



2019-2020 Science Fair Instruction Packet

What is the Science Fair?

The Science fair is an opportunity for students to apply the Scientific Method to conduct independent research. It allows students to show their passion and curiosity in the form of research and experimentation. Questions are answered through the Scientific Method.

Students also can choose to participate in the Engineering Project of the Science Fair. This allows students to solve problems by creating a prototype. **See your teacher for an alternative packet if you wish to participate in the Engineering Project.**

IMPORTANT NOTE: It is important if choosing an experiment that includes human or animal test subjects to get approval from your teacher prior to proceeding. This requires additional permissions and documentations.

The Requirements

The Science Fair has three parts, all of which are required and must be turned in to compete.

- A. Backboard
- B. Science Journal
- B. Research Report

Things to Remember

While parent support is welcome, students are encouraged to be deeply involved in the process of developing and conducting their research and experiment. It is important to only have one variable that changes, and all other conditions during the experiment should remain the same. There should be at least three trials conducted for the results of the experiment to be valid. In the Engineering component, students may have to conduct several trials to solve the problem they wish to solve.

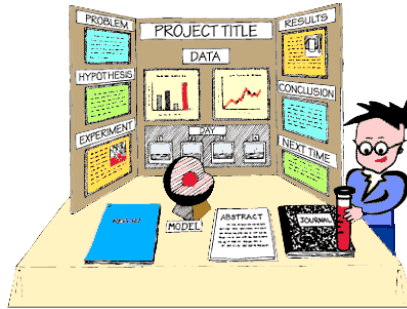
Doing Projects With A Team From Different Grade Levels

1. Only one backboard is required.
2. Each student should have a separate Research Report folder. The written 1-3 page research page, included in the Research Report, should be different. Each paper should be relevant to the grade level of that student. Bibliographies and table of contents also might be different. The other materials, including what is presented on the backboard, title page, and acknowledgement page can be duplicated in both reports.
3. IN A CROSS GRADE-LEVEL SCIENCE PROJECT, THE PROJECT WILL BE JUDGED AT THE HIGHER-GRADE LEVEL.

Doing Projects With A Team From The Same Grade Level

1. It is recommended that the team be no more than 3 members.
2. Only one backboard is required.
3. Only one journal is required, however, students may want to keep separate journals, so they may personalize their notes, observations, research, and questions.
4. Only one research report is required, including 1-3 page research paper and copies of items on the board. Also include a table of contents, bibliography, title page and acknowledgement page.

Procedures and Instructions for Experiments and Presentation for Science Fair



A. THE BACKBOARD

All Materials On Backboard Should Be Duplicated And Placed In Research Report

The backboard is a visual summary of the process you followed to create your hypothesis, materials and procedures used during the experiment, and the conclusions that were discovered. Make sure to write your name, school, grade, and teacher's name on the back of the backboard.

- ❖ The **left side** of the backboard should include the following information: (*Note: If there is not enough room on the left side of the board, this information can be included on the right side.*)
 1. **Problem/Question**---Identify the problem, in question form, and purpose of the investigation.
 2. **Hypothesis**---Develop the hypothesis from the problem and phrase it "If I use/do_____, then _____will happen because _____."
 3. **Materials**---List items used in the experiment in detail so that it can be repeated several times. Include size, quantity, type.
 4. **Procedure**---List detailed and specific steps that you followed when conducting the experiment. This is important as you must repeat the process at least three times with just one change. (Example: Say, "Put 10 ml of water into the plastic cup." Don't just say put water in the cup.)
- ❖ The **right side** of the backboard should include the following information:
 1. **Procedure**---If not already on the left side
 2. **Results/Data Analysis**---Include a paragraph summary of the data you collected.

For example: In trial 1, Albertsons' popcorn had 243 popped kernels and Orville Reddenbacher popcorn had 250 popped kernels. In trial 2, ... The average number of popped kernels for Albertsons was... The average number of popped kernels for Orville Reddenbacher's was...

(Note: Use only technical data to explain the graph or chart that will be included in the center of the board. There should not be any opinions or reflections about the information.)

3. **Conclusion**---Show your interpretation of the information. The conclusion must directly relate back to the hypothesis. It tells what happened in the experiment and whether your hypothesis was proven or disproven and why.

For example: In conclusion, the data showed my hypothesis was... This is because...I found out that... Good conclusions include a justification for the experiment (My family eats a lot of popcorn, so I wanted to find out which was the better value.) Conclusions also include extension (Next year, I would do the same experiment, but I would include movie theater popcorn in the results because...) It is recommended that an analysis of experimental flaws/changes also be included (something you did incorrectly) Say, "Next time I would change...because..."

