothesis.

   Hypothesis:

6. Decide what the key variables are.

7. Plan how to control or vary the key variables.

8. Decide on the range and numbers of measurements needed.

9. Select equipment.

10. Consider how to perform your experiment as safely as possible.

11. Write a plan for your experimental method – including a diagram.

Your parents and your Science Master must approve your plan before you start your experiment.

APPROVED BY: …….. **Date: …….**
Parent

APPROVED BY: …….. **Date: …….**
Parent 2 (if completed in pairs)

Note to Parents: SGS recognises that this home-based activity may require some input from you. We encourage you to be involved in:

- any safety considerations (e.g. advise on use of any unfamiliar tools).
- logistical issues (e.g. purchase of seedlings)

However, we request that you recognise that this project is intended to be a hands-on activity completed primarily by your son(s).

APPROVED BY: …….. **Date: …….**
Science Master

Performing the experiment

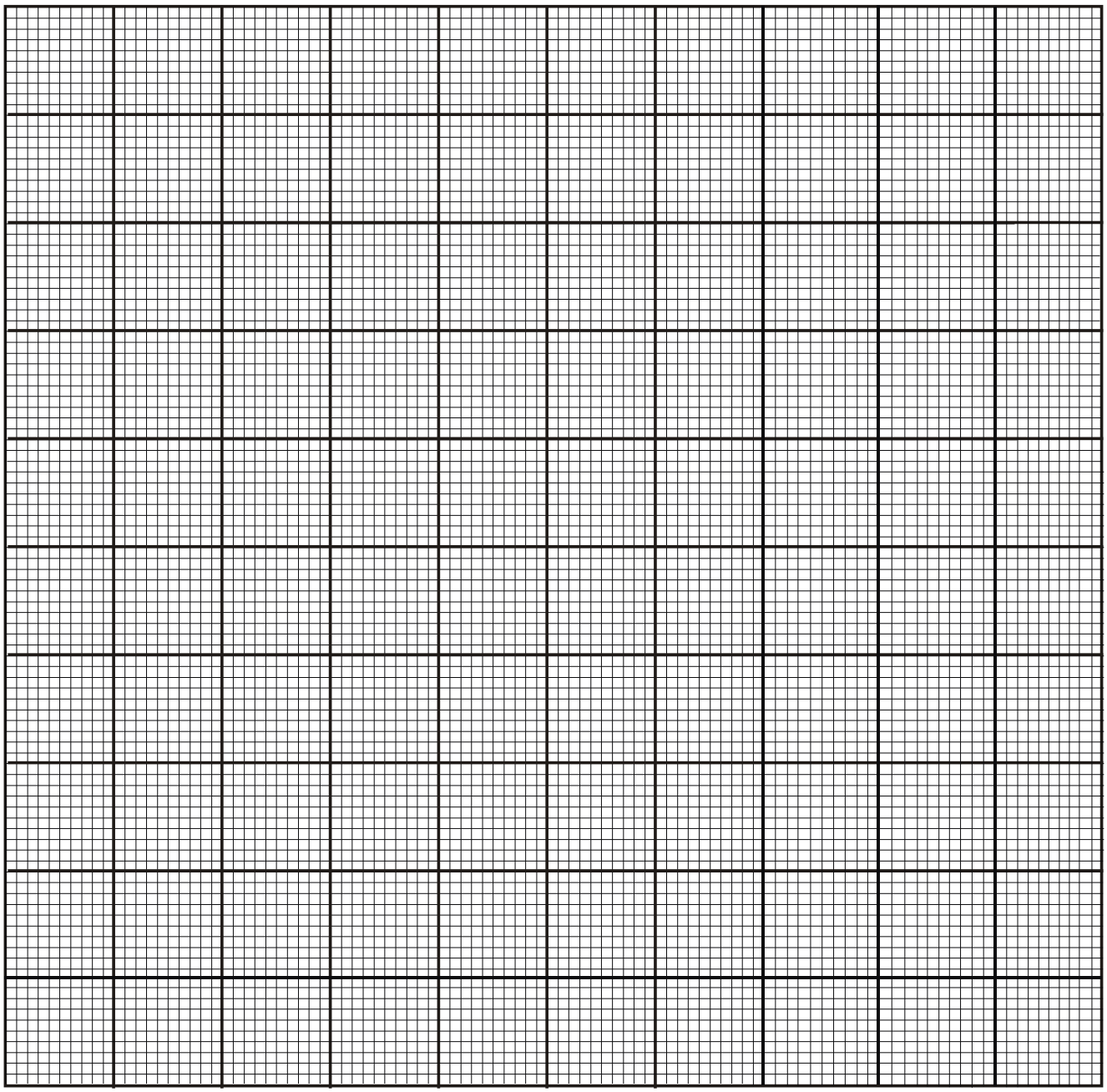
Use the space on the following page to keep a record of your investigation. Note – this is intended to be a diary of your progress – it should be written up as you perform your investigation. It doesn't have to be extremely neat, but it should be clearly legible.

If you make any changes to your plan, you should note them here.

Analysis and Evaluation

12. Present your data clearly (e.g. as a table of results).

13. If it is appropriate, draw a graph of your results. (Note: more graph paper can be collected from your Science master if necessary.)



14. Discussion

Use this space to consider what your results mean. That means considering questions like:

- Are there any obvious trends in your data?
- Does your data support or contradict your original hypothesis?
- Do your results make sense, in terms of your scientific understanding of the subject?
- Do you need to take more data?
- Are there any data points that seem inconsistent with the rest of the data?
- Does the data suggest other experiments that could be performed?

15. Conclusion

State your overall conclusions about your investigation. You should include the following:

- Did the investigation support your hypothesis?
- What improvements would I make if I did it again?
- What other experiments could you perform to expand on the information learned during this investigation?

Presentation – to be completed after the Annual Examinations

This presentation can be supported by either a poster, scientific report or a PowerPoint presentation. It should cover the following:

16. What did I/we do and why?
17. What was the hypothesis?
18. What happened / what were the results?
19. What was the conclusion?