

Grade 9

Data Handling Research Project – The Environment

You are required to conduct a research project for which you will be assessed by your Mathematics teacher.

Phase 1

Due date: Monday 20 February

1. Choose a **Research Topic** and write an **Introduction**

Decide on a topic you wish to investigate. Write a clearly worded **hypothesis** which has an explicit anticipated outcome which you wish to prove or disprove.

- 1.1 Statement of the topic: what you intend to investigate, the hypothesis.
- 1.2 Background: state why this topic interests you, do some preliminary research around the topic on the internet for example.
- 1.3 Aims and objectives: the purpose of the investigation of the topic.
- 1.4 Scope and limitations: the aspects of the topic on which you will focus, state the population, size of your sample, how you will select your sample, e.g. age, gender, and how (if applicable) you will make comparisons.
- 1.4 Method of investigation: how you will collect your data.

2. Design a **Survey/Questionnaire**

You must develop 3 - 4 questions. (Age, gender, school grade, etc. excluded)

Do not ask multi-pronged questions. Ask one thing at a time.

Sequence your questions so that the person responding can see the connections.

Move from general questions to more specific ones.

Do not ask loaded questions, that is to say, questions that reveal your opinion or bias on the subject.

Draw up tally tables or have blocks to tick or provide space on the questionnaire for written responses.

Avoid Yes/No questions

Phase 2

Due date: Wednesday 14 March

3. **Administer** the **survey/questionnaire**

Decide whether an interview or a written questionnaire would be more suitable.

If you are conducting an interview, record exact verbal responses.

Make sure the responder is given time to think and privacy in which to complete the questionnaire or interview.

Do not make any changes or adaptations to the responses.

Administer a minimum of 30 questionnaires.

4. Organize the data by making **tally tables** that will lead to **meaningful results**

Before you can begin to analyze your data you have to organize it appropriately.

Tally tables are the best method to this. Make sure your tally tables are correctly labelled and have the correct number of respondents in the totals. This shows your research design.

5. **Graphically represent the data**

Display your data graphically. Use appropriate diagrams to illustrate your findings, e.g. pie charts, bar graphs, line graphs, scatter plots or histograms etc. depending on the nature of the data. You may use computer-generated graphs.

6. **Calculate all the Averages**

Where it is possible, calculate or determine appropriate averages (mean, mode or median) for all of the questions asked.

7. **Write a Report: 100 – 150 words**

Mathematically describe the results and report features of your graphs.

You may want to use percentages. Only give objective facts in this section.

Do not offer any opinions or reasons.

Report on the averages (mean, mode, median) you found for the different questions.

8. **Write a Conclusion: 150 – 200 words**

Give an informed opinion and reveal the implications of your findings.

Refer to your objectives and state whether your hypothesis proved or disproved.

Comment on any variations from your hypothesis and discuss the possible social, political, scientific, educational or financial implications of your research findings and make recommendations. Use evaluative language based on your results:

“Based on the results

“It therefore seems

“On the other hand.....”

9. **Bibliography**

List all the websites you consulted (www.google.com is not a website) and don't forget acknowledge anyone who assisted you with your project.

10. **Present your assignment**

You may write or print your work.

Make your assignment appealing, neat and easy to read.

Follow the “Order of work” list below.

You may bind or staple your assignment or file your work in a ring binder.

Do not use a flip file or put unstapled work in a plastic sleeve. No laminated pages.

Surveys make the assignment very thick so plan ahead as to how you will present your work.

Put the first (marked) draft of your Introduction and Questionnaire as well as all completed surveys in an appendix at the end of your assignment.

Order of work in the assignment

1. Cover sheet with name, class and topic
2. Control sheet
3. Rubric
4. Contents page
5. Introduction (Hypothesis, background, aims and objectives, etc.)
6. One blank questionnaire
7. Tally Tables
8. Graphs
9. Averages
10. Report
11. Conclusion
12. Bibliography
13. Appendix: A: Your original marked worked done in Phase 1.
B: All the **filled in questionnaires** or give the link to your on-line survey

The Environment

Making the world a better place



Here are some project suggestions/ideas.

- Water: saving water, reusing water, pollution of water resources, bottled water
- Air: CO₂ emissions, air pollution, global warming
- Recycling: paper, tin, plastic, glass, batteries, electrical items, metal
- Composting:
- Compact fluorescent bulbs vs. incandescent light bulbs
- Packaging: how much packaging is necessary?
- Are people trying to save electricity – Is HMS going green?
- What are HMS attitudes towards recycling?
- What attitudes of different groups of people towards global warming?
- Does the weather affect human behavior?
- Study the traffic around your school, assess how pupils travel to school each day – draw conclusions as to the environmental issues around the use of fossil fuels and excessive CO₂ output.
- How well are the Herzlia Middle School pupils informed about environmental issues?
- Survey the various ways we could save energy around the school and the renewable options available.
- A school energy survey could be carried out. Are the pupils and teaching staff implementing energy saving practices?
- Carry out a survey on energy use in the home over one day showing the regular energy requirements, the type of energy used (fuel, gas, wood etc.), electrical appliance consumption and the efforts to manage energy made within the family
- Produce an inventory of different energy sources. Emphasize the high use of fossil fuels, look at the problem of renewing these resources and consider possible long-term solutions
- Visit a supermarket with a list of types of purchases and then carry out a study on the amount of waste produced.
- Carry out a waste audit at your school to see what you are throwing away. Could your school reduce the amount it is putting into its dustbins? Could any of this waste be reused or recycled?

- Develop an environmental, diversity, recycling survey and ask a relative/friend overseas to complete it for you and compare your results.
- Recycling plastic – how well do HMS students know the different kinds of plastic and which plastics can be recycled?
- Recycling diary: Keep a tally score of waste that you put in the bin and target the items that you throw away the most. Put your bin on a diet and recycle-more with these easy steps.
- Undertake a survey at a Supermarket to determine:
 - how many people are using recyclable bags vs. plastic bags
 - purchasing organic vs. non-organic fruit and vegetables.
- Determine what birds visit a birdfeeder over a specific time period and determine what the birds are eating (fruit or seed)
- Compare bird frequencies in indigenous vs. non-indigenous gardens or areas.
- Conduct a beach cleanup exercise to determine what and how much waste is present on our beaches (e.g. bottle tops, cigarette butts etc.)....

Link to a list of websites you can consult: <http://goo.gl/Y8J1S>

Marks will be awarded for original, relevant and interesting topics.