**Student Name: Number:**

**Wildwood Christian School**

2019-2020

Internet Resources

***Project Sites***

* Science Buddies Topic Wizard – <http://www.sciencebuddies.org/science-fair-projects/recommender_register.php>
* Science Fair Project Resource Guide <http://www.ipl.org/div/projectguide/gettingstarted.html>
* Discovery Science Fair Central - <http://school.discoveryeducation.com/sciencefaircentral/Getting-Started.html>
* Science Fair Project Resources - <http://www.all-science-fair-projects.com/>
* Science Fair Project Ideas (grade level and area of science)- [https://www.education.com/science-fair/third-grade+eighth-grade/](https://www.education.com/science-fair/third-grade%2Beighth-grade/)
* Science Fair Project Ideas (topic and grade level) - <http://www.projects.juliantrubin.com/science_fair_project/index.html>
* Science Fair Adventure - <http://www.sciencefairadventure.com>

***Other Resources***

Easy Bib – <http://www.easybib.com/>

Create a Graph - <https://nces.ed.gov/nceskids/createagraph/>

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###### Project Overview

**You have to do a science fair project. Just what does that involve? Well, here is a brief overview of what that means to you.**

**Find a topic**. Do some research into different types of science fair projects. There are many sites on the internet you can use for resources. Choose 2 or 3 different experiments that interest you and are practical. By that we mean: do you have access to the materials? Will you have time to complete the experiment? Is it appropriate for a student of your age? How complex is it? **Next, think about ways you can modify the experiments**.

**Narrow down to a specific science experiment**. The experiment you ultimately choose should be unique to you. You want to test something that has never been done before. Do some research into your topic. Remember, you need to have background information and reliable sources of information cited in your research paper (Wikipedia is not a reliable resource). Middle school students need five sources and elementary students need two sources. Once completed, you will need to write-up your question, hypothesis, material list, and very detailed procedure to give to your teacher.

**Get approval**. Keep in mind that each project needs to be approved by your teacher *BEFORE* you can begin. There is also some paperwork you will need to have completed before starting.

*ALL projects require some basic forms (ISEF Form 1, 1A, 1B, and 3);* however, there are some projects which will require additional forms, some of which need to have an additional qualified scientist sign-off on too. For example, if you are testing on a vertebrate (humans are vertebrates) then you most likely will need additional signatures and paperwork. If you have any questions about additional requirements for your project, ask your teacher before you get started.

**Experiment.** Once you have the go ahead from your teacher to begin, you can start your experiment at any time. Make sure you have all the required materials and adequate time to do a thorough job. As you are gathering data, remember each project should have a handwritten *project data book* where you are recording all your observations. Don’t forget to leave yourself time to do the work that comes after the experiment!!

**After the experiment.** Once you have completed multiple trials of your experiment, data will have to be analyzed and graphed, conclusions made, abstract written, research papers put together, and display boards created. Make sure you have left yourself time for all of this. There are general guidelines for each of these in this packet, so be sure to read over them carefully.

**Present.** Each student will be scored on a presentation of their experiment either by their teacher or at the school science fair. You will need to discuss what was learned from the information you gathered. Make sure you can: explain the project and its procedures, discuss the results, understand the research and how it relates to the results, and can explain the importance of this information. Remember, communication is a big part of science!

###### INFORMATION FOR STUDENTS ABOUT

**SCIENCE FAIR PROJECTS**

**A Successful Science Fair Project:**

1. Represents your work, not that of an expert or your parents
2. Indicates an understanding of the science area chosen
3. Shows careful planning that would eliminate a “rush” project
4. Has a data book showing a complete record of all work—each day dated
5. Includes cited photographs, charts, pictures, graphs, etc. that might be necessary to explain your work
6. Has accurate, valid and correct observations
7. Is original in approach and presentation
8. Is self-explanatory
9. Is attractive and organized
10. Does not have to cost much money

**A Successful Science Fair Project is NOT:**

1. Only a report
2. Necessarily a new discovery or an original piece of research
3. Constructing a plastic model from a hobby kit
4. An enlarged model or drawing
5. A week-end chore
6. One, two or even three posters
7. Something done by your parents or teacher

**Steps in Making a Science Fair Project:**

1. Choose a topic and discuss it with your teacher. Ask your teacher for help and suggestions
2. Once you have chosen your topic problem, find out as much about the topic as possible
3. Set up a work area somewhere around your house where you can work on your project. Make sure the area is off limits to your pets and younger brothers and/or sisters
4. Work on your project a little each day, don’t wait until the last minute
5. Collect the materials needed for the project
6. Check with your teacher for suggestions and materials. He or she can save you time, excess work and money
7. Construct your exhibit and make letters for your signs
8. Mount your pictures, graphs, charts, etc.
9. Present your science project at the fair

