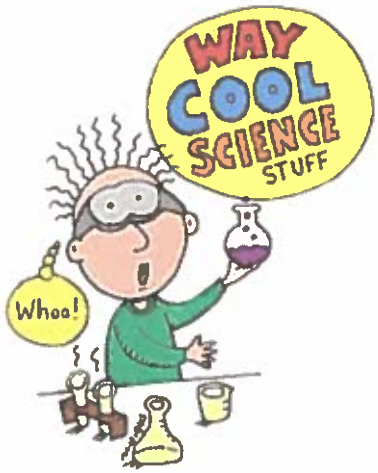
Science Fair Packet

Contents Include:

* The mandatory Science Fair rules
* Steps to the Scientific Method
* Tips for creating a display board
* Tips for talking to the judges
* The judging Rubric

Things to Remember:

- All projects should begin with a question
- All projects should follow the Scientific Method
  * Please contact your child's teacher if you would like for them to send additional supplemental materials home regarding the Scientific Method
  * Model volcanoes and solar systems are **NOT** permitted
- Commercial kits are NOT permitted
- There is a size limitation to the display
  (see NAFCS Mandatory Science Fair Rules for details)



NAFCS Mandatory Science Fair Rules

1. An individual project may be entered for grades K-4. One entry per student may be submitted.
2. Parents may help at grades K-2. Parents may suggest ideas and give guidance at grades 3-4, but may NOT put the project together.
3. A registration form may be required by the building. Teachers may elect to approve projects before students begin.
4. Students should be able to explain their projects if asked by a judge/teacher.
5. A simple bibliography should be present if references were used.
6. Exhibit size is limited to 30 inches front to back and 48 inches side to side. Floor space can be made available upon request.
7. Construction must be durable; moving parts must be firmly attached and safe.
8. Exhibitor's name shall NOT appear anywhere on the display or report. All exhibits will be identified by a number.
9. Any method of display is acceptable. For instance: machines, experiments, collections, clay models, paper-maché models, pictures, cut-aways, cross sections, posters, dioramas, panoramic models of any type, soil displays, and charts.
10. A $15.00 maximum for supplies is suggested. A list of expenses should be included with the exhibit.
11. COMMERICAL KITS ARE PROHIBITED.
12. No experiment with live animals except observations of animals in their natural environment.
13. Human body parts cannot be displayed. Exceptions are teeth (in a closed container), hair, and nails.
14. Controlled substances cannot be displayed. This includes tobacco and over the counter medications.
15. No food sampling or tasting for surveys in the classroom.
16. No open flames are permitted.
17. No electrical projects. Battery only.
18. No dangerous chemicals, open flames, or explosives.
19. Expensive or fragile items are NOT to be displayed. Valuable items essential to the project should be simulated or photographed. Neither the staff nor the buildings will be responsible for lost or damaged equipment or displays.
20. Collections should be protected or covered in some way.
21. Carefully pack all materials when transporting to and from the fair. Students/families should check with their bus drivers as to what is allowed on the bus.
22. At the end of the science fair, all students must pick up their exhibits and remove them from the area by the time designated by the building. Projects to be displayed at the county-wide exhibit need to be identified and protected.

NAFCS Suggested Science Fair Guidelines

SCIENCE FAIR CATEGORIES: There are not definite lines to be drawn between topics for kindergarten through fourth grade. It depends more on the depth of the project rather than the topic.

GRADES K-2

1. Collections: Rocks, leaves, insects, molds, animal tracks, shells, wildlife pictures, bark rubbings, types of soils, etc.
2. Demonstrations of science principles or natural phenomena: Growing crystals, shape of magnetic fields, metamorphosis of insects, parts of a flower, objects heavier than water floating, phototropism, mechanical advantage of a lever, properties of matter, open and closed circuits, how sounds are produced, model of the solar system, sea floor model, earth's surface features, how seeds travel, proving air has weight, etc.