- ❖ The **center** of the backboard should include the following:
 1. A **Title**---A clever phrase or description of your project (Can be the problem restated?)
 2. A **Graph(s)**---A graphical representation of your data, including all trials (*Note: measurements must be in metric*)
 3. **Pictures**---Photos of the experiment being performed. They must be labeled so the viewers know what is going on in the photos.
(**IMPORTANT NOTE:** Only hands and arms should be included in the photos. No faces.)
 4. **Drawings if photos are not available**---Drawings may be used if photos are unavailable. The drawings should depict what happened during the experiment. Some flat samples of materials may be included (such as wool socks or cotton balls if applicable).

IMPORTANT NOTE: DO NOT ATTACH OR BRING IN YOUR PHYSICAL EXPERIMENT. THE SCHOOL AND/OR DISTRICT DO NOT WANT BREAD MOLD, GLASS JARS, PLANTS, MODELS, ETC... BROUGHT TO CLASS OR TO THE SCIENCE FAIR.

Presentation is Important!

The project will be judged by the way it looks. If possible, type up the information you place on your backboard, or at the very least, print neatly using a dark-colored pen. Use larger print fonts on the computer to make it easier to read (no less than 12 pt. type). Use a multitude of other materials to enhance the look of the board (colored paper/construction paper, borders, markers, etc...)

B. THE SCIENCE JOURNAL

(PLACED IN A FOLDER/WRITTEN IN A COMPOSITION BOOK)

The science journal should include the data you collected while conducting the experiment. It should include dates and times you performed each of the steps in your experiment. **All measurements should be recorded in metric form (millimeters, centimeters, liters etc.)**

The journal should include any resources you used for the experiment and research so that you may include them in the bibliography. (see a sample bibliography on pg. 7) Below are sample journal entries.

1/20/16	4:20 p.m.	I measured the height of each plant and found that Plant A was 15cm tall, Plant B was 10cm tall and Plant C was 18cm tall.
1/22/16	4:10 p.m.	I measured the height of each plant for the second time and found that the heights remained unchanged from the previous measurement on 1/20/16.
1/22/16	7:30 p.m.	I researched plants on the Internet to see what they needed to grow. I found... (www.plantlife.com)
1/23/16	3:50 p.m.	I measured the height of each plant for the third time. Plant A was..., Plant B was..., and Plant C was...

Note: You may include brief summaries of research that you found over the course of the experiment. This journal should only report your research activities (**do not** include going to the store to buy the things for your experiment; things you did to create your backboard).

The journal should not be typed. It should be a rough draft of notes and observations taken each day you work on the experiment or research. It should show work done over time and should begin with the selection of the topic. Minor spelling errors are okay.

C. THE RESEARCH REPORT

(Please see pg. 2 for requirements on team projects)

The research report is a collection of materials that will be presented on the backboard and additional research about the topic. It will show how students followed the Scientific Method to test their hypotheses.

The report should include the following items, in this order:

- 1. Title Page**---List the title of the project, your name, grade level, due date (see teacher for due date), and teacher's name.
- 2. Abstract**---Provide a brief summary (100 words) about the experiment, your conclusion and the importance of the work.
- 3. Acknowledgement Page**---Give recognition to those who helped with the project.
Example: I would like to thank my parents..., the Orville Reddenbacher popcorn company for sending me information and samples, Mrs. Bailey the Librarian for..., etc...)

4. Table of Contents---List the items in the report and include page numbers to find them.

5. Duplicate copies of everything on the backboard---Problem, hypothesis, materials, procedure, graph(s), data analysis, and conclusion.

6. Research Paper---This page represents research conducted by the student(s) about the Science Project topic. The research is designed to help students better become experts at explaining why their hypotheses are true or false. Research should be from valid sources. Students should compare multiple texts to validate accuracy of information. *(See CCSS ELA RI.4.8 and RI 4.9;*

RI 5.8 and RI 5.9; and RI 6.7 and 6.8)

It should be 1-3 pages. The information should be in the students' own words. Here are some examples of how the Science Topic is connected to the research conducted.

Science Fair Topic	Research
What is the best light source for plants to grow?	Research what plants need to grow; the photosynthesis process.
What materials are best to keep people cool?	Research heat absorption or reflection of different colors and fabrics.
What fruit makes the best conductor of electricity?	Research how the fruit's structure helps it be a conductor. How electricity travels through different substances.
Does salt water heat up quicker than non-salt water?	Research solutions and the properties of solutions; how salt affects temperature.

Students may conduct research through: Internet, books, interviews, etc... The research should be related to your experiment topic as illustrated above.

