



Griffin Elementary's Science Fair

Timeline,
Helpful Hints,
&
Tools
For Assisting
Your Child

By
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STEM Teacher





Our Fair

- ➔ Our fair is **competitive**.
- ➔ Projects are due
 - Friday, January 12 for the fifth grade.
 - Wednesday, January 24 for all other grades.
- ➔ **Judging** will take place the week of January 29.
- ➔ **Awards** will be presented the week of judging.



Rubric

- Project on time
- Display Board Completed
- Research Notebook Attached

Date due: Friday, January 12, 2017

Each item is worth 0 – 5 points.

The Scientific Method	Display Board	Research Paper
There is evidence of thought, study, and effort.	___	___
The statement of the problem is concisely stated and is a question.	___	___
Accurate, scientifically verifiable facts were obtained.	___	___
Research is written using grade appropriate grammar and spelling.	___	___
Bibliography is complete with at least 3 or 5 resources.	___	___
Resources used were cited properly.	___	___
The hypothesis is worded appropriately (If..., then...).	___	___
Variables are identified correctly.	___	___
Materials are listed concisely.	___	___
Procedures are step by step, recipe format, and begin with a verb.	___	___
Evidence of three trials of the experiment is evident.	___	___
Samples of data are included (charts, tables, graphs with titles and labels, pictures).	___	___
A logical conclusion was drawn and the hypothesis was addressed.	___	___
Evidence was given to support the concluding claim.	___	___
Recommendations and applications are reasonable.	___	___
Acknowledgements were made.	___	___



Rubric Continued

Display
Board

Research
Paper

Creativity and Effort

There are elements of originality in the project.
The display is imaginative and visually appealing.
Effort and neatness are apparent.
There are no pictures of the researcher or the use of I.

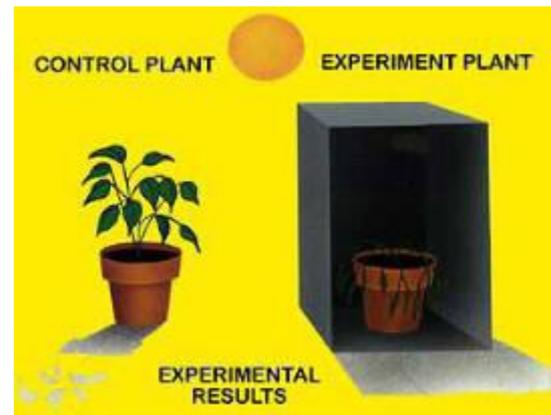
Level of Completion

A written report is included and is complete with table of contents.
The table of contents is set up logically.
The project was done thoroughly.
The written materials show attention to grammar and spelling.
There is a logical sequence and organization.

What is the Scientific Method?

➔ Steps a scientist takes to identify a question, develop a hypothesis, design and carry out procedures to test the hypothesis, and document observations and findings to share with someone else.

➔ *In other words, it's a way to solve a problem.*





The Scientific Method



- ⇒ The Scientific Method is the only scientifically accepted method to back up a theory or an idea.

Scientists Think Logically



Stanley gathered few trophies racing slow rabbits.

SCIENTIFIC METHOD

The basic steps in the scientific method are:

- State the problem.
- Gather information.
- Form a hypothesis.
- Test the hypothesis.
- Record and analyze data.
- State the conclusion.
- Repeat the work.



- ⇒ Scientists take the time to think logically when they are investigating a question or problem.
- ⇒ He/She will break things into many steps that make sense.



First Steps

⇒ First Scientists will identify a **question**, gather **information**, and then form a **hypothesis**.

These are the **Statement of the Problem**, **Background Information**, **Bibliography**, and **Hypothesis**.



Topic

- ➔ Find a topic that interests you.
 - How???
 - Look around, make an observation, wonder about something.
 - Think about hobbies or interests.
- ➔ Pick something that will hold your interest for a period of time and give you the opportunity to explore a new concept.
- ➔ Make sure you can find 3 – 5 resources on the subject.
- ➔ **Remember, the purpose of this project is to LEARN something new!**



Topics to Avoid

- ⇒ Those that involve a preference or taste comparison.
- ⇒ ***Consumer product testing – “Which brand is best?”***
- ⇒ Effect of music or talking on plants.
- ⇒ Effect of color on memory, emotion, mood, etc.
- ⇒ Handwriting analysis
- ⇒ Astrology or ESP



Statement of the Problem

- ➔ Once you have chosen your topic, ***ask a testable question*** for which you'd like to find the answer.
- ➔ Ask a question that is specific enough to allow you to find the answer with a ***simple experiment.***



Background Information

Why do I need this?

