Science Fair

Project Worksheet
Learner Resource

Please use this Science Fair Project Worksheet as a guide to build upon your final project, regardless of your project type! Once each step or the entire worksheet is completed, be sure to hand it in to your educator so they can provide feedback at the bottom of each step. Take this as an opportunity for you to be creative and have fun! Take a look at the "How to Get Started" resource to get the gears rolling for potential ideas. If you are stuck on what to do take a look at the Canada Wide Science Fair (CWSF) website found here: https://youthscience.ca/science-fairs/cwsf/ottawa-2021/. To see some examples of finished projects that were displayed at the 2019 Waterloo-Wellington Science Fair in Ontario please visit: https://www.flickr.com/photos/wwsef/albums/72157710297853526.

Step 1: Topic Idea

After deciding on your science fair project topic, be sure to get approval from your educator.

What is the purpose of your project or experiment? What would you be able to learn after you've completed your experiment or project?

Purpose:

Make a title that is both interesting and catchy. Be sure it relates to your topic and purpose.

Project Title:

Write a problem also called the initial question. Take your purpose and turn it into a question. This is the big question that you will investigate during your project or experiment.

Problem/Initial Question:

Educator Assessment:

Areas of Strength	Criteria	Areas for Improvement	Level/Grade
	• The purpose/initial question are clear and can be completed/answered through a simple project/experiment • The project title is catchy and creative		

Step 2: Determining the Variables

Be sure to check with your educator if your project will involve variables. When you are doing an investigative project (experiment/observational study) you always need to take into account your variables. However, if you are doing a innovation/invention type of project you might not have to.

Independent Variable: *(this variable gets manipulated)*

Dependent Variable: *(this variable responds to the manipulation)*

Control Variable: *(this variable remains the same)*

Educator Assessment:

Areas of Strength	Criteria	Areas for Improvement	Level/Grade
	• The Independent Variable is correctly identified • The dependent variable is correctly identified • More than 1 control variable was correctly identified		

Step 3: Research/Brainstorm

Research will help you gain information and insight into answering or understanding the "Why" questions you may have. If it is an investigate project, research will help you understand the process of your experiment and what is actually happening; whereas an innovative/invention project, research will help you understand how to get your innovation to work properly and what may be required for that to happen. Please use a minimum of THREE **credible** resources.

Note: Wikipedia isn't a reliable source! It can be a great place to start your research but you should not use it for your own understanding. As scientists we must always use reliable sources to back up our claims and information!

Research Notes/Brainstorming Sheet

Step 3: Research/Brainstorm Continued

Research Summary: What did you find or discover? Write a paragraph.

Citation Criteria:

- A minimum of THREE **credible** resources
- Cite your information using the APA format. You can use the following link to help with these citations: https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/general_format.html

Educator Assessment:

Areas of Strength	Criteria	Areas for Improvement	Level/Grade
	• The research discovered relates to the project topic • The research provides information (background/theories) about the project topic • A minimum of three credible sources were used • The resources were cited in the correct APA format		

Step 4: A Hypothesis

A hypothesis is an educated guess about what you think the outcome of your experiment or project will be. Using the research you discovered in Step 3, make sure you think about what could actually happen during your experiment (for an investigate project), or if you were able to create something for your project (for an innovative/invention project).

Note: It is completely normal and OK if your hypothesis ended up being wrong. We say that the hypothesis is rejected in this case. If your hypothesis is correct, we would say it was proven. If you hypothesis is rejected, then In your conclusion you need to explain why you think it was rejected and what you may change for net time.

Write a hypothesis that follows the format, **"If…then…because…"** using the variables you found in step 2. Be sure to include why you think this will happen; be specific.

Example: IF I measure the noise level in a classroom when an educator is in it compared to when they leave the room, **THEN** I will see that the noise level is higher when the educator is not in the classroom **BECAUSE** more people will start talking as the educator is not there to tell us to be quiet.

Hypothesis:

Educator Assessment:

Areas of Strength	Criteria	Areas for Improvement	Level/Grade
	• The hypothesis is in the correct "If…then…because…" format • The explanation (i.e. the "because" part) refers to the research done in Step 3		

Step 5: Materials/Procedure/Safety

Materials:

- This is the list of materials needed for your project/experiment
- Be sure to include amounts with units! Don't forget to include measurement tools if you used any (i.e. ruler, measuring cup).
- Some things to consider are what kind of materials do you need and how much do they cost? If you can get them from home or borrow them from school, make sure you ask for permission.

Step 5: Materials/Procedure/Safety Continued

Procedure:

- List the specific and detailed steps that you will follow.
- This is the planning stage and crucial for your own experiment, but it also exists so that anyone can repeat the exact experiment. Be detailed!
- During the experiment/project, you may make many changes to your original plan; if so, make sure you re-visit your written procedure and make the necessary edits.
- Number each step!
- Be sure to use your own words with no personal pronouns and in the past tense.

Example:

1. The paper was cut into four equal sized pieces.
2. Glue was then applied to one side of each of the four paper pieces.
3. Etc.
4. Etc.

