Science Fair Packet

Name: ____________________________

Wirht/Wallace – 4th Grade

Go to https://mswirht.weebly.com/science-fair.html for lots of resources!!!
District Expectations

B. EXPERIMENT

An experiment is a test of a question to which you do not already know the answer. To test your question, you must follow the steps of the scientific method. The display board elements below list these steps.

DISPLAY BOARD ELEMENTS

TITLE of experiment

PROBLEM: What question are you trying to answer OR what problem are you trying to solve?
DEFINITIONS: Explain the meanings of any special words stated in the “Problem.”
HYPOTHESIS or DESIGN GOAL: What do you think will happen OR What is your design goal?
BACKGROUND INFORMATION: What do books, articles, and the Internet say about your topic?
EXPERIMENTAL MATERIALS: What items do you need to do the project?
EXPERIMENTAL PROCEDURE: These are the steps you follow to do the project.
RESULTS: What happened? (Use tables of data or graphs plus descriptions.)
CONCLUSION: What is the answer to the question in your “Problem?” How do you explain your results?
REFERENCES and ACKNOWLEDGEMENTS: Books, resource people, articles (include the title and author) or specific Web sites (include the date the site was accessed). Neither search engines, such as Google and Yahoo, nor Wikipedia are scientific sources.

CRITERIA FOR JUDGING

<table>
<thead>
<tr>
<th>Experiment</th>
<th>LEAST</th>
<th>HIGHEST</th>
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<tbody>
<tr>
<td>• Title of Project – Student states project title</td>
<td>1</td>
<td>2</td>
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<tr>
<td>• Problem – Student asks a testable question or states his/her goal</td>
<td>1</td>
<td>2 3 4 5</td>
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<tr>
<td>• Definitions – Student knows the meaning of the words in the problem</td>
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<td>2 3 4 5</td>
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<tr>
<td>• Hypothesis/Goal – Student predicts what the results will be or what they are trying to achieve</td>
<td>1</td>
<td>2 3 4 5</td>
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<tr>
<td>• Background Information – Student provides written research information of test</td>
<td>1</td>
<td>2 3 4 5</td>
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<tr>
<td>• Experimental Procedure – Student describes steps of test or construction</td>
<td>1</td>
<td>2 3 4 5</td>
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<tr>
<td>• Experimental Materials – Student lists items needed for test or construction</td>
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<td>2 3 4 5</td>
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<tr>
<td>• Results – Student describes what happened; tables and graphs display data.</td>
<td>1</td>
<td>2 3 4 5</td>
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<tr>
<td>• Conclusion – Student answered the question posed in the problem or met their goal</td>
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<td>2 3 4 5</td>
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<tr>
<td>• References and Acknowledgements – Student credits all sources</td>
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<td>2 3 4 5</td>
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EXAMPLES

Do ants like diet soda? Do batteries of the same brand last the same amount of time? Does warm water freeze faster than cold water?

Remember to check the list of prohibited/discouraged/allowed items in the “Elementary Division Rules for Participation”.

Students should always plan on taking photographs of their project steps as a visual explanation of their effort.
Important Information

District Guidelines: [http://www.sciencefest.org/elementary/elementary-parents-students](http://www.sciencefest.org/elementary/elementary-parents-students)

**REMININDER:** NO HUMAN OR ANIMAL FOOD IS ALLOWED ON THE PROJECT BOARD OR IN THE PROJECT DISPLAY AREA (not even in sealed bags or containers) for any grade level.

**PROJECTS THAT ARE NOT ALLOWED:**

- grown mold or bacteria of any kind (no moldy food studies etc.)
- firearms, explosives or discharge air pressure canister devices (i.e. potato guns)
- causing pain, suffering, sickness or death of an animal
- any activity or substance that presents a danger to the student or the environment, including hazardous chemicals or radioactive materials

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**Timeline for Project Completion**

<table>
<thead>
<tr>
<th>Home or School Completion</th>
<th>Date</th>
<th>Step</th>
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<tbody>
<tr>
<td>School</td>
<td>Nov. 28 – Dec. 8</td>
<td>Question, Research, Hypothesis</td>
</tr>
<tr>
<td>Home</td>
<td>Dec. 8 – Jan. 18</td>
<td>Experiment, Results, Conclusion, Display Board Creation</td>
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<td>(rest of packet)</td>
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**Project Due:** *January 19*

**In-class practice presentations:** *January 19-24*

**Hill Science Fair:** *January 25*

**Regional Science Fair (If your child is selected to compete):** *February 23-24*
Think of a Question
Your question will drive your entire project. Make sure that your question is something that can be measured and answered by following the scientific process. You may use the project question for your project title.

