STEM/Science Fair Student Paperwork

These are instruction pages that can be printed for students completing a science project.

All Science Fair Projects require paperwork, to ensure you stay safe!

You'll find the forms you need here (you need both CUSEF and ISEF):

1. CUSEF STEM: https://cusef.byu.edu/forms/
2. ISEF STEM Fair forms here: https://student.societyforscience.org/intel-isef-forms.

Forms 1, 1A, and 1B ***must be completed by all students***.

The other forms only need to be completed *if the project requires them*, instructions for other required paperwork is listed on Form 1. For example, if my project required strong chemicals, (things other than found in a regular kitchen pantry) then I would be required to have Form 3: Risk Assessment and Form 2: Qualified Scientist.

Each project is different; read through the forms carefully.

Some projects require approval from a Scientific Review Committee (SRC), the SRC is a team of Scientists/Engineers who will double check your STEM Fair Plan and make sure that your project is legal and safe. SRC's take a few days up to a month to approve a project, plan accordingly.

What do I need?

- Notebook/Lined paper/Journal
- Three-Ring Binder with protector sheets for the extra mile journalists.
- Pen/Pencil
- Highlighter
- Tri-Fold Poster (36" x 48")
- Project Supplies

Why is a Journal important?

All Science Fair Projects have *Quantitative* data (measurements and numbers). But what makes Science/Engineering Fair **FUN**, is knowing the *qualitative* data.

Qualitative data are **observations**, usually made with your senses(sight, smell, hearing, taste, touch.)

For example: My hovercraft went 3.45 meters (quantitative data) before blowing up into a huge cloud of black smoke that lit my dad's pants on fire(qualitative data).

Science Journals help you remember what happened.

1. **Get a sturdy notebook, one that has pages that are hard to rip out.**
2. **Write with a pen, markers, crayons, colored pencils! (Make it fun!)**
3. **Add a date on your work.**
4. **Doodle.**

Don't worry if you mess up! Keeping a journal is both good practice and will give you extra points when being judged at Science Fair.

Picking a Topic

Science Buddies (https://www.sciencebuddies.org/) is a great place for beginning ideas, but if you find an idea on Science Buddies you should try to **change it to make it your own.**

Still struggling? Write down a list of 5 things you like to do, think about project ideas for each. Research your ideas online or at a library.

- ➢ Does someone around you have **expertise** in something you're interested in?
- ➢ Sometimes Teachers or Professors will let you interview and ask questions about a subject. (If you're lucky you might work in their lab.)
- ➢ What's happening in your area? Is there anything that needs to be fixed, made, built or improved?

★ **Topic Ideas:**

Project Question

What question or problem is your experiment going to answer? It can be as simple as 'Why is the sky blue?' 'What happens when a plant is put in a dark closet?'

★ **Question:**

_____.

Hypothesis:

Independent Variable/Dependent Variable

Hypothesis is an educated statement, usually written while researching. Here's a template for the basic format, but rewrite your hypothesis until it makes sense.

- ★ **Hypothesis:** It is hypothesized that _____(IV) will result in/will cause/will make_____(DV), because _____.

--Write your hypothesis without using any personal pronouns: I, me, you, us, we, them--etc.

****Notice how the spaces in the hypothesis have an IV or DV written in them? That is where your independent variable (IV) and dependent variable (DV) will go into your hypothesis. IV always goes first, DV always goes second.*** Want to make your hypothesis even better? Add a because statement:* It is hypothesized that _____IV_____ will result in _____DV_____because_____.

What's IV and DV?

IV: The ***Independent Variable*** is what 'I change' What am I going to change for my experiment?

--Example: If I am growing plants then I could change the amount of water I give the plants, or the amount of sunlight, or fertilizer.

I could NOT change the type of seeds--changing the seeds makes my project invalid, because I cannot compare growth of an apple tree to the growth of a carrot-
unless there are tree sized carrots. (I could compare 2 different carrots.)

DV: The ***Dependent Variable*** is what is 'Measured'. What am I going to measure for my experiment?

