

# Checklist for Well-Constructed Science Fair Project

**Highly recommended to follow for a great score!**

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## Rubric for Science Fair Projects

*This is NOT DIFFICULT! Simply read through the section you are on, ensuring you complete all the requirements as you go.*

*Use active voice, not passive, in ALL your scientific writing.*

**WARNING:** This needs to be your own original work! It is appropriate to have mentors and advice, but this must be your project in idea and writing. If your project is determined to be plagiarized in any way, the project will be null and void. You will receive a zero.

### PROJECT TITLE

Projects catch the attention of the viewer by an intriguing title. Make sure your title is:

- Clearly relating to your topic.
- Typed or neatly hand-crafted.
- Easy to read from a distance.

## **ABSTRACT**

Paragraph of 250 words or less, written in 3<sup>rd</sup> person, summarizing the key points of your project.

Write your abstract in the order you completed your project. Follow the order below:

- Introductory statement explaining the importance of your project.
- Explain what you found and why it matters.
- Follow with a short summary of how you conducted your project.
- Specify what the important data is for your research.
- End with a conclusion that restates what you found and the significance of it.

## **PURPOSE / OBJECTIVE STATEMENT**

Two- four sentences, written in 3<sup>rd</sup> person, explaining your goal.

- What you are trying to accomplish?
- Why did you become interested?
- How will your results will be beneficial?

## **RESEARCH QUESTION**

What is the question you are trying to answer? Should be 1 statement, but 2 at most.

- Needs to clearly be asking a question.
- This question must be answerable in the following way.
  - 1) Must be observable.
  - 2) Must be repeatable.
  - 3) Must be measurable.
  - 4) Must be able to proven true or false.

## **BACKGROUND**

A couple paragraphs, written in 3<sup>rd</sup> person, including pertinent facts related to this experiment that lead to the reason the experiment will be performed. Should include:

- First sentence should be a hook (an interesting statement to entice the reader).
- Paragraph describing the history of the purpose of the experiment.
- Paragraph describing our current understanding of the research question.
- Any definitions pertinent to the project, so the subject matter is clear.
- A final statement that justifies your hypothesis.
- Minimum of 2-5 distinct referenced statements.

## **HYPOTHESIS**

An educated guess/explanation of what will happen in the experiment.

- 1 or 2 clear statements, written in 1<sup>st</sup> person.
- Includes a “because clause” or some equivalent form of justification and is reasonable.
- (ADVANCED STUDENTS ONLY) Include a Null Hypothesis.

## **CONTROL GROUP**

A control group is when you do your experiment once without changing anything, then test again changing your variables.

- State if you used a control group. Why or why not?
- If you used a control, what was it?

## VARIABLES

A list of the following variables:

- Independent variable - the one you are changing
- Dependent variable – what did you measure (the outcome)
- Controlled Variables – the things you are controlling to keep them the same
- Extraneous Variables (things you can't control but could affect your outcome)

## MATERIALS

Written in a list format including definitions of any items, as appropriate. Definitions are just expected, no additional points. **Include pertinent definitions.**

- Each item is clearly described.
- Includes quantities for every item.

## METHODS

Describe how to do the experiment. It should be very easy for someone to come in and repeat your experiment. Definitions as appropriate - **Include pertinent definitions.**

- Write step by step instructions, in a numbered list.
- Should include drawings and labels of the set up as appropriate for the individual experiment (No deduction if not applicable).
- Written in 3rd person.
- Must have the 3 essentials:**
  - How was it done.
  - How was it measured and how do you plan to interpret your results
  - What you did to stay safe.

# RESULTS

A short text summary, graphs charts, pictures and/or drawings, explaining, **in the 3<sup>rd</sup> person**, what was discovered and what happened in the experiment from a factual standpoint. Do not tell WHY you think you got these results. Leave that for the discussion.

- Write a summary paragraph. This is KEY!!! State generally what was found from a **FACTUAL** standpoint only. Ex: This research showed...
  - Include how much data you collected, and is it qualitative or quantitative?
  - Record your observations.
  - Discuss data you had, but then eliminated from your results. If there was no data excluded, state that.
- Insert pictures/drawings of your results. Before/after pictures are very useful. *Illustrations are **expected** if you have qualitative data.*
  - Label each picture/drawing: figure 1, figure 2, figure 3, etc.
  - Each figure should have an explanation sentence of what it is.
- Include charts listing all of your data.
  - Each chart must have text below it explaining what it shows.
  - Each chart must have a title.
  - Include headers on each row and column for clear understanding.
- Include graphs created from each chart.
  - Each graph must have text below it explaining what it shows. Assume the reader cannot interpret it, so explain it well.
    - Ex:** This graph shows the number of sunny vs rainy days in the summer. July has the rainiest days while Sept has the least amount of rain
  - Each must have a title.
- Each graph must have axes labels for clear understanding.
- Demonstrate that sufficient data was collected to prove the point.
- Convert all measurements to metric. Raw data can be in English units before conversion.

- Use proper Significant Figures throughout your report.
- Use of statistical analysis to assess data is encouraged but *not required*. Must include a clear explanation so I know YOU understand what you did with your data.