Brainstorm some possible questions that you are interested in learning more about.

Once you have decided on your project question, write it on the lines below and then get approval from your teacher to begin your project.
Project Research

Research Your Topic
Spend some time learning more about your topic. Use reliable Internet sources, books from the library, your science book, or other resources. Not only do you want to be an expert on your topic, but you want to teach others about your topic.

*Science Terms* - locate at least 3 key science words related to your topic. Your science book is an excellent place to find these. Make sure that the words you choose are directly related to your topic. Provide a definition of each key word IN YOUR OWN WORDS.

<table>
<thead>
<tr>
<th>Term</th>
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Project Research

A paragraph describing the science behind your project - after you have completed your research give us, your audience, some background information on your topic in a complete and well-written paragraph. Give us specific, rather than general information. Use the space provided to write a draft. You will edit a final copy to place on your display board.
Project Research References and Acknowledgements (at least three): Books, resource people, articles (include the title and author) or specific Web sites (include the date the site was accessed) that you used to research your topic or complete your project. Neither search engines, such as Google and Yahoo, nor Wikipedia are scientific sources.

1.

2.

3.

4.
State Your Hypothesis
Based on your research, decide what you think the outcome of the project will be and make a good guess as to what you think the answer to your question will be. Also explain WHY you think that will be the outcome. Remember, it is ok if you don’t have the right answer; that is how scientists make discoveries. Make sure that your hypothesis is written in a complete sentence.

Start by listing some possible outcomes or answers to your question.

Decide which outcome is most likely. This will be your hypothesis. Clearly write your hypothesis in complete sentences.
Design Your Experiment
Clearly write out the procedure you are going to follow. Remember that your experiment needs to follow the scientific process and that you need to have one variable that you are going to change (independent variable). There are three variables in a scientific experiment: independent, dependent, and controlled.
The *independent variable* is the one, and only one, variable you will change.
The *dependent variables* are those being observed and measured throughout the experiment.
The *controlled variables* are those that remain constant and allows you, the scientist, to understand how the experiment would react under normal circumstances.

Independent Variable:
__________________________________________________________

Dependent Variables:
__________________________________________________________
__________________________________________________________
__________________________________________________________
__________________________________________________________

Controlled Variables:
__________________________________________________________
__________________________________________________________
__________________________________________________________
__________________________________________________________
Materials
List all materials needed to complete the experiment. Be specific about type, size, brand, etc.
Procedure
Write out each step of your experiment. Remember to number each step and clearly explain what to do. Other scientists should be able to follow the same steps and get similar results.
**Project Experiment**

**Conduct experiment**
Scientists conduct an experiment many times in order to get the most accurate data, so make sure you also conduct your experiment multiple times. During your experiment you need to collect data and make observations. You will record these in your Experiment Log. After you have completed the experiment use your log to write down the data and observations below. In your log you will need to:

*Collect Data* - you will need to collect numerical data; that means you need to take measurements during the experiment. Measurements can be temperature, distance, height, etc. Creating a chart is a helpful way to organize your data. You will analyze the data later to determine the results of your experiment.

*Make Observations* - as you conduct your experiment you will use your senses (sight, smell, touch, etc.) and write down any observations you make during the process.

**Observations**

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Determine the Results

Now it is time to review your data and observations to find out what happened during the experiment. Think about the best way to show your data: bar graph, line graph, chart, etc. and then create a table or a graph below. This visual will help you analyze your data for trends.

Results

Use this space, or a separate sheet in your notebook, to sketch 1 or more tables, charts, or graphs to analyze your data.
Determine the Results
You will also write out the results of each test in the experiment in paragraph form using complete sentences. Make sure that you include the numerical data (measurements) as well as any other important observations that you made.
Draw Conclusions
Analyze the results and determine how the results help you answer your project question. Write your answer in a complete sentence using the question to begin your answer. You also need to tell whether your hypothesis was supported or if the results contradict the hypothesis. If it was not supported, explain why you think so. End this paragraph by saying how you would change or improve your experiment in the future.

Answer to your project question: ________________________________________

_________________________________________________________

_________________________________________________________

_________________________________________________________

Did the results support or contradict the hypothesis? Explain. ______________________

_________________________________________________________

_________________________________________________________

_________________________________________________________

How would you improve or change the experiment? ______________________

_________________________________________________________

_________________________________________________________

_________________________________________________________
Making a Tri-Fold Board: https://www.sciencebuddies.org/blog/perfecting-the-project-display-board

Plan your design below:

All due on January 19!