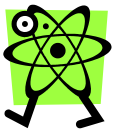


Dear Parents,

It is time for the science fair! Please read this information thoroughly before signing. It is important for these steps to be followed in this order to ensure the project is being completed scientifically. The project should be one that is FUN, educational, requires simple materials, and minimal adult supervision. Please check with your child's teacher to make sure if the project is mandatory or optional. Students will also have the opportunity to participate in the Lake Central School Corporation Science Fair.

Please discuss with your child the topic of their project. The project must answer a question, test possibilities, and draw a conclusion following the scientific method. **It is not acceptable to simply perform a demonstration or build a model.** For example, building an electrical circuit is unacceptable. Building an electrical circuit and **testing** different types of wire to determine which conducts electricity best is acceptable. Completion of this project shows the ability to conduct an experiment in a scientific manner. This is a very important goal of the science curriculum, and meets several Indiana Science Standards.

Please do not begin <u>any</u> project until the proposal has been approved.

The science fair project is conducted in stages. This is an example of the important parts to follow:

Step 1: Choose a topic. Decide on your question.

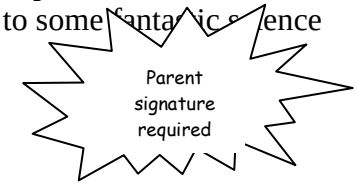
(Example: Electrical circuits. What material is the best conductor for electricity?)

Step 2: Research something pertaining to the question being asked.

(Example: Research would be on electricity/conductivity)

Step 3: An experiment will be conducted and the results and conclusions are reported in the form of a notebook and display.

We have included helpful reference pages to follow for each of the requirements. Also, please check the **sample LCSC grading rubric frequently** to see if you are meeting each requirement. **Regardless if it is required for class, this is how the project will be scored at the fair.** Attached is a timeline of when each stage is due. The final project may be presented in class upon teacher request. Thank you for your support, and we look forward to some fantastic science projects!



As an indication that you have read this letter and understand that your child is responsible for a science project, please sign below and return by 11/20/13. The packet will be returned to you the following day.

_____ _____

Student signature Parent signature

Schedule

November						
17	18	19	20 Packets distributed	21	22	23
24	25 Return signed parent letter	26	27	28	29	30
December						
1	2	3	4 Proposal due	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				
January						
			1	2	3	4
5	6	7 Research paper rough draft due	8	9	10	11
12	13	14	15	16	17 Deadline to enter LC Fair online	18
19	20	21 Research paper due	22	23	24	25
26	27 Projects due in class	28	29	30	31	
February						
2	3	4	5	6	7 Set-up at LC cafe	8 Science Fair

Remember these important dates

In between due dates, ideas are listed for what you should be doing to prepare for completion.

Science Fair Timetable DUE DATE

Packets distributed to students 11/20/13

Return signed parent letter 11/25/13

- Begin putting your proposal and daily journal together.

Science Fair Proposal 12/04/13

- Make adjustments to proposal if needed
- Check resources in school or community library.
- Consult with experts (scientists, doctors, etc.) for further information.
- Gather all the written material you can find on the topic.
- Continue working on daily journal
- Complete research
- Gather & prepare materials for the experiment

<u>Rough Draft</u> of research paper 01/07/14

- Conduct experiment and repeat for a total of 3 trials
- Record all data from each experiment in daily journal
- Take photographs as needed

Consult with teachers/parents to check your progress.

Online Entry due for LC Science Fair 01/17/14
(If participating)See on-line instructions
No paper forms

- Double check your written data
- Design all visual aids such as graphs, charts, and data tables
- Complete display board

Final draft of research report 01/21/14

Be prepared to present your project, if required by teacher.
Bring in ALL materials 01/27/14

LCSC Fair set up 02/07/14
Lake Central Science Fair 02/08/14

All dates are subject to change as needed.

Science Project Topics to Avoid	Why
Any topic that boils down to a simple preference or taste comparison. For example, "Which tastes better: Coke or Pepsi?"	Such experiments don't involve the kinds of numerical measurements we want in a science fair project. They are more of a survey than an experiment.
Most consumer product testing of the "Which is best?" type. This includes comparisons of popcorn, bubblegum, make-up, detergents, cleaning products, and paper towels.	These projects only have scientific validity if the Investigator fully understands the science behind why the product works and applies that understanding to the experiment. While many consumer products are easy to use, the science behind them is often at the level of a graduate student in college.
Any topic that requires people to recall things they did in the past.	The data tends to be unreliable.
Effect of colored light on plants	Several people do this project at almost every science fair. You can be more creative!
Effect of music or talking on plants	Difficult to measure.
Effect of running, music, video games, or almost anything on blood pressure	The result is either obvious (the heart beats faster when you run) or difficult to measure with proper controls (the effect of music).
Effect of color on memory, emotion, mood, taste, strength, etc.	Highly subjective and difficult to measure.
Any topic that requires measurements that will be extremely difficult to make or repeat, given your equipment.	Without measurement, you can't do science.
Graphology or handwriting analysis	Questionable scientific validity.
Astrology or ESP	No scientific validity.
Any topic that requires dangerous, hard to find, expensive, or illegal materials.	Violates the rules of virtually any science fair.
Any topic that requires drugging, pain, or injury to a live vertebrate animal.	Violates the rules of virtually any science fair.
Any topic that creates unacceptable risk (physical or psychological) to a human subject.	Violates the rules of virtually any science fair.
Any topic that involves collection of tissue samples from living humans or vertebrate animals.	Violates the rules of virtually any science fair.
Steps of the Scientific Method	**Detailed Help for Each Step**
Ask a Question: The scientific method starts when you ask a question about something that you observe: How, What, When, Who, Which, Why, or Where? And, in order for the scientific method to answer the question it must be about something that you can measure, preferably with a number.	Your Question
Do Background Research: Rather than starting from scratch in putting together a plan for answering your question, you want to be a savvy scientist using library and Internet research to help you find the best way to do things and insure that you don't repeat mistakes from the past.	Background Research Plan Finding Information Bibliography Research Paper
Construct a Hypothesis: A hypothesis is an educated guess about how things work: "If _____[I do this] _____, then _____[this]_____ will happen." You must state your hypothesis in a way that you can easily measure, and of course, your hypothesis should be constructed in a way to help you answer your original question.	Variables Variables for Beginners Hypothesis
Test Your Hypothesis by Doing an Experiment: Your experiment tests whether your hypothesis is true or false. It is important for your experiment to be a fair test. You conduct a fair test by making sure that you change only one factor at a time while keeping all other conditions the same. You should also repeat your experiments several times to make sure that the first results weren't just an accident.	Experimental Procedure Materials List Conducting an Experiment
Analyze Your Data and Draw a Conclusion: Once your experiment is complete, you collect your measurements and analyze them to see if your hypothesis is true or false. Scientists often find that their hypothesis was false, and in such cases they will construct a new hypothesis starting the entire process of the scientific method over again. Even if they find that their hypothesis was true, they may want to test it again in a new way.	Data Analysis & Graphs Conclusions
Communicate Your Results: To complete your science fair project you will communicate your results to others in a final report and/or a display board. Professional scientists do almost exactly the same thing by publishing their final report in a scientific journal.	Final Report Abstract Display Board Science Fair Judging

Science Fair Proposal

Rev 11/15/12

Title (3-4 words; a "**catchy**" phrase)

Problem (the question you are asking)

Hypothesis ("If I test…., then I believe… because…")

Research Topic (what you will research **prior** to doing your experiment to help you understand what you are testing**)**

Materials (**bulleted** list of items to be used in the experiment and their quantity)

Procedure (brief description of the experiment or investigation, **attach a copy** of experiment from book or internet if you have one)

1.
2.
3.
4.
5.
6.

Identify the one **variable**
Identify the **controls**

Do NOT begin work until your teacher has approved your project.
Return this completed proposal to your teacher by 12/04/13.

Student name _____ Student signature _____

Parent signature _____ Teacher signature _____

I plan to participate in the Lake Central Science Fair ☐ Yes ☐ No ☐ Maybe
My project involves human subjects ☐ Yes ☐ No
My project involves animal subjects ☐ Yes ☐ No
My project involves mold, fungus, bacteria, or germs ☐ Yes ☐ No

If you have checked yes to any of the above items, The Calumet Regional Fair will require additional documentation.

All needed forms required for the regional fair only can be located through this link:
http://www.iun.edu/~nwadmin/sciencef/sfw/forms.shtml
LCSC is no longer responsible for the regional fair. Please use the above site for contact info.

Setting up the <u>Problem</u> (the question you are asking)

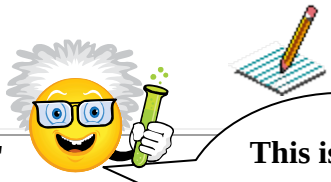
The secret is to use the "question words" (why, how, who, what, when, where) with your keywords. Ask why things happen, ask how things happen, ask what causes things to happen, ask what are the properties of key substances. Filling in a little table can help.

Question Word	**Fill Your Keywords (or Variations on Your Keywords) into the Blanks** ***These are just samples to get you thinking; there are always many more questions and the most important ones for your project may not be in the list!***	Possible Questions to Research
Why	Why does _____ _____?	Why do natural insect replants work better than artificial ones?
How	How does _____ detect _____? How does _____ affect _____?	How do dogs detect their owner's scent? How does the color of a material affect heat absorption?
Who	Who exhibits _____?	Who exhibits better short term memory, boys or girls?
What	What causes _____ to increase (or decrease)? What is the relation between _____ and _____? What is the effect of _____ on _____? What _____ is the best _____?	What causes pH to increase (or decrease)? What is the relationship between gravity and electricity? What is the effect of temperature on the germination of seeds? What material is the best insulator?
When	When does _____ cause _____?	When does playing violent video games cause violent behavior?
	When does _____ happen?	When do wild birds prefer to feed?
Where	Where does _____ occur?	Where does mold growth occur?

The Five Paragraphs of a Basic Expository Essay

"Blowing Away the State Writing Assessment Test" by Jane Bell Kiester

Paragraph #1



- This is your introduction. Begin with a good "grabber."
- Restate the topic and define it.
- State three explanations or examples.
- Conclude with a transition sentence that leads into the next paragraph.

This is NOT a paper about your experiment!!!

Paragraphs #2, #3, and #4

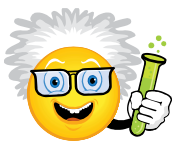
- These paragraphs are the body of your essay.
- Use a transition at the beginning of each paragraph. Try to be different.
- In each paragraph you develop one of your arguments, points, or explanations as fully as you can, restating the explanation and then expanding on it with examples or evidence that supports it.
- Each of these paragraphs (as well as the body of the essay) needs an introductory sentence and a concluding sentence.
- These are the paragraphs where it is important to use spectacular vocabulary to show a good knowledge of words.

This is the **only** paragraph where your experiment is mentioned. Everything else in this paper is researched material!!

Paragraph #5

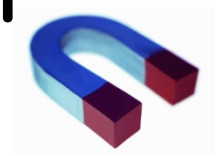
- Restate your topic in words that are different from those in paragraph 1. Describe how the research topic has helped you understand the results in your experiment.
- Summarize paragraphs 2, 3 and 4.
- Draw a one sentence conclusion.
- End with a "zinger" that makes the reader think or smile.

- Keep to the topic. Do not stray or go off on a tangent.
- Use great vocabulary. You want to show that you have a good command of words that is above and beyond what the average student your age knows.
- Organize yourself well. Never make a statement that you do not back up or support. Develop that support well.
- Use transitions such as first, second, third, next, before or after, and finally.



Your final draft should be typed in Times New Roman 12 point font with 1 inch margins. It should also include a title page and works cited page. If information is proper it should be at least 1 ½ to 3 pages in length (not including works cited or title page)

Science Fair Research Paper



Title Page

The title page is the first page of a research report. It contains the title of the research report, the author's name, the class in which it is written for and the date of completion.

Example of a Title Page:

1/3 DOWN THE PAGE

Electrical Conductivity

TITLE

by
Albert Einstein
(Your Name)

AUTHOR

Fifth Grade

Ms. Teacher (Teacher's Name)

January 20, 2011

1 INCH

Science Fair Research Paper

Works Cited Page

The works cited page is the last page of a research report. It contains all the sources used to obtain information for the research report. The list of sources should be in alphabetical order according to the author's last name. The text should be double-spaced and all lines should be indented except the first one.

This website will complete your works cited page for you: http://www.easybib.com/#sourceList.

Example of a Works Cited Page:

Works Cited

Heidenrich, C. "Erosion" World Book Encyclopedia. Chicago: World Book, Inc. 1992. Vol. 10:366

Thompson, Graham. & Turk, Jonathan. Modern Physical Geology. New York: Harcourt Brace College Publishers, 1997.

Rader's Geography 4Kids. "Erosion." Andrew Rader Studio. 1997-2007. <http://www.geography4kids.com/files/land_erosion.html>

This board is the final step.
Follow these guidelines.
It should not be an art project!!

Display Board

After experiment completion and data collection

PROBLEM/PURPOSE **HYPOTHESIS** **MATERIALS**	**TITLE** **PICTURES/DRAWINGS** **DATA TABLES/CHARTS or GRAPHS**	**PROCEDURES (list Variable & Controls)** **RESULTS** **CONCLUSIONS**

Important Hints

- Display boards may be purchased at Kahler. Science teachers will provide more information when it is available.
- You will need a **TITLE** (A short phrase, not a question, to alert readers to what you have done and catch their attention! The title should be big and easily read from across the room.).
- The overall project should be in a large enough font to read comfortably across a table.
- You do not need to use the same size font for each section, but it is preferred
- If you include photographs on your board you must give credit to the photographer. The following caption must appear on you board [Photographs by Name of Photographer].
- Photographs may not include any brand names. If a product is used the name of the product must be covered up.
- The backboard is **not** an art project; it is a way to display scientific data.
- Avoid pastel colors, a rainbow effect, and using colored pencils; these are not easily read.
- Information typed on white paper may be glued to colored construction paper for a colorful yet professional look.
- Use a ruler or yard stick to make straight lines.
- Do **NOT** staple your research report, abstract, or science fair notebook to the board. These should be placed on the table.
- Do **NOT** glue anything down until you have laid the entire project out to ensure it is visibly pleasing.

Guidelines for the Fair Display

1. **The exhibit size is limited to 76 cm (30 inches) front-to-back, 122 cm (48 inches) side-to-side, 274 cm (108 inches) floor-to-top.**
2. **The exhibit must be self-supporting. Exhibit material cannot be fastened to the walls and the use of tacks or nails in the tables is prohibited.**
3. **If a request for an electrical outlet was checked on the student entry form, the student must supply the electric cord.**

Take pictures of your experiment for the display. Many items are not allowed at the fair. Read the following list carefully as you plan your display for presentation.

Not allowed at the fair

1. Living organisms, including plants
2. Human or animal food, including popcorn, seeds, chewing gum, or soda
3. Any liquids, household/laboratory chemicals including water
4. Any containers with liquid
5. Organisms, fungi, mold, cultured growths, spoiled food
6. Soil, sand, or waste samples
7. Taxidermy specimens or parts
8. Preserved vertebrate or invertebrate animals
9. Human/animal parts or body fluids (for example: blood, urine) (Exceptions: teeth, hair, nails, dried animal bones, histological dry mount sections, and completely sealed wet mount tissue slides)
10. Plant materials (living, dead, or preserved) which are in their raw, unprocessed, or non-manufactured state (Exception: manufactured construction materials used in building the project or display)
11. Poisons, drugs, controlled substances, hazardous substances or devices
12. Dry ice or other sublimating solids
13. Sharp items (syringes, needles, pipettes, knives)
14. Flames or highly flammable materials
15. Batteries with open-top cells
16. Chemicals
17. Tanks that have contained combustible liquids or gases
18. Projects with moving parts that have unprotected belts, pulleys, chains, or pinch points unless for display only and are not operated
19. Class III and IV lasers
20. Operating high voltage electricity projects
21. Glass on display
22. Pressurized tanks

Sample Rubric

A scientific question/purpose is. . .	Well done	Incorrect/Lacking	Not present	
evident	1	.5	0	
clearly displayed on the board	1	.5	0	
discussed	1	.5	0	
relevant to the project	1	.5	0	
Total Points 4			**Maximum**	
Hypothesis is. . .				
evident	2	1	0	
clearly displayed on the board	1	.5	0	
is stated in a way that is testable through experimentation	2	1	0	
relevant to the experiment	1	.5	0	
Total Points 6			**Maximum**	
Controls/Variables are. . .				
evident	1	.5	0	
correctly identified and addressed	2	1	0	
clearly displayed on the board	1	.5	0	
accurately displayed on the board	1	.5	0	
Total Points 5			**Maximum**	
Materials are. . .				
evident	1	.5	0	
bulleted	1	.5	0	
neatly presented	1	.5	0	
Total Points 3			**Maximum**	
Procedure. . .				
steps are explained	2	1	0	
steps are followed through experimentation	2	1	0	
adaptations to procedure and experiment are	1	.5	0	

addressed				
inconsistencies and unusual findings are investigated	2	1	0	
Total Points 7			**Maximum**	
Total for Page One Points 25			**Maximum**	
Results. . .	Well done	**Incorrect/Lacking**	Not present	
are present	1	.5	0	
were attained through the stated procedure	1	.5	0	
Data has been graphed	1	.5	0	
Data collection is neatly displayed	1	.5	0	
Data has been collected and measured	1	.5	0	
Total Points 5			**Maximum**	
Conclusion . . .				
is logical	1	.5	0	
is through	1	.5	0	
is based on data collection results.	1	.5	0	
is properly related to the hypothesis	1	.5	0	
is evident and neatly displayed	1	.5		
Total Points 5			**Maximum**	

Understanding of experiment: Student can orally explain project. Student can . . .	Excellent	Very Well	Well	Fair	Poor	**Unable to explain**
explain how the scientific method was used	5	4	3	2	1	0
explain how the scientific method was followed in the procedure	5	4	3	2	1	0
explain how the results were achieved	5	4	3	2	1	0
explain how the conclusion was achieved	5	4	3	2	1	0
explain the research about the topic	5	4	3	2	1	0
answer questions based on the project.	5	4	3	2	1	0
Total	**Maximum Points 30**					
Total for Page Two	**Maximum Points 40**					

Presentation: Student can present project with confidence.	Outstanding	Fair	Poor	
maintains eye contact	2	1	0	
stands with good posture	2	1	0	
voice is easily heard	2	1	0	
speaks with ease and fluency about the project	2	1	0	
excitement about project is evident in presentation	2	1	0	
Total Points 10			**Maximum**	
Quality: Project . . .				
is visually attractive	2	1	0	
is presented in interesting manner thru the display	2	1	0	
includes correct spelling for written sections	2	1	0	
display is neatly arranged	2	1	0	
show evidence of student's own work	2	1	0	
Total Points 10			**Maximum**	
Originality: Student showed interest and involvement that extended above and beyond science project. **Student . . .**	Well done	**Incorrect/Lacking**	Not present	
can explain how experiment was chosen	1	.5	0	
made creative changes to a topic from a book or Internet to further investigate the topic	1	.5	0	
took initiative to expand exploration into the topic and can explain what would be done differently next time.	1	.5	0	
displays excitement about the project and can provide an interesting fact or favorite part of the experiment.	1	.5	0	
Topic for the project is a new or original idea	1	.5	0	
Total		**Maximum Points**	**5**	
Total for Page Three		**Maximum Points**	**25**	

Research: Student has supporting materials. **Observation Log/journal . . .**	Well done	Incorrect/Lacking	Not present	
is present	1	.5	0	
is well organized	1	5	0	
is thorough	1	.5	0	
is dated	1	.5	0	
refers to this project only	1	.5	0	
Total Points 5			**Maximum**	
Research report . . .				
is present	1	.5	0	
is well organized	1	5	0	
is thorough	1	.5	0	
is dated	1	.5	0	
refers to this project only	1	.5	0	
Total	**Maximum Points 5**			
Total for Page Four	**Maximum Points 10**			

Additional comments about the project/suggestions for improvement:

_____

Judge's signature

(Please remember to initial the student's table label.)

Total for Page One	**Maximum Points 25**	
Total for Page Two	**Maximum Points 40**	
Total for Page Three	**Maximum Points 25**	
Total for Page Four	**Maximum Points 10**	
	Total Points 100	

1. Animal Sciences	Animal genetics, development, paleontology, histology, animal ecology, animal physiology, animal husbandry, pathology, invertebrate biology, systematics, etc.
2. Behavioral and Medical Science	Clinical & developmental psychology, cognitive psychology, physiological psychology, sociology, ethnology, archaeology, linguistics, learning, perception, urban problems, surveys, public opinion, etc.
3. Biochemistry	Genetics; enzymes, blood, protein or food chemistry, metabolism, structural biochemistry, general biochemistry, hormones, etc.
4. Cellular and Molecular Biology	Cellular biology, molecular biology, protozoology, yeast, fungal and bacterial genetics, cellular & molecular genetics, immunology, etc.
5. Chemistry	Materials, plastics; fuels; pesticides; metallurgy; analytical, organic, inorganic, physical, or soil chemistry, general chemistry, etc.
6. Computer Science	Computer software & hardware, algorithms, artificial intelligence, information & operating systems, computer methodologies, systems organization, data bases, encryption, coding, information theory internet networking and communications, graphics, computational science, etc.
7. Earth Science	Geology, geophysics, seismology, oceanography, topography, mineralogy, petroleum, geography, atmospheric physics, climatology, weather, tectonics, geochemistry, paleontology, planetary science, geochemistry, etc.
8. Engineering: Electrical and Mechanical	Mechanical, electrical, computer, acoustical, photographic, heating and refrigeration (including solar), electronics, power transmission and generation, thermodynamics, communications, etc.
9. Engineering: Materials and Bioengineering	Bioengineering, civil engineering, construction engineering, chemical engineering, industrial engineering, processing, material science, architecture, etc.
10. Energy and Transportation	Aerospace and aeronautical engineering, aerodynamics, alternative fuels, fossil fuel energy, vehicle development, renewable energies, etc.
11. Environmental Sciences	Pollution (air, water, soil), Quality (air, water, soil), pollution sources and control of them, environmental alteration (heat, light, irrigation, erosion), etc.).
12. Environmental Management	Bioremediation, ecosystems management, environmental engineering, land resource management forestry, recycling, waste management, impact studies, etc.
13. Mathematical Science	Calculus, geometry, algebra, logic, number theory, statistics, probability, analysis, operations research, pure and applied mathematics.
14. Medicine and Health Science	Medicine, disease diagnosis and treatment, epidemiology, physiology, genetics, dentistry, pharmacology, pathology, allergies, dermatology, ophthalmology, pediatrics, nutrition, speech and hearing, etc.
15. Microbiology	Antibiotics, antimicrobials, bacteriology, microbial genetics, virology, etc.
16. Physics and Astronomy	Astronomy, atoms, molecules, solids, optics, lasers, masers, instrumentation and electronics, particle, nuclear, atomic or plasma physics, fluid and gas dynamics, , magnetics and electromagnetics, quantum mechanics, optical astronomy, astrophysics, biological physics, theoretical physics, etc.
17. Plant Science	Agriculture, agronomy, ecology; horticulture, forestry, photosynthesis, mycology, plant development; hydroponics, plant physiology, pathology, or genetics, taxonomy, or biorhythms; plant systematics, evolution, etc.

Team projects need to be listed within one of the above categories.