

The 7 Steps of the Scientific Method

Step 1:

TITLE & PURPOSE – The title can be the question in a “catchy” form. The purpose (or Question) is what you want to solve in your experiment.

Step 2:

HYPOTHESIS – This is your educated guess based on your research.

Step 3:

BACKGROUND RESEARCH – Include a short paragraph that gives the background information on which you based your hypothesis.

Step 4:

MATERIALS / PROCEDURE – List all materials used. Explain the procedure for the experiment.

Step 5:

DATA - These are your results displayed in a way that your audience can understand. It is usually displayed in a chart, table, graph, or photographs.



Step 6:

RESULTS – This is a statement or paragraph explaining what happened during the experiment. It can also include pictures.

Step 7:

CONCLUSION - This is a statement of whether your hypothesis was right or not. If it wasn't right, why you think it turned out the way it did, and what you do differently next time.

How Do I Start a Science Experiment?

1. Select a Topic

Remember that a Science Fair Project is a test you do to find an answer to a question, not just showing what you know about something. What is it that you are trying to find out from your experiment?

2. Gather Background Information

Gather information about your topic from books, magazines, the Internet, people and companies. Investigate what others have already learned about your question. Gather information that will help you perform your experiment. Keep notes about where you got your info.

3. Start the Scientific Method

* State the Purpose of your experiment - What are you trying to find out? Select a variable (something you will change/vary) that will help you find your answer.

* State your Hypothesis - your guess about what the answer will be. After having thoroughly researched a topic, you should have some prediction about what you think will happen in your experiment.

4. Run A Controlled Experiment and Record Data

Now that you have come up with a hypothesis, you need to develop a procedure for testing whether it is true or false. This involves changing one variable and measuring the impact that this change has on other variables. When you are conducting your experiment, you need to make sure that you are only measuring the impact of a single change. Scientists run experiments more than once to verify that results are consistent. Each time that you perform your experiment is called a run or a trial. Keep notes in one place. Write down everything you can think of - you might need it later.

5. Graphs and Charts

What happened? Answer that question then put the results in graphs and charts.

6. Results

Analyze Your Results: At this stage, you want to be organizing and analyzing the data that you have collected during the course of your experiment in order to summarize what your experiment has shown you.

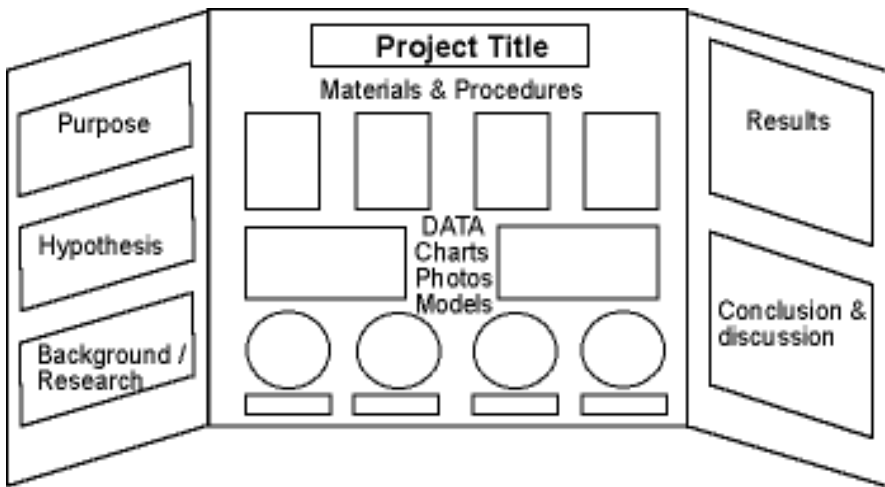
7. Conclusion

This is your opportunity to explain the meaning of your results. Did your experiment support your hypothesis? It is okay if your hypothesis was wrong. Does additional research need to be conducted? How did your experiment address your initial question and purpose?

8. Construct an Exhibit or Display

Your Display Board is the first impression of your science fair project. It is a display that tells the comprehensive but concise story about the project and all your efforts. So keep it simple, very neat and well organized. Make it fun, but be sure people can understand what you did. Show that you used the Scientific Method.

