

Wilchester Elementary

SCIENCE FAIR 2010

Information Packet

1. Science Fair 2010 Timeline
2. Requirements for Science Fair Projects
3. Reminders/Rules for Science Fair 2010
4. Science Fair Project Ideas
5. Excerpt from 4th - 5th Grade Science Textbook (This section is not posted on the website.)
6. Suggested Action Plan for Project (4th & 5th Grades only)
7. Science Fair Information Sheet (4th & 5th Grades only)
8. Sample Judging Tally Sheet (4th & 5th Grades only)

This Science Fair Information Packet is also available on the Wilchester PTA website at www.wilchesterpta.com.

Wilchester Elementary

SCIENCE FAIR 2010

Timeline

1. Tuesday, January 12 Science Fair Kick Off presentations to 4th-5th Graders during school
2. Wednesday, January 13 Parent Information Meeting at 8:15 am, in the school Library (K-3rd grade classroom volunteers and 4th & 5th grade parents will meet at the same time.)
3. Wednesday, January 20 Science Fair Information Sheet due from every 4th and 5th grade student. Give this to your homeroom teacher. (You can turn it in early, too, on Jan. 19th.)
4. Friday, February 26 Science Fair Projects are due between 7:45-8:00 A.M. in Wilchester gymnasium
5. Friday, February 26 Awards Ceremony and Mad Science Show for students and families at 6:30 P.M. in school Cafeteria.

Wilchester Elementary

SCIENCE FAIR 2010

Requirements for Science Projects

Your Science Project should be displayed on a standard **3-part folded project display board**. Every project must include the following sections, which should be clearly identified on your display board:

1. **Title** - This is the name of your project. It should appear at the top of your display board.
2. **Problem** - The problem **MUST** be stated in question form. What question are you trying to answer? A good format for the question is "What is the effect of **this** on **that**?"
Helpful Hint - Problems Question - for example: "Which type of material absorbs the largest volume of liquid: soil, gravel or sand?" Students should refrain from using the words "better or best" Do not say: "Which material: soil, gravel or sand absorbs better (or best)?"
3. **Hypothesis** - Using complete sentences, explain what you think the answer to your problem question is. It is okay for you to be wrong here. It is fun to learn something new through your science project experience. You can use a "brand name" in your Hypothesis.
Helpful Hint - The students **MUST** explain their thinking in detail - for example: "I think that the _____ will absorb the largest volume of liquid **BECAUSE** compared to the other two it _____. Please make sure your hypothesis explains your thinking in detail (why or because). This is an expectation that our teachers are discussing with their students in the classroom.
4. **Materials** - List **ALL** the materials and equipment used in your Science Project. Be specific. What did you need to *gather*? For example, 6 slices of white bread, 4 clean glass baby food jars, measuring spoons, etc. There is no need to list obvious items such as your hands or your desk.
5. **Procedure** - This is a step-by-step set of directions on how you did the experiment. Numbering each step will make it easier for everyone to understand what you did. An observer should be able to *recreate* your experiment from these directions.

Trials -- In doing your project, you should repeat the steps of your procedure at least 3 times for each manipulated variable. This way, you have at least 3 sets of information to measure and record. These repeated steps are called trials and they may be done simultaneously. For example: If a project is looking at the effects of something on three different types of plants - you would need 3 sets of three plants or a total of nine plants.

Variables -- All science projects have many variables which may be set up to test lots of different questions. In our Science Fair, you may test the effect of only **ONE** variable. You may measure as many outcomes (responding variables) as you wish. **ALL** other variables and

aspects of the project must remain the same for every trial. **In the Procedure section of your project display, classify all the variables of your project** as one of the following:

Controlled Variables – These are the parts of the experiment that you controlled by keeping them the same throughout the experiment. Examples might be the same amount of sun, type of soil used, amount of water, etc.

More Requirements..

Manipulated Variable – This is the part of the experiment that you are testing. This is the variable that you adjust on purpose in order to observe what happens. You may have only **ONE** manipulated variable.

Responding Variable(s) - This is the outcome(s) that happened as a result of the experiment. This is the part which you measure and record for your results. This could also be called a dependent variable. It is dependent on the changes you made to the Manipulated Variable. You may measure as many different responding variables as your project allows. In fact, your project will be more interesting and more conclusive if you measure more than one outcome.