This is how you learn about the topic. You need an understanding of the subject matter so that you will understand what is happening during the experiment and why it happens.

Research allows you to create an **hypothesis** (a statement that can be tested) of what may occur in your experiment.

Whether your hypothesis is **supported or not**, you will have the knowledge to understand why the outcome happened.



Background Information

Locate at least **3 sources** (**5 for 5th grade**) of information.

How to research a topic:

- ➔ Identify **keywords**. These words should come from the question you formulated for the Statement of the Problem.
- ➔ Using these keywords, formulate questions to which you would like to have answers. Use the **questions words**; **why, how, what, when, where, and who**.



Where Do I Look???

- ⇒ Dictionary
- ⇒ Encyclopedia
- ⇒ Science Books (from library and school)
- ⇒ Internet
 - SSO – Gale, Britannica School, etc.
 - Discovery Education, Brainpop, etc.
- ⇒ Ask an expert



Bibliography

Why do I need to have one?

- You must identify where your information comes from so that you give credit to those who provided it and so that another researcher can find it.
- A bibliography identifies from where your background information came.
- ***Avoid Plagiarism!***
- There's a secret: www.easybib.com!



Hypothesis & Variables

- ➔ The hypothesis is a testable statement.
- ➔ It identifies the **independent** and **dependent** variables.
- ➔ **Constants** or controlled variables make the testing fair. They are what you keep the same.



Variables

The purpose of the hypothesis is to state the **cause and effect relationship** that you think will happen. You are looking to see what will happen to one thing when another is changed. These changing items are called variables. There are three kinds.

The **Independent variable** is the one that is changed by **you, the scientist**. (What am I changing?) The one tested.

The **dependent variable** is the one that one you watch for a change, the one you measure, the one you record. (What is observed.)

Finally, there are the **constants (the variables that are controlled or kept constant)**. These remain unchanged. They make the test fair.

The control group is the one comparisons are made against. The one in which nothing is changed.



Hypothesis

Once all your **research** is done, you should be able to make an **educated guess** (a prediction based on research that is testable) regarding your question. It should be stated in the **if...then...** format.

If the **independent variable** is manipulated, **then** the **dependent variable** will be altered.

The 5th grade needs to add **because**.

If the **independent variable** is manipulated, **then** the **dependent variable** will be altered **because** research shows that...



Next Steps

Testing A Hypothesis

- ➔ The next step scientists take is to create and conduct an **experiment** to test the hypothesis. That's the fun part!



Materials

What do I need for my experiment?

Make a list of the items you need to complete your experiment. **Be specific**. For example, if your experiment uses water, identify the amount to use.

Good

1,000 ml of water

versus

Not Specific

water



Procedures

Think of this section as a detailed recipe.

- ➔ List the steps in the recipe that are very specific and detailed for anyone to follow. Steps must begin with a **verb**. This list must be written so that a stranger could pick it up and do the experiment exactly as you did it without your assistance.
- ➔ When listing your procedures, include steps that require you to repeat them because you must do at least **3 trials** for your experiment. Once you collect the information from all 3 trials, you will be able to compare your data.



Repeat the Experiment

⇒ Once a scientist completes an experiment, she/he will **repeat** it (3 times) to check to make sure she/he gets the same findings.

⇒ We call this verification, or making sure that everything is **valid and reliable** and will happen again and again.



Recording and Observing

- ⇒ A key to good experiments is **observing** what happens and writing it down.



- ⇒ Scientists must gather **information** or **data** and **document** it so it is readable and makes sense to others.
- ⇒ ***This is really important!***



Data & Observations

Record all your observations and results in your **working notebook**. Even if an error occurs, be sure to record it.

Remember we learn more from mistakes! Once done, make a table, chart, or graph to show your results.



Analysis & Conclusion

- ➔ This area summarizes the data, basically what happened.
- ➔ The conclusion will state whether the data from the experiment **supports or contradicts (doesn't support) the hypothesis.**
- ➔ Be sure to give **evidence** to support your **claim.**



Recommendations

- ➔ List any recommendations or suggestions that you have for the next researcher who explores this topic or performs the experiment.
- ➔ Note things that could be changed or done differently.
- ➔ This is where you can address your, “I wonder what would happen if...” thoughts.



