

Napa County Science Fair

Ideas for Science Fair Projects

Websites that can help you find a project:

www.school.discoveryeducation.com/sciencefaircentral/

www.sciencebuddies.org

www.all-science-fair-projects.com

www.scienceproject.com

Make a list of several ideas before you check your final project. You can use the scientific process, or design an engineering project.

- Do white candles burn at a different rate than colored candles?
- Does the shape of an ice cube affect how quickly it melts?
- Do the same types of mold grow on all types of bread?
- Do plants need water to grow?

The Scientific Process

The Hypothesis: This is your question and “educated guess” about what will happen. If you buy a plant and do not water it, it will die and turn brown. Your hypothesis is – Do plants need water to grow and stay alive.

Experimental Design: Plan your experiment so you can test your hypothesis.

Materials: Make a list of your supplies. 2 tomato plants, measuring cup, ruler, water.

Procedure: A step-by-step description of what you did to perform your experiment. For example, on every Monday, Thursday, and Saturday I added $\frac{1}{4}$ cup of water to my wet plant and none to the dry plant. I measured their height, counted the leaves, and took pictures of each plant. I enter the data in my journal.

Results: The results are a written statement that says what happens during and at the end of your experiment. The plant I watered grew, each time I while the dry plant lost its leaves, turned brown and did not grow.

Conclusions: This is where you answer your research question. You make a statement of whether your data supported your hypothesis or not. You may have data that supported your hypothesis or you may have data that did not support your hypothesis.

The Engineering Process

An Engineer takes what the Scientist discovers and turns it into something that can be used by people to help make our lives easier! Many Engineers follow these steps when they are designing a new invention:

1. Define a Need

- Look for ways that things are done!
- Then develop an idea on how to do it better.

2. Do Background Research

- Find out what others have already learned about your idea.
- Gather information that will help you design your invention.
- Write down where you get your ideas and build on those ideas!

3. Establish Design Criteria

- List design requirements.
- Target cost of product.
- What is the size and form?
- What are the functions and features?
- Make decisions about how to manufacture the product.

4. Prepare Preliminary Designs

- Good engineers look at a variety of different possible designs.

5. Build and Test a Prototype

- A prototype is an initial working model of your idea.
- Often it is impossible to meet all your design criteria and you need to
- compromise on choices of materials and features.

6. Redesign & Retest as Necessary

- Almost every prototype has unexpected flaws.
- Engineers redesign their products to "get the bugs out" and improve the
- idea!

7. Present Results

- Share your excitement for your design with other people.
- Learn from others so you can do better with your next idea and the one after that... and after that...and after that!

How to Prepare a Winning Presentation

Prepare a **POSTER** to tell your audience the question you asked, the method you used, the results you got and the conclusions you made.

Draw charts, diagrams or illustrations to explain your question, methods and results. A neat and organized poster will show your work better than a sloppy, disorganized one.

Standardized poster boards can be purchased, or you can make your own. Your entire display should not exceed three feet in width.

Your **DATA**, or your **PROCESS**, is an important part of your presentation.

Display it with or as part of your poster.

DEMONSTRATION MATERIALS placed in front of your poster. For example, you could bring the plant that you watered and the dead plant that received no water.

Be prepared to talk about your project. A judge will come by and spend about 10 minutes looking at your project and asking questions.

Napa County Science Fair Scientific Process Score Sheet

1. Asking the question: Is the investigation guided by a question that can be tested and measured?

Score	Criteria
1	Poor statement of question.
2	Unorganized statement of question.
3	Shows insight and thought in the selected question.
4	Original, unique project that addresses a serious question.

2. Hypothesis: Does the student make a claim or hypothesis?

Score	Criteria
1	No hypothesis/claim has been stated.
2	Unclear hypothesized relationship between the variables and predicted results has been stated.
3	Clear hypothesized relationship between the variables and predicted results has been stated.
4	Exemplary hypothesized relationship between the variables and predicted results has been stated.

3. Planning and Carrying out the Investigation: Are the variables identified and a clear, replicable procedure presented?