### WHAT PARENTS CAN DO

**HELPING YOUR CHILDREN WITH THEIR SCIENCE FAIR PROJECTS**

1. Mark Science Fair date on your family calendar.
2. Give encouragement, support and guidance (Be positive).
3. Make sure your child feels it is his or her project. Make sure the project is primarily the work of the child.
4. Realize that the main purpose of a science fair project is to help your child use and strengthen the basic skills he or she has learned and to develop higher level skills.
5. Realize that your child will need help in understanding, acquiring and using the major science process skills (researching, organizing, measuring, calculating, reporting, demonstrating, experimenting, collecting, constructing, presenting).
6. Realize that your child may be using reading, writing, arithmetic and social skills for the first time in a creative way to solve a problem.
7. Realize that the teacher works with a lot of students and this may make it difficult to give large amount of individual attention to your child.
8. Realize that the teacher may need your help, contact the teacher and volunteer to help at the school’s science fair.
9. Help your child design a safe project that is not hazardous in any way.
10. Help your child plan a mutually agreed upon schedule, to prevent a last minute project and a disrupted household. A 4 to 8 week plan that uses a check-off sheet is best. The following steps (you may want to add more) should be on your schedule:

 a. Find a topic

 b. Narrow down the topic to a specific scientific problem that is appropriate to the child’s ability level

 c. Research what is already known about the problem

 d. Develop a hypotheses (What outcome do you expect?).

 e. Develop a procedure/investigation to test the hypothesis (if experimental).

 f. Make observations and collect appropriate data.

 g. Interpret the data and other observations.

 h. State and display the results.

 i.

 j.

 k.

 l.

Draw appropriate conclusions. Create the exhibit.

Write the research paper and the abstract. Present the project.

1. Read through the Science Fair packet with your student for understanding and clarity

|  |  |
| --- | --- |
| **Topic to Avoid** | **Why** |
| Any topic that boils down to a simple preference or taste comparison. For example, “Which tastes better: Coke or Pepsi?” | Such experiments don’t involve the kinds of numerical measurements wanted in a science fair project. They are more of a survey than an experiment. |
| Most consumer product testing of the “Which is best?” type. This includes comparisons of popcorn, bubblegum, make-up, detergents, cleaning products, and paper towels. | These projects only have scientific validity if the Investigator fully understands the science behind why the product works and applies that understanding to the experiment. While many consumer products are easy to use, the science behind them is often at the level of a graduate student in college. |
| Any topic that requires people to recall things they did in the past. | The data tends to be unreliable. |
| Effect of colored light on plants | Several people do this project at almost every science fair. You can be more creative! |
| Effect of music or talking on plants. | Difficult to measure. |
| Effect of running, music, video games, or almost anything on blood pressure. | The result is either obvious (the heart beats faster when you run) or difficult to measure with proper controls (the effect of music). |
| Effect of color on memory, emotion, mood, taste, strength, etc. | Highly subjective and difficult to measure. |
| Any topic that requires measurement that will be extremely difficult to make or repeat, given your equipment. | Without measurement, you can’t do science. |
| Any topic that requires dangerous, hard to find, expensive, or illegal materials. | We care about your safety and your parents’pocketbook. |
| Graphology or handwriting analysis. | Questionable scientific validity. |
| Any project in violation of state law, federal, law, state science fair rules, or ISEF rules. | In brief, you may not do projects that involves:* Unacceptable risk (physical or psychological) to a human subject
* Drugging, pain, or injury to a live vertebrate
* Use of illegal or prohibited materials
 |

**No projects involving viruses, bacteria, DNA, humans, or is hazardous.**

**Science Fair: The Basics**

You do not have to find a cure for cancer to participate in science fair! Any experiment that is ***new*** to the student would make a good science fair project. Keep in mind, however, that students earn points for creativity, so ***avoid copying someone else's project directly***. If you find a question you like, make it original -- perhaps a new way of testing it or an innovative experimental design. Don't be afraid to try something unusual because you think it may not work. The judges will still notice your ingenuity and scientific thought. (Points are not taken away for a failed experiment!)

When designing an experiment, consider several things:

* You must be able to perform a controlled experiment using the scientific method.
* There is a different between experiments and demonstrations or models. You want to do an experiment, not just build a model.
* Make sure you have (or can get) all the equipment you will need to do your experiment. Sometimes having access to unusual equipment – like a solar panel or a centrifuge- can lead to an interesting project.
* Make sure you have enough time to complete the experiment and you have considered the proper time of year to do such an experiment. For example, if you want to study the productivity of vegetable plants, do your experiment over the summer, not in December.