--Example: If I am growing plants then I could measure the height of the plant, the growth of the leaves, etc.

I could NOT measure how wet the soil is, or how pretty the flower pot is,
because that's NOT part of the real plant.

Research/References

Research a minimum of 3 references. (Try to not use websites ending in .com) Kid sites are easier to understand. Websites ending in .edu, .org. or college/university websites are wonderful. You can even use a video on youtube as a reference (just make sure it has good information and that you have permission to watch it.)

Books, Magazines, Websites, Journals, Newspaper articles you use should have been written in the last 10 years.

-- Research your Independent and Dependent Variable, and find an article related to your topic or question.
--Print the references you find online and highlight the most important parts.

- ★ **Research:** Use this to guide the writing of your research paragraph:

    1. Tell three things you learned about the independent variable.
        -
        -
        -

    2. Tell three things you learned about the dependent variable.
        -
        -
        -

    3. Did you find any article related to your study?
        -
        -
        -

    4. What else did you learn?
        -
        -
        -

-- Statements from sources require an in-text citation. They usually go at the end of the sentence or statement you used. Example: (Author Last Name, Year).

In-text citation also look like this:
With a bit of work, the STEM Fair can be fun(Provo.edu, 2020).
According to my STEM Teacher (2020), STEM Fair can be fun.
STEM Fair(2020) said, “Science Fair can be fun.”

References

--References go at the very end of your STEM Fair project, but are easier to put together while you do your research.

I suggest that you use a reference generator, such as BibMe (http://www.bibme.org/) to create your **full references** . APA style is generally used for Science Fair. Create your references page while you complete your research, it will be faster.

Here's the basic format:

Author Last Name, First Name Initial. (Date) Title of Article. Where Published. Publisher. Retrieved from: URL

- ★ **References: (Print the references you made on BibMe and staple/tape them here.)**

Materials

A list of all the things you need to complete your project. Think through your project-what will you use, then while doing the project add anything you missed.

- ★ **Materials:**

Procedures

A detailed set of instructions telling others how to do the project. Step 1: Gather Materials...2...3...4...up to as many steps as you need. I suggest that you write down all the procedures then give the instructions and a highlighter to a parent or guardian, any steps that don't make sense, or need more instruction should be highlighted and revised.
--Write your procedures without using any personal pronouns: I, me, you, us, we, them-- etc.

- ★ **Procedures:**

Data Table

A good experiment should have a minimum of 45 trials. Or 3 sets of 15 trials. The first should be a control--control is the normal expected part of the experiment. (i.e. the plant given a normal amount of water) The second should have a value higher than the control. (i.e. the plant given extra water.) The third a value lower than the control. (i.e. the plant given less water).

Each experiment will be a little different, some may be able to make 3 sets of 15 trials, others won't.

Here's an example data table for a plant growth experiment.

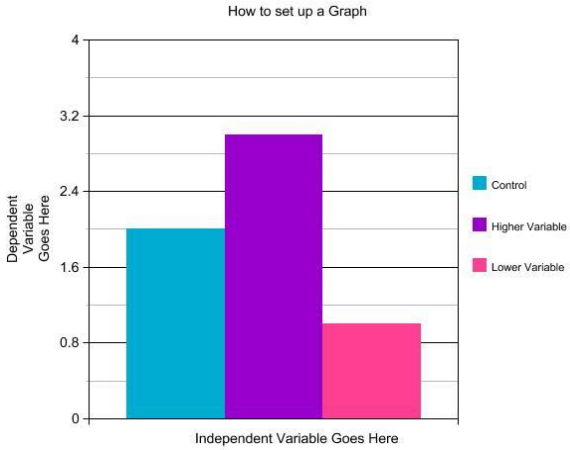
Data Table Title: ****Should be the same title displayed on your graph.***					
Plant 1 (CONTROL)		**Plant 2 (MORE WATER)**		**Plant 3 (LESS WATER)**	
IV: 100 mL water	**DV: Height (cm)**	**IV: 150 mL water**	**DV: Height (cm)**	**IV: 50 mL water**	**DV: Height (cm)**
Day 1 **Include qualitative Observations** --Plant is healthy, green.	1 cm	Day 1	1 cm	Day 1	1 cm
2	1 cm	2	1 cm	2	1 cm
3	1.2 cm	3	2 cm	3	1.1 cm
...		...		...	
15	8 cm	15 --Plant is yellow, dead/dying, soil is soaked.	2 cm	15 --Plant growth is slow, stem is brown and broken.	5 cm