One last note about variables: Another way of thinking about these variables is illustrated by the **Problem Question**:

What is the effect of [the manipulated variable] on [the responding variable] ?

6. **Observations** – Collect data by observing and measuring your **responding variables**. Use charts and tables to show your data. Not all outcomes are quantifiable. Descriptions, drawings and photographs are data too. Properly label all graphs.

Organize your data by drawing graphs or diagrams. This will help you see patterns and decide what the information from your data means. You should be able to **compare** the results each time you adjust your manipulated variable.

Your project display must include at least one graph drawn by hand showing your results. Additional graphs may be generated by hand or on a computer. Typically, on an XY graph or bar chart, the Manipulated Variable is shown on the X axis and the Responding Variable is shown on the Y axis.

Your observations of each trial should be reasonably similar. If you observe inconsistent results from your trials, double check that the controlled variables were indeed held constant. Was the weather consistent? Did one of your siblings pour juice on your project? This is why at least three trials are required! If one trial is completely wacky, don't ignore it. Include the wacky data in your report and explain why you think it's erroneous.

Don't despair if your results still don't look "right". Think of other explanations for the results. Perhaps your hypothesis was wrong! This is okay! Most importantly, be ready to learn from your project experience.

7. **Conclusion** - Using complete sentences, re-answer the problem question using what you learned from your observations. Remember, you are **comparing** all your results. This is a very important part of the science fair display because it shows that you learned something from your experience. A thorough conclusion will be at least one paragraph.
- Be **specific**. For example, "The plants which were fed plant food grew an average of 3 inches taller in the two-week period than the plants which did not receive plant food." Or, "The plants which were fed plant food grew an average of 4 more leaves in the two-week period than the plants which were not fed." These sentences are more informative than, "The plants which were fed plant food grew more."
 - Include whether your **hypothesis** was correct. If you learned something new or unexpected, this will be different than your hypothesis.
 - Try to explain **why** the results occurred. If you encountered problems during your work, you may discuss what impact these issues may have had on your results. Scientists are always learning from unexpected results. For example if you were testing plant food, you may discover that one of the controlled variables could have been set differently. You could write: "None of the plants grew as much as I expected. I think I should have watered all of them more."
 - Try to think of other uses for your experiment. "Farmers should use plant food to help their crops grow better."
 - Make note of where/how you got your project idea. If you chose an idea you've seen before, simply state that you saw it before and were interested in it. Include the title and author of any book used. If the project was an original idea of your own, explain why you became interested in it.

Reminders/Rules for

SCIENCE FAIR 2010

General Reminders/Rules:

1. The objective of your Science Fair project is to answer a question by **comparing** the results of an experiment. This is not to be confused with a scientific **demonstration**.
2. **Websites** can be good sources for ideas, but make sure the project fits our format. Don't forget to **credit** the source of your project idea. The public library is another good resource.
3. **No Guns** used in your experiment - no BB guns, water guns, Nerf guns, marshmallow guns
4. **No animals or insects** can be involved in your project. No *dead* animals either. (This includes your pets, ants, bugs, etc.) You can use animal products available at the grocery store like chicken eggs or bones, cooking ingredients, etc.
5. **No experiments on siblings, please.**
6. **No deliberate growing of bacteria in petri dishes, as harmful bacteria could potentially be grown.**
7. No experiments that could cause danger to someone.
8. Fourth and fifth graders may work in pairs or alone. **Once you turn in your project sheet with a partner listed, you cannot change your partner.**
9. Do not buy expensive materials for your project before you have received approval from both your teacher and the PTA Science Fair Committee for your Science Fair project.

Display Rules/Reminders:

10. Your project should be displayed on a **standard 3-part folded display board** which can be found at a number of stores including office supply stores, Michaels and even Walgreens. Any part of your project that does not go on the display board must fit on the table in front of your board.
11. Except for the title, the main parts of your project should be identified with a **heading**. (Problem, Hypothesis, Materials, etc.)
12. Make sure the information on the display board is neat and check your spelling. You may type or handwrite your work. You may use computer graphs, but **at least one graph must be drawn by hand**. Remember that you are demonstrating YOUR skills, not the computer's features or your parents' expertise.