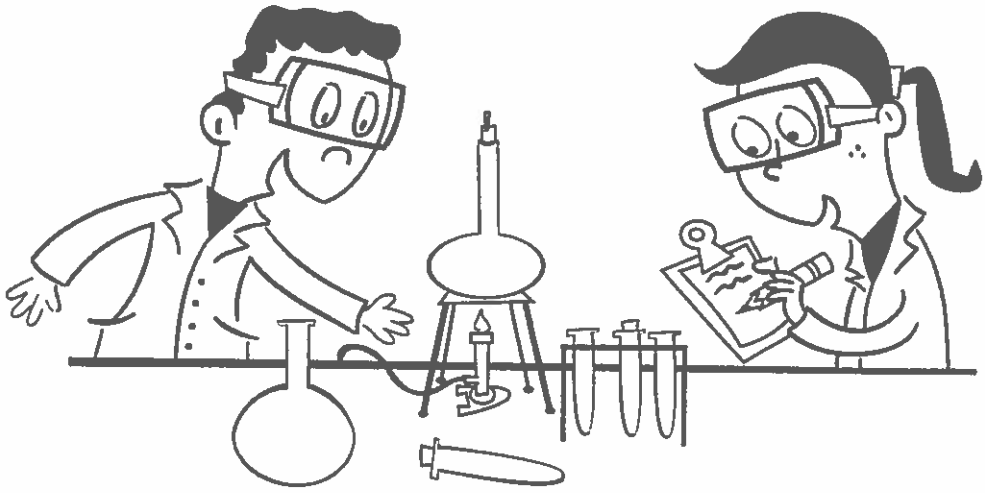
GRADES 3-4

1. Collections that require basic identification of the item.
2. Models of natural phenomena: Water cycle, food chain, rock cycle, solar system, etc. Perhaps an accompanying report should be included.
3. Models of science principles: How optical equipment works, hydroelectric power, series and parallel circuits, how a geyser works, a balanced ecosystem, nuclear power plants, steam engine/turbine, etc.
4. Demonstrations of science principles. Factors that effect: plant growth, duration of flight of a paper airplane, the strength of an electromagnet, etc. Defining density, surface tension, osmosis, echoes, etc.

Steps to the Scientific Method

Name: _____ **Date:** _____

Your teacher has just announced that there's going to be a science fair this year, and that your project needs to follow the scientific method—the step-by-step process that scientists follow when they perform an experiment. Where should you begin? Step One: Don't panic! Step Two: Check out the cheat sheet below. It outlines the scientific method.



1. **Make an observation. Then, propose a research question based on your observation.**
   A good science-fair project question is testable and measurable. For example: *Which brand of bubble gum keeps its flavor longest?* You can test this by chewing different brands of gum and measuring how long the flavor lasts for each brand. The best questions are usually ones that you have a genuine interest in answering.

2. **Identify the variables.**
   A science-fair project involves *variables,* or things that change or could be changed. There are two types of variables: independent and dependent variables. An *independent variable* is one that you change on purpose. For instance, if you were experimenting to find out which brand of gum keeps its flavor longest, you may choose to test three different brands of bubble gum. The *dependent variable,* or the factor that responds to a change in the independent variable, would be the amount of time that the flavor lasts.

   You'll also want to identify your *constants,* or things that will stay unchanged. For instance, you might test only bubble gum that is sugar free. And to make sure that the amount of gum you test is equal each time, you might choose to test only sticks of gum—not gumballs.

3. **Research your topic to learn more about it.**
   Research comes in many forms. You can research a topic by going to the library, performing Internet research, interviewing a scientist, or even speaking with experts at museums, zoos, hospitals, and so on. For our example, you might interview a spokesperson or scientist from a bubble-gum company.

4. **Develop a hypothesis, or a possible answer to your question.**
   Your *hypothesis* should be based on your research. It is important to remember that it is okay if your hypothesis turns out to be wrong. You can learn a lot from any hypothesis—whether it is right or wrong. Your science-fair project will help you test your hypothesis.

5. **Design an experiment that will help you answer your research question.**
   Come up with an experiment *procedure.* This list of steps should be detailed enough so that anyone could read it and repeat the experiment exactly as you performed it.

   You will want to run several trials. That means that you'll want to repeat your experiment several times. The more times you repeat the experiment, the more reliable your results will be.

   Record your experiment results in a journal. The more notes you take, the easier it will be to type up your report (more on that later). Also, take photos to document your work as you go.

6. **Draw conclusions from your results and type up a report that explains your project, results, and conclusions.**
   The report should be typed and include neat and colorful charts and graphs.