Step 5: Materials/Procedure/Safety Continued

Safety:

- Be sure to include all of the safety protocol that should be followed when conducting the experiment or project.

Educator Assessment:

Areas of Strength	Criteria	Areas for Improvement	Level/Grade
	• The procedure is easy to understand and is in the correct step-by-step format • Procedure is written in past tense with no personal pronouns • All materials are included, as-well as their amounts • All safety concerns and protocols are included		

Step 6: Observations

During the experiment, pay close attention to the details. It is important to record all of the data in a log book, or in the space provided below. The observations should be presented nicely in table or chart format when necessary. Observations can include drawn pictures, or photos of the experiment or project; don't forget labels!

Note: An observation table can help you organize your data very nicely. Remember to have all your units written down! Also, observations are what occur during the experiment, and NOT what you conclude from it – that is for the conclusion!

Observations:

Step 6: Observations Continued

Observations:

Educator Assessment:

Areas of Strength	Criteria	Areas for Improvement	Level/Grade
	• The observation tables are detailed, clear, neat and exhibit the results found within the experiment/project • Tables/diagrams/pictures are accurately labelled		

Step 7: Results/Analyze

If possible, create a finalized table and/or graph to display your data. If the project is a innovation/invention then be sure to have a finished photo/diagram of it with all its proper labels. A graph can help display information in a way that shows potential trends. Be sure to have a proper title on your graph or table, and have proper labels (with units) on your x- and y-axis.

Under the "Results" section below write a paragraph that summarize your results. Be sure to connect these results to your previous research work (i.e. theories you discovered). Some questions to think about here are:

- What can be determined from your project/experiment and observations?
- How does it relate to the research done in Step 2?
- Explain why your results occurred.
- If a graph or table was created, are there trends you see? If so, what?

Table/Graph/Finished Innovation:

Step 7: Results/Analyze Continued

If possible, create a finalized table and/or graph to display your data. If the project is a innovation/invention then be sure to have a finished photo/diagram of it with all its proper labels. A graph can help display information in a way that shows potential trends. Be sure to have a proper title on your graph or table, and have proper labels (with units) on your x- and y-axis.

Under the "Results" section below write a paragraph that summarize your results. Be sure to connect these results to your previous research work (i.e. theories you discovered). Some questions to think about here are:

- What can be determined from your project/experiment and observations?
- How does it relate to the research done in Step 2?
- Explain why your results occurred.
- If a graph or table was created, are there trends you see? If so, what?

Results:

Educator Assessment:

Areas of Strength	Criteria	Areas for Improvement	Level/Grade
	• The results are intuitively analyzed and appropriately displayed in a graph, table, paragraph or in another way		

Step 8: Conclusion

You have finally arrived at the end of your project or experiment! Well, not completely. Depending on your project type you should be able to make some final conclusions in a couple paragraphs. Be sure to include and or answer the following in your conclusion:

- Summarize the experiment or project in one sentence.
- Was your hypothesis proven or rejected? Why?
- What did you discover in your experiment or project? Explain what happened by relating it back to the connections from your research!
- Were there any experimental or design errors that could have affected your results?
- What did you learn from this project?
- How can you connect this to the real-world? If there is already, expand on what the implications could be.
- What would you do next time if you had to re-design your project or re-test the experiment again?

Conclusion:

Step 8: Conclusion Continued

Conclusion:

Educator Assessment:

Areas of Strength	Criteria	Areas for Improvement	Level/Grade
	• The project/experiment is summarized in one sentence • The results are related to the hypothesis • Clear understanding of the experiment results in relation to the research • Results are applied to the real world • At least two experimental/project errors are stated • The next steps are explained well		

Step 9: Reflection

Being reflective is all aspects of life is an important key to success. The same goes for scientists after they perform experiments or design projects. Be sure to include and or answer the following in your reflection:

- If this project or experiment as a group or in partners, discuss the power of group work with your partner(s) and explained how it worked out.
- If you worked individually, state how it was to work by yourself.
- Discuss what parts went well for you during this project.
- Discuss what could have been done differently during this project.

Reflection:

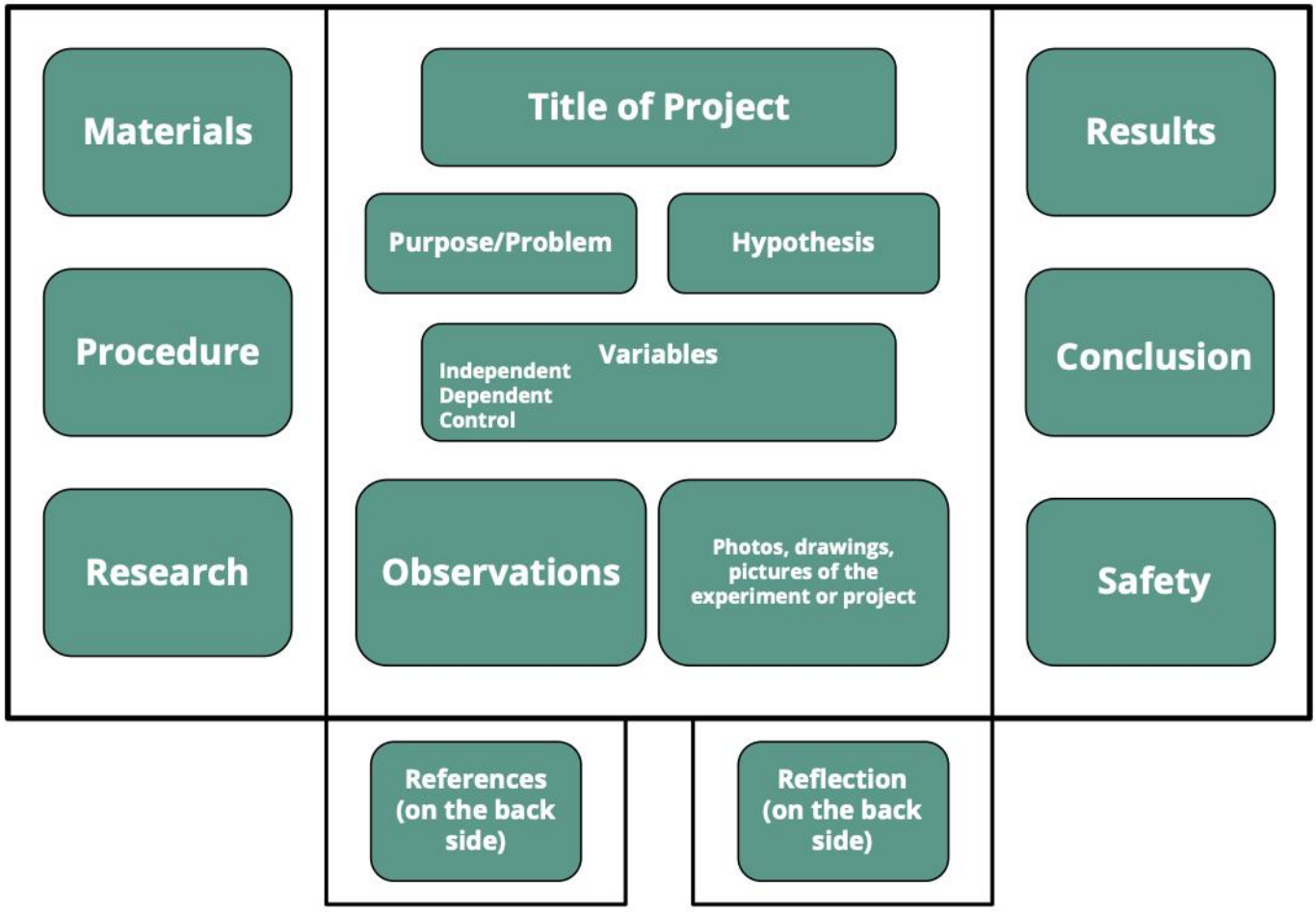
Educator Assessment:

Areas of Strength	Criteria	Areas for Improvement	Level/Grade
	• The reflection clearly indicates the pros and cons of working individually or with a group • The reflection states the challenges that occurred and how they were overcome • If project was done in a group, all group members were on task at all times and worked cooperatively		

Step 10: Display Board/Poster

Now that all the elements of your project are completed, it is time to organize your information into a display board/poster! Be sure to make it neat, and colourful so it can standout! Remember to include your name and educator's name on the board. Below is an example of how your display board/poster could be presented!

Display Board/Poster Example:



Step 11: Presentation

Finally you need to prepare a presentation for the audience and judges. You've just made a discovery about the world we live in; blow the audience away with your creativity and knowledge! It is your time to share your hard work and present yourself as a new, young Scientist! Be enthusiastic, professional, and above of all, have fun! Also, be sure to think of potential questions the judges may ask you so that you can practice what your response is (your guardian can help you with this!). Some key reminders for planning your presentation are as follows:

- Have notes on index cards to help guide you during your presentation. Be ready to answer questions from the judges!
- Remember to bring your project display board/poster, and or your physical project (if you created something) on the day you present.
- Judges would love to see you demonstrate your experiment or project, if that is possible.

Presentation:

Potential Questions the Judges May Ask:

Step 11: Presentation Continued

Below is a mock rubric that a judge may use as they watch your presentation, and view your display boards/posters.

Component	3	2	1	Score
Poster Display	• The Display Board/Poster is complete, neatly written or typed, and shows effort and creativity. Pictures are displayed.	• The Display Board/Poster is mostly complete, neatly written or typed, and shows some effort and creativity. Pictures are displayed.	• The Display Board/Poster is incomplete, sloppy, and show little effort and creativity.	
Presentation	• The presentation was planned and organized well. • The presentation was memorized, and little resources were used. • Answered questions adequately and effectively.	• The presentation was planned and organized well for the most part. • Some resources were used during the presentation. • Most questions were answered well, but some were a struggle.	• The presentation was planned poorly and disorganized. • The presentation was read completely from paper or computer. • Almost all questions were not answered.	
Comments				

From all of us here at GreenLearning, we wish you good luck with your Science Fair Project!