Choose a catchy, attention-grabbing title that accurately summarizes your research. The title should be big and easily read from across the room. The following is a sample board that clearly and neatly shows **all 7 steps** of the scientific method: (each step is discussed in further detail on the next page)



Organize your information like a newspaper so that your audience can quickly follow the thread of your experiment by reading from top to bottom, then left to right. **Include each of the 7 steps above of your project on your board.**

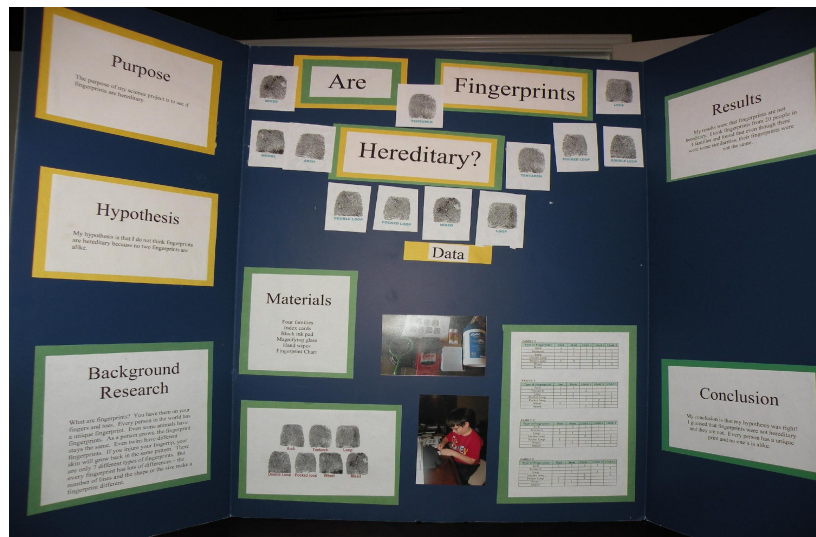
9. Write a Short Report

Tell the story of your project - tell what you did and exactly how you did it so that others can share in your discoveries. Include a page that shows where you gathered background information and a title page for the cover. This report must be typed. This is for participants ages 8 and up.

10. Practice Your Presentation to the Judges

Practice explaining your project to someone (parent, friend, grandparent, etc.) This will help you be calm on Science Fair Day. The judges are very nice and will be interested in what you did and what you learned. You will not have to present your project in front of a group of people, but you will have 2 judges come around and talk to you. You might be asked questions about the scientific method, why you chose your project, and you will be judged on your enthusiasm and knowledge of your project. Make sure you make eye contact and can explain your project without reading directly off the board.

Science Fair Project Example



Are Fingerprints Hereditary?

Purpose

The purpose of my science project is to see if fingerprints are hereditary.

Hypothesis

My hypothesis is that I do not think fingerprints are hereditary because no two fingerprints are alike.

Background Research

What are fingerprints? You have them on you fingers and toes. Every person in the world has a unique fingerprint. Even some animals have fingerprints. As a person grows, the fingerprint stays the same. Even twins have different fingerprints. If you injure your fingertip, your skin will grow back in the same pattern. There are only 7 different types of fingerprints. But every fingerprint has lots of differences – the number of lines and the shape or the size make a fingerprint different.

Materials

Four families
Index cards
Black ink pad
Magnifying glass
Hand wipes
Fingerprint chart

Data

(Here we put pictures of the process of the experiment, the materials used, the chart with findings of the experiment, and pictures of the different types of fingerprints)

Results

My results were that fingerprints are not hereditary. I took fingerprints from 220 people in 4 families and found that even though there were some similarities, their fingerprints were not the same.

Conclusion

My conclusion is that my hypothesis was right! I guessed that fingerprints were not hereditary and they are not. Every person has a unique print and no one's alike.

Hints from Judges (especially for Competitive Fair)

- When addressing the judges, speak clearly. Don't talk too fast.
- Make eye contact.
- Keep good posture when speaking. Don't slouch.
- Practice speaking in front of people.
- It's OK to write a script for your presentation, but don't merely reel off a memorized speech. With sufficient practice, your "speech," should sound like conversation, not canned.
- Do not clutter your presentation with long words and lists of numbers. It is OK to generalize, unless you are asked for specific data to support your claims.
- Get plenty of rest for the Fair!
- Do not be ashamed or hesitate to utter the words "I don't know." The more you work on a project, the more you realize that you don't know.
- Do not falsify or hide information. Be truthful at all times.
- Be excited and energetic about your work!
- Cite all of the help you received. Give credit where credit is due.
- Rehearse your presentation beforehand.
- Check your time. You should be able to completely explain your project in less than 10 minutes.
- Keep your display board simple, clear, and free of unnecessary clutter. A neat and tidy board is better than a fancy or expensive model.
- Avoid name-dropping, bragging, or embellishments.
- Allow plenty of time in your presentation for judges to ask questions.
- Have fun showing off your work to others!