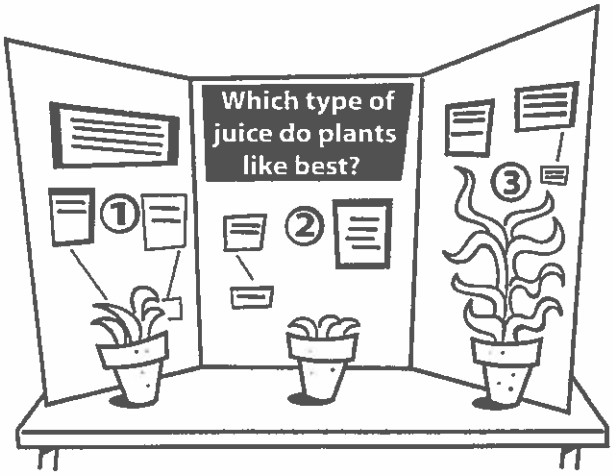
10 Tips to Creating a Winning Display

Name: _____ **Date:** _____

Your project display is the first thing that people will see when they stop by your booth at the science fair—so you'll want it to look fabulous!

What is a display? A science-fair display is made up of a sturdy backboard that shows off the key points of your project. Your display should include the following: project title, your question, hypothesis, experiment (including materials and procedure), data (including tables, graphs, charts, and photos if you have some), results, conclusions, and future experiment plans. Your display should also include your science-project report and any other items that will help people understand your project, like models or equipment that you used during your experiment.

It is important that your display be neat, colorful, and organized. Below are some tips to designing an award-winning display.



1. Your backboard should be an upright board that sits on top of a table and is able to support itself. It is usually three-sided, but it does not have to be.
2. The backboard should be no larger than 108 inches (274 cm) high, including the exhibit table, 30 inches (76 cm) deep, and 48 inches (122 cm) wide.
3. You can either buy a pre-made backboard or build your own from heavy cardboard or pieces of wood, attached by hinges. Steer clear of thin poster board or cardboard because they bend too easily. A company called Showboard sells pre-made backboards (www.showboard.com or 1-800-323-9189).
4. Use computer graphics or self-stick letters to create headings for each part of your display. Make sure your lettering is easy to read.

10 Tips to Creating a Winning Display

(continued)

Name: _____ **Date:** _____

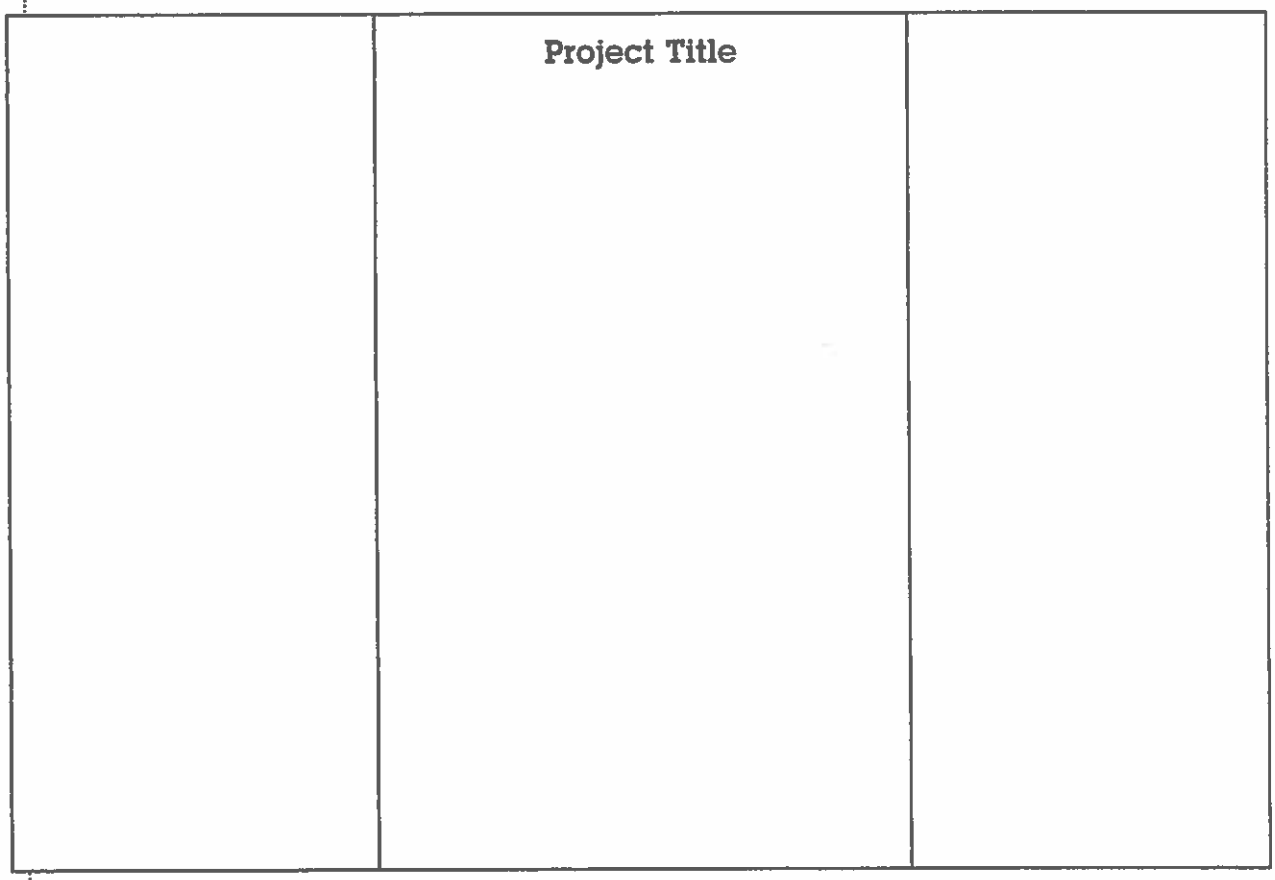
5. Type the following parts of your display. Use spell check before you print out the pages. Also, remember that you have limited space on your backboard, so plan ahead.
   - **Project title:** Your project title should be large enough to be read from a distance of roughly 3 feet (1 meter). Use larger letters for your title than for anything else on your board. This will help it to stand out.
   - **Your question**
   - **Your hypothesis**
   - **Experiment** (including materials and procedure): Summarize your experiment so that it fits on one or two sheets of paper.
   - **Data** (including tables, graphs, charts, and possibly even photos): If possible, use a color printer to create colorful graphs and tables.
   - **Results:** Summarize your results so that they fit on one sheet of paper.
   - **Conclusions:** Your conclusions should be a summary of what you learned. You should try to do this in a paragraph or two. Also, say whether or not your hypothesis is correct.
   - **Future experiment plans:** As you experimented, you probably thought up new questions, or even how you might do the experiment differently if you were to do it again. Share those ideas in this section.
6. Use colors on your display, but don't get too flashy or the colors could be distracting.
7. Before you stick anything to your backboard, lay the letters and pages onto the board. Space things out evenly and neatly. Rearrange things until it looks just right!
8. Use rubber cement or double-sided tape to post your papers. Avoid using white school glue because it can cause paper to wrinkle.
9. Don't forget to gather any models or other props that you'll want to display on the day of the science fair.
10. Don't forget that your project report and project summary are part of your display! When you set up your display at the science fair, remember to place them on the table in front of your backboard.

Plan Your Display

Name: _____ **Date:** _____

Use a pencil and this blank backboard panel to sketch out how you plan to arrange your display. Erase and sketch again until you are happy with the way your display looks!

Keep in mind that your display should include all of the following: project title, your question, hypothesis, experiment (including materials and procedure), data (including tables, graphs, charts, and photos if you have some), results, conclusions, and future experiment plans. Usually, your project title should be centered at the top of the middle panel.



Checklist for a Good Display: Do You Have What It Takes?

Name: _____ **Date:** _____

Does your display have what it takes to wow the judges? Below is a checklist of what judges are looking for when they stop by to check out your display. Before you attach anything to your backboard, make sure you have checked everything off this list!

- ❑ Does your backboard meet the size requirements?
  (no larger than 108 inches (274 cm) high, including the exhibit table, 30 inches (76 cm) deep, and 48 inches (122 cm) wide)
- ❑ Can your backboard stand up all on its own?
- ❑ Does your display include all of the following?
  - ___ Project title
  - ___ Your question
  - ___ Hypothesis
  - ___ Experiment (including materials and procedure)
  - ___ Data (including tables, graphs, charts, and possibly even photos)
  - ___ Results
  - ___ Conclusions
  - ___ Future experiment plans
- ❑ Is your display arranged in a way that is easy to follow and understand?
- ❑ Are your project title and other headings large enough to be read from a distance of roughly 3 feet (1 meter)?
- ❑ Is your display typed?
- ❑ Is your display colorful, but not so flashy that it is distracting?
- ❑ Is your display neat?
- ❑ Is everything spelled properly?

STUDENT PAGE

PREPARING FOR THE INTERVIEW

Say It!

Name: _____ **Date:** _____

An exciting part of any science fair is the interview. During this question-and-answer session, a judge will ask you all about your project. It is important to practice your interviewing skills so that you can impress the judges!

Break up into pairs. With your partner, take turns acting out the roles of judge and the person being interviewed. Use the questions below as your guide.