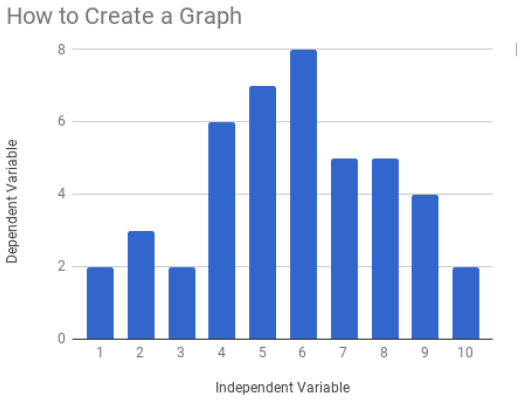
Make a data table to match your project.

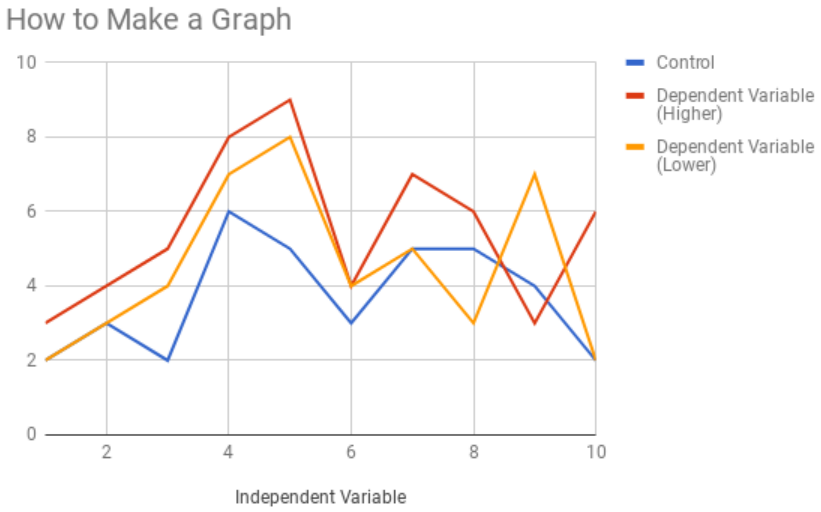
Graph

Create a Graph:
https://nces.ed.gov/nceskids/createagraph/
is an excellent program that's easy to use, if you don't have too much data.

Excel or Google Sheets are excellent for graphs especially if you have a lot of data to graph. While in excel or google sheets input your data and click on the symbol to make a graph..







Conclusion

Answer these questions in your conclusion, if the answers are well written then your conclusion will be complete. Do not give any one word answers to any question.

★ **Conclusion**

--Write your conclusion without using any personal pronouns: I, me, you, us, we, them-- etc.