Score	Criteria
1	No identification of variables and/or incomplete/confusing procedure.
2	Most variables described and/or procedure is somewhat incomplete/confusing.
3	Variables described clearly and procedure is complete and replicable.
4	Variables described clearly, details about control and experimental groups, Procedure is listed in clear, replicable steps.

4. Data Presentation and Analysis: Is there a clear visual representation of data/observations and analysis of data/observations?

Score	Criteria
1	Little or no evidence of data collection and analysis.
2	Unclear/confusing evidence of data collection and analysis.
3	Sufficient evidence of data collection and analysis.
4	Exemplary evidence of data collection and analysis.

5. Appearance/Organization and Presentation: Is the presentation clear, clean, and comprehensive?

Score	Criteria
1	Sloppy presentation. Unclear purpose, procedure and results.
2	Presentation may be disorganized leading to confusion about purpose, procedure and results.
3	Presentation is organized and contains all elements.
4	Exemplary presentation that highlights important elements of presentation.

6. Constructing Explanations: Does the student connect findings to hypothesis and reflect on learning?

Score	Criteria
1	No conclusion, connection to hypothesis, and/or reflection.
2	Limited conclusion, connection to hypothesis, and/or reflection.
3	Adequate conclusion including connection to hypothesis and reflection.
4	Exemplary conclusion including connection to hypothesis, possible sources of error and reflection.

Total Score _____

Napa County Science Fair Engineering Process Score Sheet

1. Defining the problem: Does the project define a problem that needs to be solved?

Score	Criteria
1	Problem/need not identified.
2	Unoriginal problem/need.
3	Sufficiently addresses a real problem or need.
4	The identified problem/need is original or creative.

2. Experimental Design Process: Does the design process show evidence of brainstorm, prototypes and making improvements/refinements?

Score	Criteria
1	No evidence of brainstorm, prototypes, and improvements.
2	Some evidence of brainstorm, prototypes, and improvements.
3	Sufficient evidence of brainstorm, prototypes, and improvements.
4	Exemplary evidence of brainstorm, prototypes, and improvements.

3. Engineering plan: Does the plan include ways to collect data, test proposed designs, and analyze collected data?

Score	Criteria
1	No evidence in the plan of ways to collect data, test proposed designs, and analyze collected data.
2	Some evidence in the plan of ways to collect data, test proposed designs, and analyze collected data.
3	Sufficient evidence in the plan of ways to collect data, test proposed designs, and analyze collected data.
4	Exemplary evidence in the plan of ways to collect data, test proposed designs, and analyze collected data.

4. Appearance/Organization and Presentation: Is the presentation clear, clean, and comprehensive?

Score	Criteria
1	Sloppy presentation. Unclear purpose, procedure and results.
2	Presentation may be disorganized leading to confusion about purpose, procedure and results.
3	Presentation is organized and contains all elements.
4	Exemplary presentation that highlights important elements of presentation.

5. Data Presentation and Analysis: Is there a clear visual representation of data/observations and analysis of data/observations?

Score	Criteria
1	Little or no evidence of data collection and analysis.
2	Unclear/confusing evidence of data collection and analysis.
3	Sufficient evidence of data collection and analysis.
4	Exemplary evidence of data collection and analysis.

6. Solution/Design: How well does the project/invention meet the need for which it was created?

Score	Criteria
1	No evidence that the solution best utilizes resources to meet the need.
2	Unclear/confusing evidence that the solution best utilizes resources to meet the need.
3	Sufficient evidence that the solution best utilizes resources to meet the need.
4	Exemplary evidence that the solution best utilizes resources to meet the need.

Total Score _____

How Parents Can Best Participate

Hypothesis DO Ask how the hypothesis relates to the project. DON'T Write the hypothesis yourself.

Experimental Design and Materials DO Assist in finding materials. DON'T Do the experiment yourself.

Results DO Ask how your child will record the data in tables and graphs. DON'T Create the tables and graphs yourself.

Conclusion DO Remind the student that this is where they answer their research question and that they make a statement of whether their results supported their hypothesis or not. DON'T Draw the conclusion yourself.

Presentation DO Assist in finding materials. DON'T write any of the text on the display board yourself.

Most of all ... HAVE FUN!

Napa County Science Fair Committee

<https://www.napacoe.org/programs-students/science-fair/>

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