January 19, 2010

Dear 5th – 8th Grade Parents:

We are very excited to inform you about the school's annual Science Fair that will occur Thursday, March 4, 2010. This event showcases the great creative talents and high quality academic achievement that are the hallmarks of the Christ Lutheran student body. Displays will be on exhibit for viewing on Friday, March 5, 2010 and Sunday morning, March 7, 2010. The goal of the Science Fair is for **the student** to use scientific methods and knowledge to investigate a concept that interests him/her. It will provide a valuable opportunity for youngsters to be creative, to have pride in their work, and to apply scientific methods towards their self-chosen learning goal.

Lessons on scientific research and other information related to the Science Fair will be part of each classroom's curriculum. In this packet you will find a Science Fair description of project types, timeline, rules, definitions of terms, information on how to set up your notebook and a bibliography format. In addition, teachers will give feedback on projects in order to help students be as successful as possible.

The Science Fair is a very exciting event for our school. This year every classroom (including Preschool) will display how science is experienced and studied at Christ Lutheran School. Although we discuss methods and procedures in the classroom, most of the work will be done at home. Your suggestions and encouragement will be of great value to this process. We believe that you will enjoy and take pride in the creative and unique science projects developed by your children.

There will be a Parents' Information Night for those who have any questions or would like more information on how to create a science fair project. The meeting will be held on Thursday, January 21, 2010 at 7:00 P.M. in the church with the Science Fair Committee leading the presentation.

In His Service,

Patricia Mayer, Principal & the Science Fair Committee

Science Fair Project Options

1. Explain a Scientific Concept or Principle using the Scientific Method (e.g. Pendulum movement, Osmosis, Chemical Bonding, Conductivity of Metals, Tropisms in Plants, Tornadoes, Plate Tectonics)
    a. The project requires detailed research that shows how the concept/principle was discovered; explaining the concept/principle thoroughly; and creating a model, experiment, or demonstration that illustrates the concept/principle.
    b. Students can demonstrate, through an experiment, the concept or principle. For example, if a child was interested in osmosis, they could set up an experiment to see what the best concentration of a solution would be for the highest rate of osmosis to occur. Another experiment for osmosis might be what makes a good semi-permeable membrane to facilitate osmosis. Students could explore the effect of temperature on the rate of osmosis. Just because the concept/principle already exists doesn't mean that a student can't develop an experiment to test different parts of the concept or principle!

2. **Conducting a Scientific Experiment** (What effect does habitat have on the growth of mealworms? How can you train a guinea pig? Which metal is least corrosive? What solution is a better conductor of electricity? How can you break chemical bonds?)
    a. Conducting a Scientific Experiment must use all aspects of the scientific method. The amount of trials will be predicated on the type of experiment chosen. While the reliability and validity of the data is important, the project should not be expensive or take over the academic life of the child or the family. The majority, if not all, of the work should be done primarily by the student his/herself. The notebook and display must include data tables, appropriate graphs or charts, and displays of the materials and procedures.

Christ Lutheran School Science Fair, March 4, 2010
Rules and Information

1. The work on the project should be done by the student. If any outside help or assistance is given, it **must** be described in the project notebook. (Example: Advice from a local scientist or parental assistance in typing or construction, etc.)

2. A display space will be provided for each exhibit. Exhibits must have outside measurements **no greater than** 3 feet wide, 1.5 feet deep, and 4 feet high. The student's name **must** be in the front of the display or 5 points will be deducted.

3. Exhibits **must** be free-standing and constructed of durable materials such as pegboard or heavy cardboard. If electrical hook ups are needed, arrangements must be made at least one week prior to the Science Fair. If liquids are used in the exhibit, the student **must** provide a table cover or points may be deducted.

4. Exhibits **must include a project notebook and suitable display**. They should be neat, well organized and legible.

5. **No live animals may be displayed.** Use drawings or photographs instead. Humane practices must be observed. Projects using live animals **must** be cleared by your teacher first.