13. Write your name(s) and your teacher's name on the **BACK** of the display board. **Please do not write your names on the front of the display board.**

14. You can use photos of your experiments as part of your display, but **NO RECOGNIZABLE PERSONAL PHOTOS (for example, faces) ARE ALLOWED for 4th and 5th grade projects. They are allowed in K-3 projects.** In other words, we should not be able to tell who anyone is from your photos. Do not have your name or initials on any photos either.

15. You can bring **items to display** that are part of your project, but they must be able to fit on the table in front of your project. Do not bring any device or machine which requires electricity (other than battery-power) with your project. We do not have access to electricity for finished projects. No open containers with liquids in them are allowed to be displayed. Avoid large buckets or containers with liquids in them. If you bring something that will not fit in the area in front of your display, it will be placed in a designated area of the gym.

16. You cannot actually perform any experiments or do any demonstrations as part of your display on the day of the Science Fair. **Students will not be present during judging.**

Important Dates:

17. **The fourth and fifth grade Science Fair Information Sheet is due Wednesday, January 20, 2010.** Every student must complete a form even if you are a member of a team. Please turn these in to your homeroom teacher in the morning (You can turn in on Tuesday, January 19, 2010 also).

18. **Parent Information Meeting is Wednesday, January 13, 2010, at 8:15 a.m. in the Library.** All Moms and Dads of 4th-5th graders are invited (K-3rd grade classroom volunteers will attend this same meeting).

19. **Science Fair Projects are due Friday, February 26, 2010 between 7:45 and 8:00 a.m.** Bring the project display to the Wilchester gym between 7:45 and 8:00 a.m.

20. **There will be the Awards Ceremony and a Special Mad Science Show starting at 6:30 P.M. on Friday, February 26, 2010 in the Cafeteria.** Your whole family is invited to the show and to see all the projects.

21. Our judges will be here **Friday, February 26, 2010** to look at the 4th and 5th grade science fair projects and fill out the judging sheets. **Judging will be based on ALL of the requirements of the project,** and on overall presentation including creativity and neatness.

22. All 4th and 5th grade students will receive a **certificate** for their participation and a pizza party.

Good luck and work hard on your project. You may call or e-mail Mrs. Harsley or Mrs. Stones with any questions.

**Mrs. Harsley
For 4th Grade Projects
713-464-5118
sharsley@comcast.net**

**Mrs. Stones
For 5th Grade Projects
713.932.1974
ejstones@comcast.net**

Wilchester Elementary

SCIENCE FAIR 2010

Suggested Action Plan

- Choose a partner with similar work habits and similar schedule. Remember you cannot change partners once your project sheet is turned in.
- Select a project topic which interests you and fits the guidelines.
- Complete Science Fair info sheet – Keep a copy for your notes
- Set up as many work sessions with your partner as needed to complete your project. Remember, don't underestimate the amount of time it takes to complete the experiment and create the display board!
- Make a list of all the materials you will need.
- Write down your procedure in numbered steps. If, during your project, you realize your original procedure isn't exactly right, CORRECT IT!
- Plan what measurements you expect to take by making a blank chart. It may look like this:

Manipulated Variable eg. Water	Trial #1	Trial #2	Trial #3	Trial #4	Trial #5
None					
1/4 cup					
1 /2 cup					
3/4 cup					
1 cup					

Make a separate blank chart for every Responding Variable (outcome).

Now you are ready to begin the experiment. Gather your materials.

- Following your written procedure, complete all the trials and fill in your data chart(s) with measurements. This step may take less than an hour or several days depending on your project.
- If you can, find totals, calculate averages etc. with your data. Draw graphs showing your data.
- Write a rough draft of your conclusion following the instructions.
- RE-WRITE all of this information on your project display board. Make it neat and colorful!

Wilchester Elementary

SCIENCE FAIR 2010

Science Fair Project Ideas

You may also check out ideas on-line.

One good website is www.all-science-fair-projects.com

The Houston Public Library is another good resource. Kendall Library (our nearest branch) has a section of science fair idea books.