Applications

- ➔ How does my experiment/research relate to the real world?
- ➔ What is my real world connection?



Acknowledgements

- ➔ Thank those who assisted, provided information, and were supportive through this process.
- ➔ Do not use the words I, me, my, mine in this section or anyway else on the project.



Sharing

- ➔ Scientists share their experiments and findings with others.
- ➔ Scientists can learn from each other and use someone else's experiments to help with what they are studying or doing.

Findings represent the **conclusion** that needs to be tied back to the hypothesis.

When scientists share, they **present** their work.



Display Board

- **All the information on the board is also in the final Research Paper.**
- ➔ Present all the information from the working notebook on the board in a logical way.
 - Items related to the experiment should be in the middle.
- ➔ Include additional information such as pictures.
 - Do not show pictures of yourself, the researcher.
- Do not use the words I, me, my, etc. Speak in the 3rd person on the board and research paper.
 - Do not put your name on the front of the board or the research paper.



Research Paper

This is the final written product.

No name is written on the paper!

➔ Follow this format for the contents:

Title Page

Table of Contents

Statement of the Problem

Background Research Paper

Hypothesis & Variables (5th is required)

Materials

Procedures

Data/Observations

Results Analysis/Conclusion

Applications (5th is required)

Recommendations

Acknowledgements

Bibliography

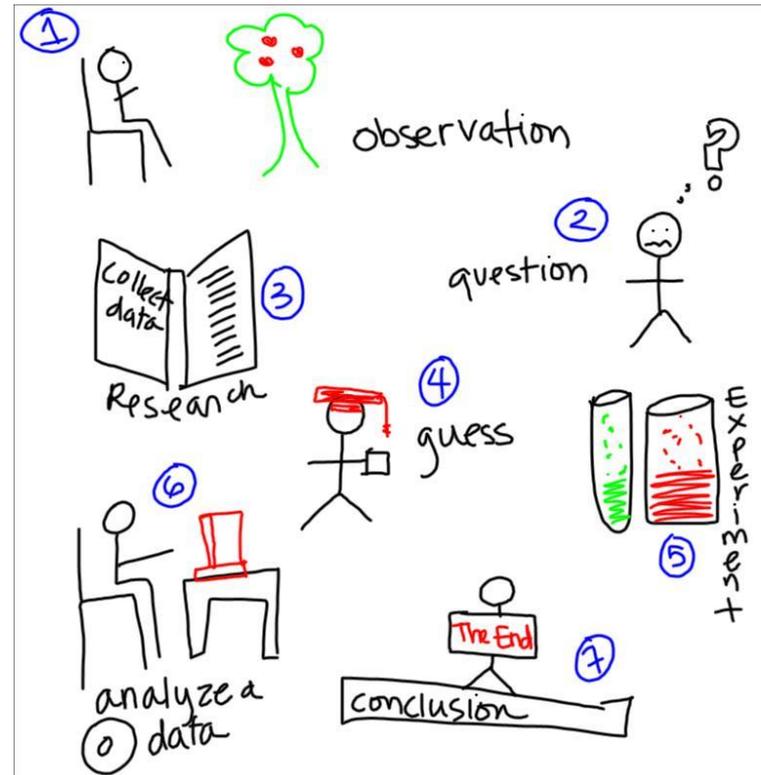


Remember...

- ➔ The purpose of the project is to learn something new!
- ➔ The purpose of the project is to practice science process skills.
- ➔ The purpose of the project is to have fun!!!

Steps

1. Question - **Statement of the Problem** – Testable Question
2. Research - **Background Information** and **Bibliography**
3. **Hypothesis** and **Variables**
4. Experiment – **Materials** and **Procedures**
5. **Observations** and **Data**
6. **Conclusion**
7. **Applications**
8. **Recommendations**
9. **Acknowledgements**





Questions?

- ➔ Ask your child's teacher.
- ➔ Ask Mrs. Chmura. Contact her through email.
Deborah.Chmura@browardschools.com
- ➔ Need help finding a topic?
 - Check out www.sciencebuddies.org,
www.stevespanglerscience.com, etc.