## DISCUSSION

Interpret your facts here, explain why you think you got the results you did.

- Must be written in 3<sup>rd</sup> person.
- Must have 1 additional reference statement supporting the results of the experiment.
- First sentences should describe what happened in the experiment (restated or summarized from the results) and clearly explain what was learned.  
***\*Do not restate word for word what is in your results section!***
- Next, include several sentences that describe your assessment of why it happened.

The following can be presented in any order in the discussion but must be included:

- Why was this method of experimentation an appropriate way to answer the question?
- Justify how you decided to make your measurements.
- Is there any way you could make your measurements more accurate? Was this the best way of taking measurements for this project? Why or why not?
- State how you controlled variables so you are certain of good results.
- What kind of unexpected results occurred?
- Your assessment of why those unexpected results happened? (if you do not have any unexpected results, you need to make some sort of a statement that the results turned out as expected or as predicted.)
- Clarify and add any definitions you may still need to add to make a clear report.
- How could you improve your experiment if you did it again?

## CONCLUSION

May be written in 1<sup>st</sup> person.

- 1-2 statements that clearly answer the research question posed.
- Accept or reject your hypothesis (or null hypothesis for advanced students)
- Include a reason that makes sense for accepting or rejecting your hypothesis.

## FUTURE RESEARCH / PRACTICAL APPLICATION

Having BOTH sections are highly recommended. If you decide to only do one, you may wish to choose practical application, since judges and readers look for the benefit your project gives.

- Must be written in 3<sup>rd</sup> person.
- Describe any additional questions you wondered about while experiment. How could you investigate those questions? Include an additional reference statement.

**And / or**

- How do your discoveries apply to real life, where are they used? How does what you discovered apply to YOUR life? Include an additional reference statement.

## WORKS CITED

Cite where you found your references (websites, books, magazines, interviews). You may use [www.easybib.com](http://www.easybib.com) to make sure you have your citations in the correct format (MLA8 or APA). For websites, make sure you include date accessed at the end.

- Include a citation for each referenced statement used in your paper. *There should be a minimum of 4:* (2 in background, 1 in discussion, 1 in future research/practical application.)
- Citing in your paragraphs:** After each reference statement in your paper, type the *first word*, in parenthesis, from your corresponding works cited source. This is how the person reading your report will know what information came from that reference.  
**Do not use a number method by putting (1) or <sup>1</sup> next to your citations or works cited.**



## Here is an example of how to cite a website:

Marlow, Jeffrey. “Could Modified Proteins Build the Microfactories of the Future?” *The Extremo Files*, Discover Magazine, 30 Sept. 2015, [blogs.discovermagazine.com/the-extremo-files/2015/10/01/could-modified-proteins-build-the-microfactories-of-the-future/#.XbBai-hKiM8](https://blogs.discovermagazine.com/the-extremo-files/2015/10/01/could-modified-proteins-build-the-microfactories-of-the-future/#.XbBai-hKiM8). Accessed 23 Oct 2019.

## Here is an example of how to cite the source above in your paragraph:

Amino acids require a specific process to be built correctly. They “are attached to their specific corresponding tRNA carrier by a tRNA synthase enzyme. Holding onto the amino acid with one hand, tRNAs grope around for specific codon triads on the mRNA with the other, adding their cargo to the nascent protein if all the cogs fit into place” (Marlow).

## JOURNAL

This is *required* and should contain what you **did** and **thought** about during your project. Only handwritten journals stand up in court of law, if in a patent dispute. **Electronic journals are acceptable, but not ideal. You must NEVER delete ANY previous entries.**

- Presented in front of display board.
- Written in a composition notebook that clearly shows if pages are ripped out.
- Each entry page dated and initialed and **must** be written in pen.
- Only right side of journal is written on (left side is crossed out).
- Includes multiple entries through the duration of project.

## DISPLAY BOARD

**Follow the order of the parts in this checklist to organize your sections on display board.**

- Presentation is organized in a logical manner.
- Board has intriguing and creative design.
- Sections are typed and neat.
- Font is appropriate and easy to read.

## INTERVIEW

### **I. Professionalism**

- \_\_\_ make eye contact
- \_\_\_ speak clearly
- \_\_\_ polite / well-mannered
- \_\_\_ appearance is professional

### **II. Knowledge of Process**

- \_\_\_ clearly and effectively describe how they used the scientific method
- \_\_\_ describe the different sections of the poster/project
- \_\_\_ describe how they measured and tested their question

### **III. Understanding**

- \_\_\_ explain why they chose this project
- \_\_\_ clearly describe their results/data, using charts and graphs to illustrate
- \_\_\_ define any vocabulary used specific to their project
- \_\_\_ describe what kind of background research they did to learn about their topic
- \_\_\_ describe the different variables involved in their project
- \_\_\_ run multiple trials

### **IV. Group Projects (deduct 2-4 points if requirements are not met)**

- \_\_\_ All students on the team contributed to the project
- \_\_\_ All students had designated areas to work on.

## OVERALL NECESSITIES

- All project sections are typed.
- The report avoids conversational language.
- Spelling, grammar, and capitalization are correct.
- Each section is clearly labeled.