Judge's Questions:

1. What is your project about?

_____

2. Why did you choose this project?

_____

3. How did you come up with the idea for your project?

_____

4. What was the purpose of your experiment?

_____

5. Did your experiment answer the main questions that you had before you began your project?

_____

6. What was your experiment procedure?

_____

7. How did you gather your data?

_____

8. Can you explain the data that you gathered?

_____

9. What conclusions have you drawn from your project?

_____

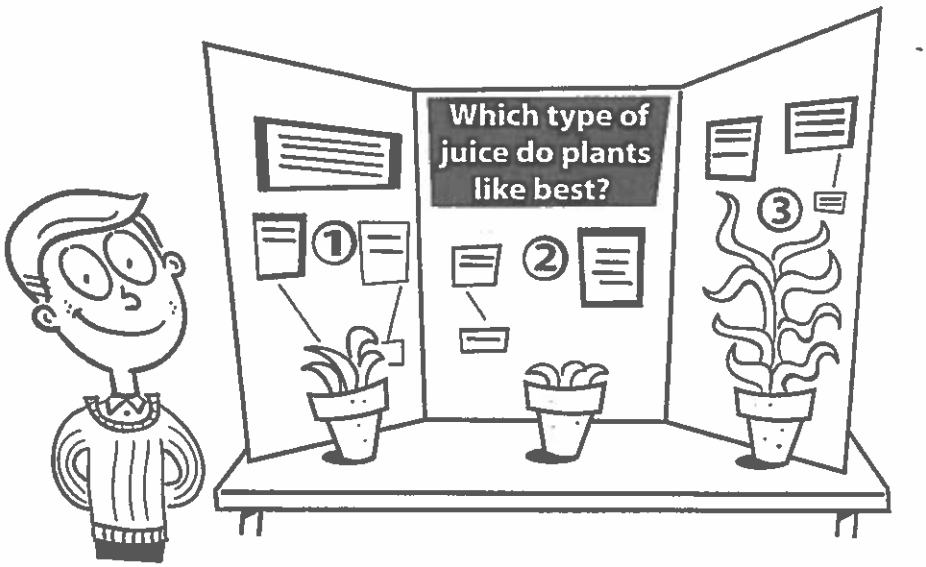
10. What new questions arose from your project? How could you extend your project to answer them?

_____

Science Fair Dos and Don'ts

Name: _____ **Date:** _____

The big day is almost here! People from outside of your school may be visiting your science fair. You will want to represent your school well. Make sure you know how to behave during the science fair.



- ☐ Do dress neatly.
- ☐ Do wait quietly until it is your turn to have your project judged.
- ☐ Do try to answer the judge's questions as best as you can.
- ☐ Don't talk or laugh loudly while you are waiting for the judges to come to your table.
- ☐ Don't play around with your display, or you might damage something before the judges even get to you.
- ☐ Don't chew gum.
- ☐ Don't be nervous. Just do your best.
- ☐ Do have fun!

Judging Rubric

Name of Project: _____

Grade: _____

Student Name(s): _____

_____

Teacher: _____

How the points work:

4 points = Excellent
3 points = Good
2 points = Acceptable
1 point = Needs Work

1. Shares understanding of the scientific method through oral presentation

points	
4	Discusses the six main parts of the scientific method: hypothesis, variables, materials, procedure, data, and conclusions.
3	Discusses four or five parts of the scientific method.
2	Discusses two or three parts of the scientific method.
1	Does not seem to understand the scientific method.

2. Shows use of the scientific method through the backboard

points	
4	Clearly and neatly labels and displays the scientific method on the backboard.
3	Displays the scientific method on the backboard.
2	Has some steps to the scientific method on the backboard.
1	Lacks steps to the scientific method on the backboard.

3. Speaks knowledgeably about the project

points	
4	Shares many details of the project with the judge.
3	Shows clear understanding of the project.
2	Knows what the project is, but gives little explanation.
1	Tries to answer questions from the judge.

4. Presents data using well-organized tables, graphs, and charts

points	
4	Tables, graphs, and charts accurately and neatly display data.
3	Tables, graphs, and charts accurately display data.
2	Some tables, graphs, and charts are included on the board.
1	Lacks tables, graphs, and charts.

5. Shows enthusiasm and interest in the project

points	
4	Shows genuine enthusiasm for and interest in the topic. Offers suggestions for further investigation.
3	Shows genuine enthusiasm for and interest in the topic.
2	Seems interested in the project.
1	Does not seem to care about the project.

Points: _____ /20

Comments: _____

_____

_____