1. Which solid fuel produces the most heat? or What is the effect of the type of solid fuel on the amount of heat produced?
2. Do people remember more details from an expected or unexpected event?
3. Which truss system can hold up the most weight?
4. What boat design can hold the most weight? Or travel the farthest? Or go the fastest?
5. Which metals conduct heat best? or What is the effect of different metals on conducting heat?
6. Which material makes the best heat insulator? or What is the effect of different materials on insulating heat?
7. Which color of liquid absorbs the most heat? or What is the effect of the color of a liquid on how it absorbs heat?
8. Which color container absorbs the most heat? or What is the effect of the container's color on how well it absorbs heat?
9. Which color container cools off the quickest?
10. Do black bottom pools keep the water warmer?
11. What are the effects of swimming pool water (chlorine) on hair?
12. Does a magnetic field affect the growth of beans?
13. Does electricity affect the growth of beans?
14. How do detergents affect the growth of plants?
15. Do plants grow better with tap water or distilled water?
16. Do roots always grow down?
17. Do mirrors affect the way plants grow?
18. Does leaf surface area affect plant growth?
19. Under which color cellophane do plants grow best?
20. Can you give a plant too much fertilizer?
21. Do seeds sprout better in cold or hot climates?
22. Does acid rain affect the germination of seeds?
23. Under which thickness of plastic do radishes grow best?
24. Does aspirin prolong the life of cut carnations?
25. What are the effects of water on different types of wood?

Wilchester Elementary **SCIENCE FAIR 2010**

Tally Sheet for Judges

Title of Project: _____ Project # _____

<p>TITLE: The title should be clear and easy to identify No title = 0 points; Poor title = 1 point; Good title = 2 points</p>	
<p>PROBLEM: To what degree is the problem new and/or different and how well is it written? The problem should be clearly asked in the form of a question. No problem statement = 0 pts. Incomplete problem statement = 1 pt. Complete problem statement and well-written = 2 pts. Complete, well-written problem statement and idea is new and/or different = 3 pts.</p>	
<p>HYPOTHESIS: The hypothesis should be a testable prediction and written in a complete sentence(s). No hypothesis = 0 pts. Incomplete hypothesis = 1 pt Hypothesis present, but not completely testable = 2 pts Well-written, testable hypothesis = 3 pts</p>	
<p>MATERIALS: Materials list should include all materials that need to be gathered. No materials list = 0 pts; incomplete materials list = 1 pt; complete list = 2 pts.</p>	
<p>PROCEDURES: To what degree do the experiment's steps connect the hypothesis, data and results? Steps are not listed and/or numbered = 0 pts Steps are incomplete and not listed step-by-step = 1 pt Steps are complete and listed step-by-step = 2 pts</p>	
Controlled variable identified clearly and correctly = 2 pts	
Manipulated variable identified clearly and correctly = 2 pts	
Responding variable identified clearly and correctly = 2 pts	
A minimum of three trials were performed = 2 pts	
<p>OBSERVATIONS: Did the student collect enough data to support the results? No quantitative data collected = 0 pts Insufficient data collected = 1 pt Sufficient data collected (data for minimum of three trials) = 2 pts Data collected above expectations = 3 pts</p>	
Data shown in table format = 2 pts	
Graphs are well presented and easy to understand = 2 pts	
Display includes at least 1 hand-drawn graph = 2 pts	
<p>CONCLUSION: How well are the results interpreted? No interpretation of data = 0 pts Partial interpretation of data = 1 pt Correct and appropriate interpretation of data = 2 pts Comprehensive and significant interpretation of data, with use of math skills such as averages or percentages = 3 pts</p>	
Conclusion includes basic conclusive sentence = 2 pts	
Hypothesis is reviewed = 2 pts	
Student refers specifically to data = 2 pts	
Student cites application to situation outside of experiment = 2 pts	
<p>OVERALL: Project is a creative and interesting idea = Score 0-5 pts The presentation is clear, well-organized and easy to follow = Score 0-5 pts</p>	
TOTAL POINTS (Maximum points = 50)	

Wilchester Elementary **SCIENCE FAIR 2010**

Science Fair Information Sheet

Student Information:

Student Name: _____ Phone: _____

Teacher: _____

Partner's Name: _____

Partner's Teacher: _____

Problem Question: (Fill in the blanks.)

_____?

Hypothesis: (Remember to write a complete sentence.)

Student Signature

Parent Signature

**Every student must complete this form. It is due
Wednesday, January 20, 2010. Turn it in to your
homeroom teacher.**