**Conducting Your Experiment**

All project work must be done at home under parental supervision or at an institutional site under the direction of a qualified scientist. ***Students must do their own projects.*** (Parents should never do the project for the child! Remember that each child will be judged on his or her knowledge of the subject.)

All experiments should follow a scientific method, the systematic method scientists use to conduct experiments. The important thing is that students choose an experiment in which something can be measured. The basics are:

1. **Ask a Question.** Choose a question that can be answered by observation and measurement.
2. **Form a Hypothesis.** A hypothesis is an educated guess about what will happen. A hypothesis is an “If/Then” statement. Most of the time a hypothesis is written like this: "If [this is done] , then [this] will happen." A hypothesis should include what your independent and dependent variables are. For example "If a plant receives fertilizer [having fertilizer is the independent variable], then it will grow to be bigger than a plant that does not receive fertilizer [plant size is the dependent variable]."
3. **Conduct Your Experiment.** Write out your procedures and follow them closely. Be sure to have controls and only one variable at a time. Repeat the experiment to validate your results.
4. **Present Your Results.** Your results are the measurements and observations you made during experimentation, often presented in a table or graph.
5. **Discuss Your Results.** Explain your results -- why did things happen the way they did?
6. **Draw Conclusions.** Answer your original question and state whether your hypothesis was correct. Does this have applications to everyday life?

2019 – 2020 Science Fair Research Paper Grading Rubric

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Area Assessed** | **9** | **8** | **7** | **0** |
| **Abstract** | Abstract is a 4 paragraph, 250 word or less summary of the project including; **the purpose of the experiment, hypothesis, procedures used, data, and conclusion.** | Abstract is a 250 word or less summary. Some of the required information is included, **only one topic is missing**; purpose of the experiment, procedures used, data, or conclusion. | Abstract is included, but does not contain all the required information. **Two or more pieces of information is missing**; the purpose of the experiment, procedures used, data, and conclusion | An abstract is not included in the research paper.More than 250 words are included. Abstract does not include any of the required information |
| **Table of Contents** | The table of contents includes **all the required items listed with an associating page number** where the information can be found. | A table of contents is included, but **1 topic and page number is missing.** | A table of contents is included, **but 2 or more topics and page numbers are missing**. | No table of contents is included. |
| **Introduction and Background Research** | Max page length: 1 page (grades 4/5) & 2 pages (grades 6-8) giving a clear report introduction. This page gives the background info garnered from library research and tells why the interest in the science experiments.  | Does meet the page limitation. An introduction to the report, **but only one piece information is missing. Some information is unclear.** | Page limitation is not met. The introduction is **not very clear. More than two pieces of information is missing.** | No introduction is included in the research paper. |
| **Hypothesis** | Written as an “If \_\_\_, then because \_\_\_” statement including the independent and dependent variable**.** | Written as an “If \_\_\_, then \_\_\_” statement, but **no because statement is provided.** | A hypothesis is provided, **but is not written as an “If \_\_\_, then \_\_\_” statement**. No because statement is provided. | No hypothesis is included in the research paper. |
| **Variables** | All variables are included: independent, dependent, & constant(s)**. Each variable is correctly identified.** | All variables are included; IV, DV, CV. **Only 1 variable is not correctly identified.** | All variables are not included; IV, DV, or CV. **2 or more variables are not correctly identified**. | No variables are included in the research paper. |
| **Materials** | A list of specific items used in the experiment is provided. **The list is written vertically** and includes; the exact amounts used, metric measurements used, and any construction information as needed. | A list of items used in the experiment is provided, but is not specific. **The list contains items used, but not the exact amount with units of measurement.** The list is written vertically. There is also construction information. | Items used are included, **but not written verticall**y.There are amounts included, but **without the unit of measure.** There is no construction information include. | No materials are listed for the project.The materials list is incomplete. |

2018 – 2019 Science Fair Research Paper Grading Rubric

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Area Assessed** | **9** | **8** | **7** | **0** |
| **Procedures** | A **greatly detailed step by step procedure is included in a numbered list.** There is indication that **5 trials were conducted.** There are indications that **observations were made and recorded while conducting each trial of the experiment**. There is also indication that **data was recorded** during **each trial** of the experiment. This experiment **could be replicated by someone**. | A **detailed step by step procedure** is included. There is indication **that 5 trials were conducted.** There is indication that **data was collected during the experiment.** There is also indication that **some observations were made during the experiment.** Experiment could be replicated by someone. | A **procedure is included.** There is indication that **3 trials were conducted**. There is indication that **some observations were made and data was collected.****This procedure could not be replicated.** | No procedure is included.It is hard to understand what procedure was conducted during this experiment. No observations were recorded. No data was collected. |
| **Results** | Graphs, tables, or charts are used to display data collected. These visuals are labeled correctly. A **clear explanation of the results** is included. | A graph, table, or chart is included to represent the data collected. The visuals are labeled correctly. A brief explanation of the results is included. | No graphs, tables, or charts are included. A statement about the collected data is included, but is not clear. | No information related to the results of the experiment is included. |
| **Discussion**(Conclusion in the lab write-up) | Meets page limitation. **This is a clear interpretation of the results from the experiment.** Includes an explanation of what caused the results, how the results relate to the background research collected, what results were expected, and any possible errors. **There is also connection to the stated hypothesis.** | Meets page limitation. Results are interpreted, but **information included does not give a clear explanation of what caused the results.** There is no connection to the background research collected. There is a connection to the stated hypothesis. | Meets page limitation. A **discussion of results is included but does not make any connections** to why the results came about. There is no connection to background research. No connection to the stated hypothesis. | No discussion is included in the research paper.Discussion is unclear. |
| **Conclusion…..**Of the entire paper, a summary of everything learned (research, experiment, results, & discussion) | Meets page limitation. This is a **clear summary of the results obtained**. The question is restated. **There is a connection to the hypothesi**s, proved or disproved. An answer to the question is provided based upon results. There is a clear understanding of the project and results. | Meets page limitation. **This is a summary of the results obtained**. The question is restated. There is a connection to the hypothesis stating if it was proved or disproved. **There is no answer to the scientific question.** There appears to be some understanding of the projects and results obtained. | This is less than one page, **only one to two paragraphs.** Information is included about the project. No question is restated. **There is no connection to the hypothesis.** An overall answer to the scientific question is not provided.There appears to be little understanding of the project and results obtained. | There is no conclusion provided in the research paper.The conclusion is unclear. There appears to be no understanding of the project and results obtained. |
| **Bibliography** | 5 different sources are listed (3 for grades 3 & 4). All sources have additional information provided as it applies; dates, publishers, copy write date, web address, and page numbers. | 5 different sources are listed. There is partial information provided for 3 to 4 of the sources. This information includes dates, publishers, copy write date, web address, and page numbers. | Sources are provided. These sources are all one type, (book, web) ***or*** there are less than 3 sources provided. Partial information is provided; dates, publishers, copy write date, web address. | No bibliography page is included.Only the name of the sources used is listed. |

**Goals Suggested Timeline/Due Dates**

1. *Generate Hypothesis*

Review different ideas

Select a topic and several ideas Try several experiments

Narrow your ideas to a single experiment Determine your problem or purpose Generate a detailed hypothesis

***Problem/Hypothesis Due Date***

1. *Design an Experiment*

Detailed procedure written Material list completed

***Procedure/Material List Due Date***

1. *Perform the Experiment*

Perform you experiment – gather data Repeat your experiment – gather data Try it again – gather data

Try it a third time – gather data Take pictures as you experiment Complete data tables

Complete graphs

1. *Write Your Report*

Rough draft of your written report Proofread your report

Complete Final report

1. *Present Your Findings*

Complete your display

Outline what you want to say in your oral report Practice your oral report

Review information in order to answer questions from Judges

1. *Turn in your Science Fair Project!!!*

***DUE DATE***

**Science Fair**

**PROJECT TOPIC INFORMATION SHEET**

**Due Thursday, January 27, 2020**

Student:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Category: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Teacher Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Project Title (can be changed later):

Below please write a summary of the Science Fair experiment you plan on doing: (Include purpose)

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Materials & Supplies:

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Procedure: (Use another page is necessary.)

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What is your hypothesis? If \_\_\_, then \_\_\_ because.

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What are you variables?

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How long will it take for you to complete the experiment part of your project from start to finish?

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**Science Fair Due Dates**

I have read the Science Fair Packet. I am aware of all due dates. I will not begin any experiments until approved by my teacher. I will respect judges and their judging. I will show respect to all participants and their projects.

|  |  |  |
| --- | --- | --- |
| **Check** | **Objective** | **Due Date** |
|  | Science Fair Packet Signed | Friday, January 17 |
|  | Project Topic Information Packet | Friday, January 24 |
|  | Bibliography | Monday, January 27 |
|  | Completion of Experiments | Monday, March 2 |
|  | Research Paper | Thursday, March 12 |
|  | Display | Thursday, March 12 |

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Parent Signature

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Student Signature