(Note: Do Not place articles and print outs from Internet Web pages in your research. Students need to read those items and synthesize the information into their own words.)

7. Glossary---List at least five words related to the experiment and include their definitions. The words should be of appropriate difficulty, and the student should understand the meanings. Words like plant, soil, and water are not words with appropriate difficulty. Please do not copy the dictionary definition exactly.

(Good Example) Photosynthesis: The process by which plants manufacture food and oxygen using water, light and chlorophyll.

(Bad Example) Photosynthesis: A synthesis of chemical compounds with the aid of radiant energy and light where chlorophyll containing tissues produce carbohydrates when exposed to light.

8. Bibliography---Create a list of sources you used to collect the research. Include a minimum of three sources. See next page for bibliographic examples.

Bibliography Sample Entrees

Encyclopedia (print)

Author (last name, first name). "Name of article." Name of Encyclopedia.
City: Publisher, Copyright Date.

Example:

"Bats."

World Book Encyclopedia. Chicago: World Book, Inc. 2005.

Books

Last Name, First Name. Name of the book. City of publication: Publisher's name, Copyright Date.

Example:

O'Henry, John. Space. New York: Scholastic, 2001.

On-Line Magazine Article

Author. "Title." Journal Date. Date you visit the URL, URL address

Example:

Halls, Kelly, "Juggling History." U.S. Kids June 1997 March 2000.

<http://discover.sirs.com/cgi-bin/dis-article-display?>

Magazine Article

Author. "Title of article." Name of magazine, date, pages.

Example:

Markham, Lois. "A Gallery of Great Native Americans." National Geographic for Kids, August 2001:6-7.

World Wide Web

Author (if available). "Title" Date created. Source. Date you saw it. URL

Example:

"The Victorian Web. Ed. George Landow." June 2000. Brown University. 25 Feb. 2004

<http://landow.stg.brown.edu/victorian/victov.html>.



Useful Websites:

Science Buddies

http://www.sciencebuddies.org/science-fair-projects/project_guide_index.shtml

Science Fair Central

<http://school.discoveryeducation.com/sciencefaircentral/Getting-Started.html>

All Science Fair Projects

<http://www.all-science-fair-projects.com/category0.html>

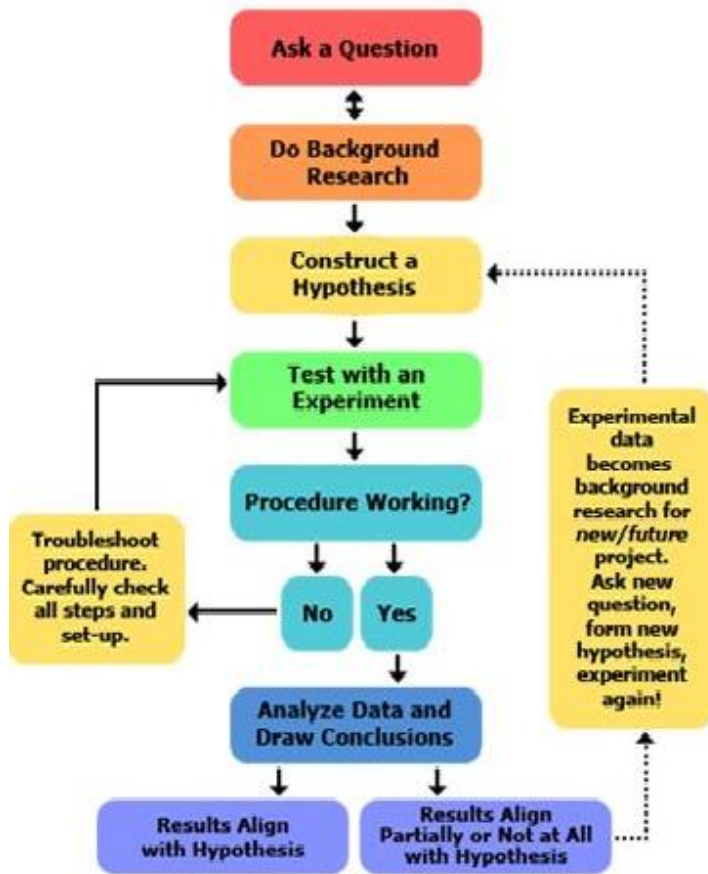
1000 Science Fair Projects

<http://www.1000sciencefairprojects.com/Kids-Science/Kids-Science-Fair.php>

RIMS Inland Science and Engineering Fair: Regulations and Information Packet

<http://www.rcoe.us/student-events/files/2014/06/2015-2016-SF-guidelines.pdf>

Scientific Method



Engineering Method