1. What was the answer to your project question?

2. Was your Hypothesis correct? List data averages for your project when answering this question.

3. Explain why the data averages are important.

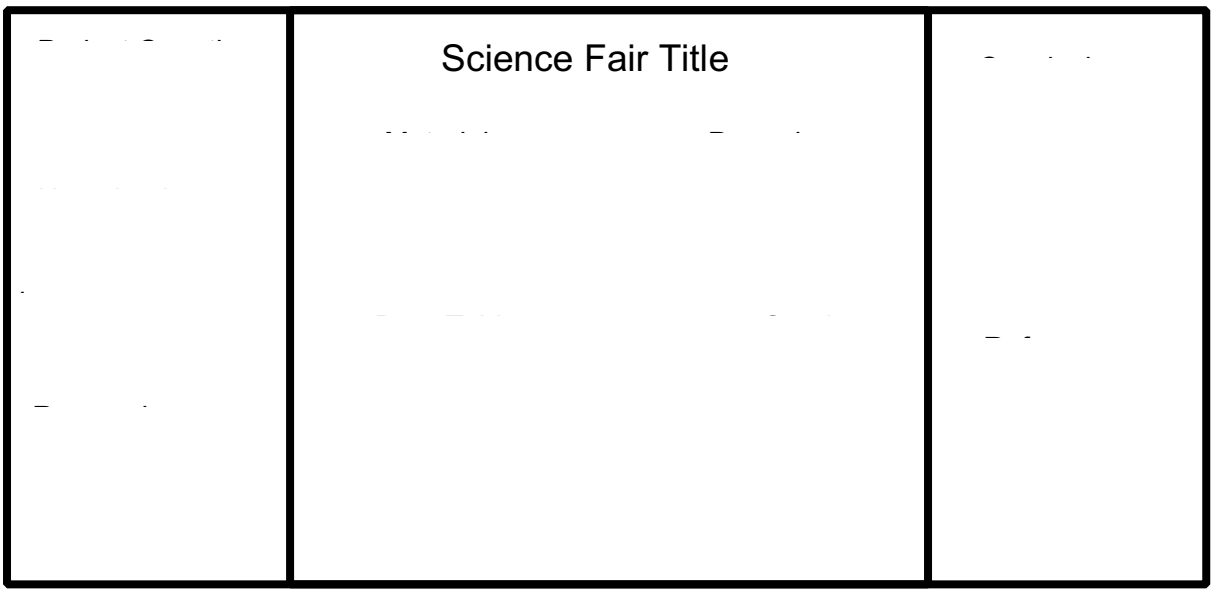
4. What would you do differently next time?

5. Did you make any mistakes or did you change anything to improve your project?

6. How does your project help others, society, the world?

Poster Setup

Other similar setups are acceptable, as long as the order makes sense.



Presentation

Completing all that work deserves a good presentation.

- Introduce yourself, tell why or how you choose your topic.
- Use flashcards if needed, but don't read directly from the board.
- Point to the board when explaining your data, so that judges can see it more clearly.
- Show your creative approach to this particular experiment.
- It's okay to say "I don't know" to a question. It's better to say, "That sounds like a good idea for my further research."

Present to multiple people so you can be ready.

If you move on to district, state or internationals be aware that **HALF** of your points will come from the presentation.

Abstract

An abstract is a short explanation of your Science Fair. If written correctly it should entice others into wanting to see the entire project. An abstract will be placed at the beginning of the project, but it's always written **LAST**. You are required to write a (maximum) 250 word one-page abstract for your project. Find links at the bottom of this page for extra help and instructions for writing an abstract: https://provo.edu/teaching-learning/stem/stem-fair/

- ★ **Abstract**

Answer the following:

1. What is the purpose of the experiment? (Why should I care about your experiment?)

2. What problem was answered in your experiment?

3. Briefly explain the method for testing the experiment.

4. Tell the results. (What answer did you find?) (Include exact numbers here: list averages.)

5. Conclusion: How does this project change the world?

Most abstracts have a word limit of 150-200 words. Any instructions you may have received otherwise should be followed.

What if I wrote too many words?

- Remember to delete personal pronouns: I, you, we, me, them, etc.
- Avoid non-specific words: very, small, may, seems, so...
- No tables or graphs.

Science STEM Fair

Name: _____Teacher:_____

What's Due?	**Date Due**	**Signed/Score**
Paperwork Printed and Signed:		
Topic:		
Question:		
Research and References:		
Hypothesis and Variables:		
Materials:		
Procedures:		
Data Table:		
Graph:		
Conclusion:		

Abstract:		
Poster and Printed Report:		
Presentation		

Final Score: _____

Teacher Notes:

Sample Data Table:

Trial	Results	Observations
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		

14		
15		

Sample Graph: