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Science Fair

Topic Selection and Parental Agreement

There will be no more than two students to each project. All writing must be readable and if you need to you should type everything except signatures. The following substances or devices are considered hazardous and students are **not permitted** to use them in any way for their projects.

*Hazardous, toxic, flammable chemicals
*Firearms
*Equipment – welders, lasers, voltages
*Radioactive substances
*Radiation
*Human subjects
*Non-Human vertebrate animals
*Pathogenic agents – bacteria, fungi
*Recombinant DVA
*Human or animal tissue
*Controlled substances – alcohol, tobacco, prescription drugs

What is your question or problem you are going to address? _____

_____

What is it that interests you about your topic? _____

_____

_____

Science Teacher _____

My parents and I have discussed and agreed on the above topic for my science fair project. We understand the risks associated with this project. As a student I agree to work carefully and safely, and my parent have given me permission to do this project.

1. Partner Name _____

Parental Agreement Signature _____

2. Partner Name _____

Parental Agreement Signature _____

I am the supervising parent:

Name: _____ Date: _____

Signature: _____

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Bibliographic Format: Using APA Guidelines

Book with one author:

Creswell, J.W. (1994), *Research design: Qualitative and quantitative approaches.* Newbury Park, CA: Sage

Book with two or more authors:

Webb, W.H., Beals, A.R., & Whit, C.M. (1988). *Sources of information in social sciences: A guide to the literature* (3rd ed.). Chicago: American Library Association

Journal article, single author:

Van Maanen, J. (1981) The information game: Selected aspects of ethnographic research in police organizations. *Urban Life*. 9(4), 469-494

Chapter or article within an edited book:

Soltis, J.F. (1990). The ethics of qualitative research. In W.W.Eisner & A. Peshkin (Eds). *Qualitative inquiry in education: The continuing debate* (pp. 247-257). New Yourk: Teachers College Press.

Materials from the Internet:

Li.K. (1996, July 26). *Electronic Sources: APA Style of Citation*. [WWW document]. URL http://uvm.edu/~xli/reference/apa.html

Mestre, L. (n.d./1998). *Education resources*. [WWW document]. URL http://www.library.umass.edu/subject/education/

Write all of your sources in the correct bibliographic format in ***alphabetical order by author.***

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Display Design

Question or Problem	**Title**	Procedure
Hypothesis	**Methods, Materials, Pictures, Data, Results, Graphs, etc.** This section should be the "meat" of your science fair project	Conclusion with discussion (retest possibilities and applications) of your results
Background Research		Bibliography

Your booklet that goes with the display should include the :

- PROBLEM: question you asked
- HYPOTHESIS: what you think the solution is and the research you did that helped you reach that hypothesis
- MATERIALS: what you use in the experiment
- PROCEDURE: how you are going to do the experiment
- DATA ANALYSIS: should include data from observations as a data table, organization of that data as a graph, and pictures (drawn or photograph) of experiment
- CONCLUSION: answer to problem question, discussion of results, and further questions you might want to find answers to
- BIBLIOGRAPHY: record of sources you used for research

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Notebook (Research Plan) Guidelines

- All notebooks should be neat and typed and have the following sections. See teacher sample.
  - TITLE
  - PROBLEM STATEMENT – what it is and why you chose it
  - WRITTEN RESEARCH – remember, neat and readable
  - HYPOTHESIS – should be if/then or include both dependent and independent variable in the statement
  - TABLES AND GRAPHS (include here any pictures)
  - CONCLUSION
  - BIBLIOGRAPHY
- Include, as your last section, all your rough drafts and experimentation notes.

Oral Report Guidelines

- Prepare for your presentation by reviewing each part of your project so that you know it well. Review your research so that you can speak intelligently about your topic.
- Describe each of the steps of scientific method as outlined in your notebook or displayed on your board.
- Use note cards for your presentation. ***Do not read from your board!***
- Practice your presentation before you actually present.
- Prepare a 2-4 minute introduction of your project.
- Speak slowly, and do not chew gum. Take a deep breath if you get confused.
- Ask if there are any questions.

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Question or Problem

What is your question or problem you are addressing? _____

_____

Research

After completing the research, you must summarize what you have learned about the topic and variables in a minimum of one page, typed, using standard format. Did the research leave you with questions unanswered? Organize the information in a logical way: don't just list in order what each source told you. Pay attention to grammar, spelling and sentence structure. Do not use 1st person (I, we, my, etc.). Use introductory and concluding paragraphs. **Be sure to include a bibliography of at least 5 sources with your research paper.**

Hypothesis

The hypothesis is a single sentence that is the possible solution to the problem statement based on your research. The sentence should indicate what you expect the dependent (resultant) variable or effect to be as a result of changing the independent (manipulative) variable or cause.

Possible formats for a hypothesis sentence:

1. It is hypothesized that there is a direct relationship between _____ and _____.
2. The hypothesis for this research project is that _____ will cause a significant change in _____.
3. It is hypothesized that _____ will result in _____.
4. If _____, then _____.

Choose one of the above formats and write your hypothesis here. _____

_____

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Organizing and Planning Your Project

In order to make sure you know what you're measuring and how you will set up your experiment, include the following information in your hypothesis and experimental procedures.

- Problem Statement _____
- _____
- Hypothesis _____
- _____
- Independent variable _____

  _____
- Dependent variable _____
- _____
- A list of all factors that must remain constant
  - _____
  - _____
  - _____
  - _____
- A description of the control group. _____
- _____
- If you are using organisms, list their scientific names.
  - _____
  - _____
  - _____
  - _____

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Experimental materials and procedures

Write a list of all the steps you will need to follow to run the experiment. Be sure to include the materials needed. Another person should be able to follow your procedure without talking to you. Be sure your parents know what you are doing and the equipment used. Have parents sign at the bottom of the page.

List the materials you will be using:_____

_____

_____

Procedure:

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.

13.

14.

15.

_____

parent signature

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Observation Data / Table

You must have a data table drawn before you experiment so that you will have a place to record your observations neatly.

Guidelines:
1. Label each data table with a number and title.
2. Include a column for the control group and each experiment.
3. Each column should have a heading with units, if appropriate.
4. All trials for each group should be shown.
5. The average for the trials in each group should be calculated.

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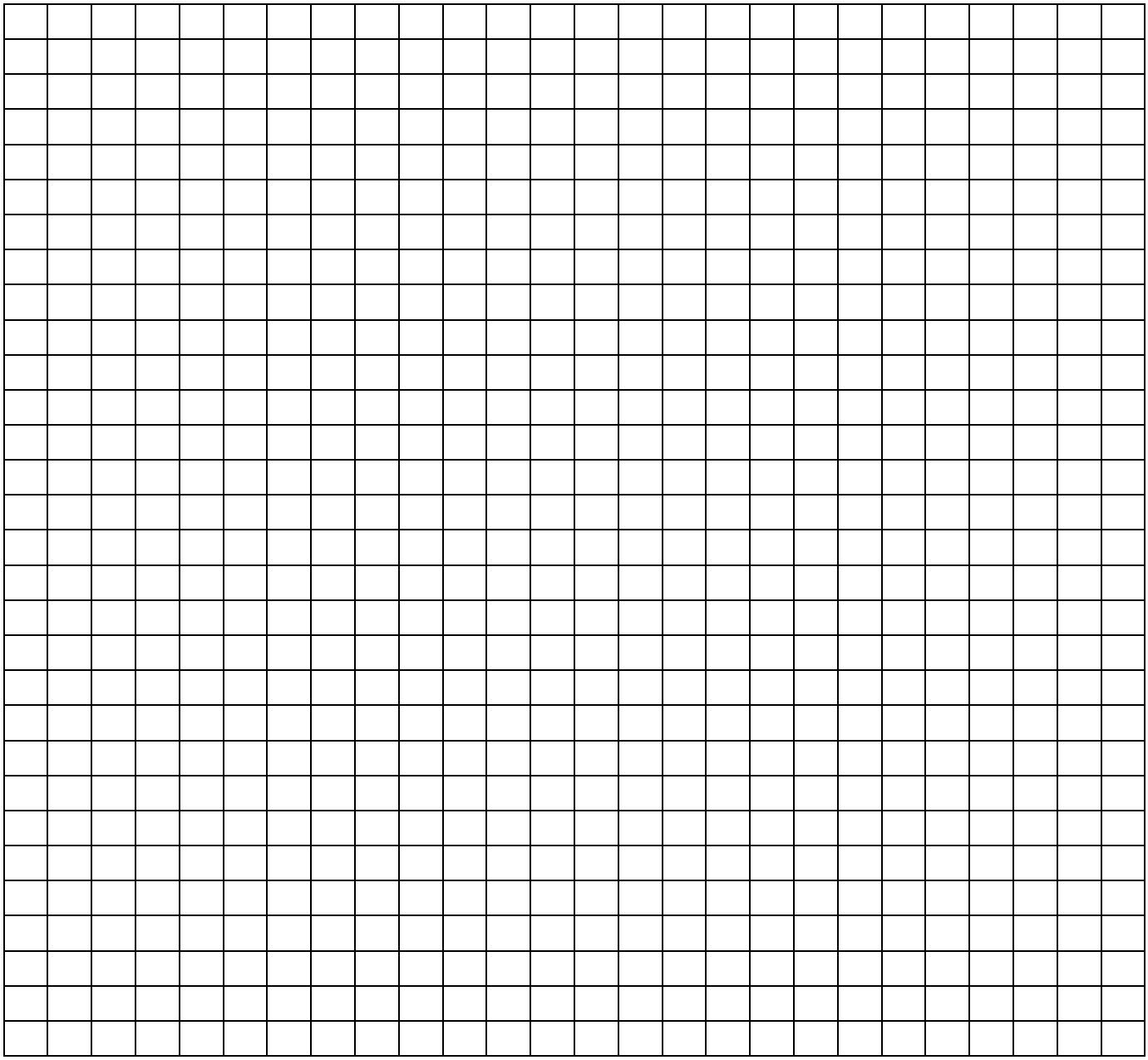
Observation Data – Graph

Guidelines:

1. Use graph paper or a computer.
2. Decide whether a line graph or a bar graph is better for your data.
3. Label the top of the graph with a title that includes the dependent variable first and the independent variable second along with units of measurement.
4. Label the x-axis (horizontal) with the independent variable and its units.
5. Label the y-axis (vertical) with the dependent variable and its units.
6. Number the axes appropriately.
7. Label the individual bars/lines appropriately.



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Experiment Conclusion

The conclusion will be another mini-report that summarizes the experiment and relates it to the research and to the hypothesis. In addition, you need to think about how the experiment might be improved. Before writing a rough draft of your conclusion, fill in the information in each area below. These are the things that you will then organize and summarize in the conclusion.

1. What was the answer to the problem statement?

2. Was your hypothesis correct?

3. List data that will defend your answer to #1 and #2.

4. List at least 3 errors that might have happened and explain how they affected your results. (Do not include "I might have written down the wrong number," or "I might have calculated wrong.")

5. What could have been done differently if you repeated this experiment (either to minimize errors or help clarify your results)?

6. What is the importance of this experiment? What impact could the results have?

Use the answers for the questions on this page to write your conclusion on the back. A good format might be to write one paragraph about questions 1,2, and 3; a second paragraph about questions 4 and 5; and a third paragraph about question 6. Use correct grammar, spelling and sentence structure. Write good introductory and concluding sentences. Do not use the first person (I, we, me).

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Conclusion