6. **Dangerous chemicals, drugs, highly flammable materials, or open flames may not be displayed at the Science Fair. The school reserves the right to reject projects which are unsafe or unsuitable for display.** All electrical equipment must conform to standard electrical safety laws.

7. Damage to the exhibits could occur to while on display even though every precaution will be taken to keep them safe. The school is not responsible for lost, stolen, or damaged items.

8. Projects will be divided into two major categories:

    a. **BIOLOGICAL SCIENCES** (Botany, Agriculture, Forestry, Hydroponics, Algae, Plant Genetics, Photosynthesis, Environment, Health, Zoology, Animal Genetics, Animal Ecology, Physiology, Psychology, Anatomy, Studies of Invertebrates, Birds, Snakes, Bacteriology, etc.)

    b. **PHYSICAL SCIENCES** (Physics, Electronics, Mathematics. Magnetism, Light, Sound, Computers, Lasers/Optics, Communications, Nuclear, Earth Science, Space, Geology, Oceanography (regarding non-living things), Astronomy, Chemistry)

9. For grades 5-6, projects will be judged separately by grade level. Seventh and eighth grade projects will be judged together. Projects will also be judged separately by categories (biological and physical).

10. Students will be responsible for the set-up and take-down of their projects in the school gym. **Parents may assist by carrying parts of the exhibit, but may <u>not</u> help set it up or points may be deducted.**

    SET-UP……..Thursday, March 4, 2010 7:30-8:45 A.M. (**NO viewing) *<u>Projects must be set up by 8:45 A.M. when the doors close. Any project arriving after 8:45 A.M. will have 10 points deducted from its total score.</u>***

    VIEWING……Friday, March 5, 2010 8:30 A.M. – 6:00 P.M. and Sunday, March 7, 2010 8:00 A.M. – 12:00 noon

    TAKE-DOWN……Monday, March 8, 2010 (**<u>projects MUST be removed from the gym by 8:45 A.M.)</u>**

11. Judging will take place starting at 9:00 A.M. on Thursday, March 4, 2010. Each student must be present for an oral interview with the judges.

12. No one may be in attendance during the judging except the student entering the project and the judges.

13. All decisions of the judges will be final. Entries will be judged in the following ways:

    a. Knowledge of the exhibit and related areas
    b. Accuracy demonstrated by the student
    c. Evidence of problem solving through experimentation or research
    d. Neatness and attractiveness of the exhibit

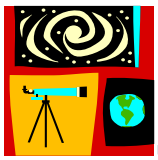
14. Science Fair winners will be awarded ribbons. There will be separate ribbons for each category and grade level.

15. **Using "AFFECT" and "EFFECT"- Please make sure that you are using the correct word – especially in your title!**

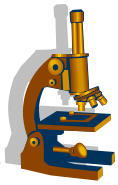
    a. <u>Affect</u> – used as a verb (action word) meaning <u>to influence</u> or <u>to cause to change in some way</u>. E.g. How will fertilizer *affect* the growth of plants?

    b. <u>Effect</u> – (1) used as a verb meaning <u>to cause</u>, e.g. Will fertilizer *effect* better plant growth?

    (2) used as a noun (person, place, or thing) meaning <u>the result</u> or <u>the reaction</u>. (Hint: if it has "the" in front of it, you probably want the word *effect*) e.g. What is the *effect* of fertilizer on plant growth?



Science Fair Project Timeline



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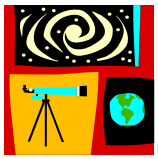
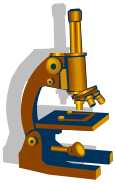
Student's Name Grade Teacher

TASK	DATE DUE	POINTS POSSIBLE	POINTS EARNED
1. Choose a problem/topic to investigate/research.	1/28/10	25	
2. Conduct some background research/get advice. Develop a hypothesis.	2/02/10* (*2/5/10 for 5th Grade)	75	
3. Decide on procedures for experiment, make a list and gather materials so you are able to begin your experiment.	2/02/10* (*2/5/10 for 5th Grade)	50	
4. Conduct your investigation, perform your experiment and collect data. (*Evidence of these tasks may be shown in the form of notecards, charts or tables, portfolios, or model prototypes.)*	2/15/10	75	
5. Organize your data/results/information into a ***typed*** rough draft. (*There will be no official teacher comments on this draft.*)	2/15/10	25	
6. Draw your conclusions.	2/15/10	25	
7. Write your report for your project. (*Teachers will provide official comments and suggestions to help students revise their reports before creating their notebooks. Extra credit is available for projects that are turned in BEFORE the due date*.)	2/18/10	75	
8. Revise and proofread your report. Create your notebook.	2/25/10	25	
9. Design your exhibit/display board.	2/25/10	25	
10. Construct your exhibit backdrop and visual aids.	2/25/10 – 3/03/10	25	
11. Turn your project in. Set your project up in the gym that morning according to Science Fair rules.	3/04/10	75	
12. Present your project. (*5th - 8th graders will be interviewed regarding their projects.)*	3/04/10	300	
	TOTAL POINTS	800	_____

Half of the project points will be recorded in the student's English grade and the other half will be applied to the student's Science grade.



Science Fair Judging Form 2010



_____ _____ _____

Student's Name Grade Teacher

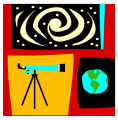
_____

(Project Title)

Division: ____ Physical

____ Biological

Project Evaluation	**Possible Points**	***Actual Points***
1. **Knowledge of Exhibit and Related Areas**	**40 points**	
Knowledge of Subject Area	0 - 10	
Knowledge/Explanation of Project	0 – 10	
Explanation/Defense of Results/Conclusions	0 – 10	
Recommendations for future Research/Useful Applications and Error Analysis	0 – 5	
Acknowledgement of Technical Assistance/Citation of References	0 – 5	
2. Evidence of Problem Solving Through Experimentation/Research	**40 points**	
Background research, where appropriate, relevant to hypothesis/question	0 - 5	
Clear statement of hypothesis/question	0 – 5	
Appropriate use of scientific method/research skills	0 – 10	
Orderly/complete recording of data/information	0 – 5	
Interpretation of data leading to a valid conclusion	0 – 10	
Originality/complexity of project	0 – 5	
3. Accuracy Demonstrated by the Student	**10 points**	
Correct spelling, grammar, usage, and vocabulary	0 – 5	
Correct calculations, graphing, construction of tables/clear presentation of information	0 – 5	
4. Neatness and Attractiveness of Exhibit	**10 points**	
Exhibit and notebook neatness and legibility	0 – 5	
Exhibit's visual attractiveness	0 – 5	
5. Grand Total	**100 points**	



Science Fair Notebook 2010

Scientific Experiments

1. **TITLE PAGE**

State the title or pose the questions. Identify which categories your project falls into. In the bottom, right-hand corner write your name, the date, your grade, and your homeroom teacher's name.

2. **INTRODUCTION**

In two or more paragraphs introduce your project making sure to explain how and why you chose the topic.

3. **STATEMENT OF PROJECT**

On this page, state what you are going to do, prove, build, or explain. If you have a hypothesis, state it here.

4. **BACKGROUND RESEARCH ***

Succinctly summarize your background research that led you to your hypothesis. Include scientific theories that may be related to your project and other famous experiments that have been done in this area before.

5. **METHODS ***

Clearly describe your experimental design. What did you do? What materials did you use? Make sure you describe it so that anyone could replicate your experiment exactly they way you did it. If you want some good examples, look at the lab instructions that you have used in class.

6. **DATA ***

Record your data here. Use tables, charts, graphs; whatever visuals that help you display your results in an easily understood format. THIS IS NOT WHERE YOU EXPLAIN WHY YOU GOT YOUR RESULTS. This section is more focused on what you found out and using mathematics to display it (using averages, charts, graphs, finding ranges, etc.)

7. **CONCLUSION**

In this section explain what you results mean. Interpret the data: what does this tell you about your hypothesis? What did you learn? How does you data compare with what you discovered in your background research? Were there any unexpected findings? Why do you think so? What does your data show conclusively and what can't you say based on your results? Explain why this project was important. (1-2 pages)

8. **FUTURE RESEARCH/ERROR ANALYSIS**

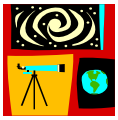
List any problems you had with your experiment. What would you do differently? Why? What problems did you encounter? If you had the time and resources what would you do next in order to learn more about your topic? What future research projects would help support you conclusions? (1-2 pages)

9. **BIBLIOGRAPHY** (1 page)

10. **ACKNOWLEDGEMENTS**

This is not a "thank you" speech; this area is for you to give credit to anyone who gave you any special advice or help. In most cases getting assistance does not count against you and may actually help your project or research. E.g. companies that gave you information, people who helped you find information in a library, a store, people who helped you to design or build special parts of your project, and most of all – parental help!

Together these sections should be 3 or more pages.



Definition of Terms

Scientific inquiry - refers to the diverse ways in which scientists study the natural world and propose explanations based on evidence they gather. **The processes that scientists use in inquiry include posing questions, conducting background research, developing hypotheses, designing experiments, collecting and interpreting data, drawing conclusions, communicating ideas and results, and analyzing their experimental design for error and suggestions for further research.**

Statement of the Problem (Question) – a simple statement or question describing the problem you are investigating

Background Information or Research – any necessary information, definitions, etc, that may be necessary to begin or continue your experiment and help you to develop your hypothesis

Observing - using one or more of your senses to gather information. Your senses include sight, hearing, touch, taste, and smell. Observations can be either quantitative or qualitative.

Quantitative observations - deal with a number, or amount. Seeing that you have eight new e-mails in your inbox is a quantitative observation.

Qualitative observations - deal with descriptions that cannot be expressed in numbers. Noticing that a bike is blue and that a grape tastes sour are qualitative observations.

Classification –the process of grouping together items that are alike in some way. Classifying things helps you to stay organized so you can easily remember and use them later. The basic requirement is that the system be useful.

Inference - a possible explanation or interpretation of an observation. Making an inference doesn't mean guessing wildly. Inferences are based on reasoning from what you already know.

Prediction – making a forecast of what will happen in the future based on past experience or evidence. While inferences are attempts to explain what is happening or *has* happened, predictions are forecasts, or what *will* happen

Experimental design – everything that a scientist uses to test a hypothesis

Hypothesis- a possible explanation for a set of observations or answer to a scientific question. In science, a hypothesis must be testable. (e.g. Plants grow more when they are exposed to more light.)

Control – a condition that remains the same. This helps one to infer that a change in the responding variable is due to a manipulated variable. (e.g. "normal" light exposure for a plant)

Variable – Any factor that can change in an experiment (e.g. the amount of light a plant is exposed to, how much a plant grows over a period of time)

Manipulated Variable – The variable that is purposely changed to test a hypothesis (e.g. different amounts of light that similar plants are exposed to)

Responding Variable – the factor that may change in response to the manipulated variable (e.g. the amount of plant growth in each of the light conditions).

Controlled Experiment- all other variables should be exactly the same. An experiment in which only one variable is manipulated at a time. A controlled experiment produces data. (e.g. all plants receive the same amount of water, have the same amount and type of soil, are the same species, and are the same height at the beginning of the experiment).

Data - facts, figures, and other evidence gathered through observations. A data table provides an organized way to view data. Graphs are also a great way to display data so that it can be analyzed. In the data/observation section of your notebook, remember to only state your data; do not try to explain it or draw any conclusions. This section mostly consists of numbers, charts, and graphs. Any writing should be short, to the point, and technical.

Procedures – a complete and detailed list of the steps you followed during your experiment. The list should enable anyone to replicate your experiment EXACTLY the way you did it. The writing style is clear, concise, and to the point. Measurements are included whenever possible.

Materials – a list of everything you used in your experiment. Again, measurements should be included whenever possible.

Conclusions – This is where you explain your data. Does what you found agree with your hypothesis? (It doesn't have to.) Why do you think you got the data that you did? Here you use inferences and make sure that your data supports them.

Further Research/Error Analysis – In this section you critically review your experiment and see if there is anything that you would change. What problems did you encounter? How could you change your experimental design in order to make it better? In addition, you should talk about any next steps that you (or someone else) might take after your experiment. Is there another experiment that you would like to conduct in order to get more information now that you know what you know?

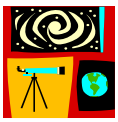
Making models - involves creating representations of complex objects or processes. Using a model allows scientists to share information that would otherwise be difficult to explain. Models include diagrams and physical objects, such as globes and movie sets. Some models are computer-generated, like the ones architects use to design new buildings. Models are only representations of a real object or process. Therefore, some information may be missing from a model.

Biographies – short, concise pieces that describe the important contributions that different people made to a monumental discovery. It does not need to be long, but should include who the person is, how they were involved in the discovery, and what their background is/was. Make sure that you emphasize how the person was vital in making the discovery happen.

Timeline – This is a timeline that includes dates (as specific as possible), people involved, and description of events written in a clear and concise manner making sure to include the 5 w's and 1 h (who, what, when, where, why, and how).

Bibliography – an alphabetical list of books, periodicals (newspapers/magazines), pamphlets, websites, interviews, and other sources that you consulted during your project.

Acknowledgements – giving credit to people who helped you during your project.



Bibliography Format

ENCYCLOPEDIAS

Author (if available). Article Title (in quotation marks). Title of the encyclopedia (underlined). Edition (if available). Date published.

"Sodium Chloride." Columbia Encyclopedia**. 2000.**

BOOKS

Author or editor (last name first). Title (underlined). City where the book was published: Publisher, copyright date.

Kurlansky, Mark. Salt: A world History. East Rutherford, NJ: Penguin USA, 2003.

MAGAZINES

Author (last name first). Article title (in quotation marks). Title of the magazine (underlined) Date (day/month/year): Page numbers of the article

Hallet, Don. "The Wieliczka Salt Mine". Geology Today Sept./Oct. 2002: 182-185.

NEWSPAPERS

Author (if available, last name first). Article title (in quotation marks). Title of the newspaper (underlined) Date (day/month/year), edition (if listed): Section letter and page number of this article.

Tanner, Beccy. "Salt Mine Museum Could Spark Tourist Trade." Wichita Eagle 8 May 2000: A9.

INTERNET

Author (if available). Page title (if available, in quotation marks). Site title (underlined). Date posted (day/month/year if available). Name of sponsor (if available). Date found by you <electronic address (URL)>.

"Dry (Rock Salt) Mining." Salt Institute. 10 May 2004 <http://www.saltinstitute.org/mich-l.html.>

FILM, VIDEO, AND SO ON

Title (underline). Type of medium (filmstrip, slide program, Powerpoint, video, and so on). Distributor, date released.

Modern Marvels: Salt Mines. Videocassette. A&E Television Networks, 1999.

LETTER OR E-MAIL TO THE AUTHOR (written by you)

Writer (last name first). Subject line title (if any) in quotation marks. Type of message ("Letter to the author" or "E-mail to the author"). Date addressed (day/month/year).

Roberts, Kim. "About your experimental salt mining techniques". E-mail to the author. 4 May 2004.

INTERVIEW WITH AN EXPERT

Name of the person you are interviewing (last name first including any titles). Place of interview (location, city and state). Date (day/month/year) and time.

Rachman, Lydia, PhD. Harbor College office, Harbor City, CA. 12 June 2004, 3:30 PM.