THROUGH SCIENCE

SCIENCE FAIR

Cornelius Elementary School

2014-2015

Student Name: _____

Teacher: _____

Grade Level: _____

TABLE OF CONTENTS

Dear Cornelius Family,

The 5th Annual Science Fair is upon us! We are very excited about this process and hope that you will share our enthusiasm. This packet will outline all of the information that you need to successfully implement the science fair process at Cornelius. Please take the time to read it and follow it step-by-step. It will serve as your guide.

Our goal in providing this project is to help our children learn to become true scientists. Learning how to find answers to things that make us wonder is the whole point of studying science. Students need to know the process and learn the skills of systematically searching for these answers. They also need to learn that science does not always turn out the way that we might expect.

There are three general types of science projects. *Collections* (leaves, flowers, shells, seeds, etc.) help students learn observation and organization skills. *Demonstrations* display new information students have learned and promote problem solving and research. *Experiments* (investigations) involve the entire scientific process and require advanced reasoning and problem solving skills. We would like students who participate in the science fair to present experiments. These are the only types of projects accepted at the county, state, and national levels. We want to start preparing our students for those levels of competition, and we believe that our students are not too young for this truly scientific work. Students moving on to higher levels must have completed an **individual project.**

We recommend that you use your Family Handbook from front to back. There are helpful hints, guidelines, explanations, and schedules. We encourage you to guide your child through the process. With your encouragement your child can develop the skills and attitudes that s/he needs to make this project a valuable experience. Your child may need assistance with skills s/he may not have mastered yet, such as organizing, constructing, measuring, calculating, and typing. However, wrestling with the challenges of creating an experiment and finding solutions is how your child will grow from this experience.

Please keep in mind that your support will make the difference between a stressful and productive experience. On the other hand, please remember that all investigations and final products should reflect the problem solving and work of an elementary school child. Your child's project will be judged on the process, not the advanced level of the question being asked. Guide your child whenever and wherever you can, but let the final project showcase your child's individual effort and design.

A successful project takes time and planning. Doing a little every week makes the process more enjoyable. Please take advantage of the included materials and, most importantly, HAVE FUN!

Please keep your Family Handbook in a safe place. <u>Extra copies will not be provided.</u> However, you will be able to access this handbook on the school website.

We can't wait to see what our students discover. No doubt, they will do an amazing job. If you have any other questions about science fair, please refer to your packet or see your child's teacher. Thank you for your help!

Sincerely,

Cornelius Elementary Faculty and Staff

Why Not to Choose an Experiment from a Book...

It is tempting to find a quick and easy project or demonstration from a book that is already laid out for you. With hectic schedules, taking the time to do a science fair project can be a bit overwhelming. The thought of "getting it done" is probably in the forefront of your mind.

However, like all things worthwhile, completing a science fair project is difficult, time consuming, and a lot of hard work. That's because it is not about the completed display board or the ribbons. *It is all about the process.* It is about curiosity and persevering to find a way to satisfy that curiosity. Too often, our students are given immediate feedback from the Play Station or instant explanations/answers from a computerized learning game. They are not left to wrestle with a problem or expected to deal with fuzzy situations. Exploring the real world is not always simple.

By completing a science fair project from the first task of finding a topic to study, students are learning valuable skills. They are researching, developing a question, creating and implementing a plan, measuring and note-taking, summarizing and evaluating their work, communicating their results with others—and that's just the beginning!

STEPS TO SUCCESS

STEP 1: Buy a Logbook

Invest in a composition notebook (black and white marble notebook only). This notebook will contain rough drafts of everything about your science fair project. A complete notebook is critical if you are trying to get to higher levels of competition.

Your logbook must include at least the following sections:

- Evidence of selection of your topic and development of your testable question (from steps 1,2, & 5)
- Research notes and a rough draft of the writing (from steps 3 & 4)
- Bibliography (from step 3)
- Notes from planning and designing your experiment (from step 6)
- Experiment observations and data (from step 8)
- Rough drafts of charts and graphs (from step 8)
- Conclusions (from step 9)
- Ideas for future studies on this same topic (Now that I know _____, I wonder…) (from step 10)

****Each entry must include the date**

Your logbook should be in its original format when you hand it in with your project. Do not rewrite, redraw, mark out, erase, or tear out any ideas or work. This is exactly what the judges want to see – your hard work. They want to see what you were thinking all the way through the process. They want to see where something didn't work or where you changed your mind. Your logbook will prove that you started your experiment and worked on it throughout the quarter. It is your evidence that you didn't throw a project together at the last minute. Judges look very hard at the logbook, especially at higher levels of competition.

Your report that you turn in with your logbook and project will be a neat, final draft of all the information in your logbook. You want to show off both!

STEP 2: Choose a General Topic to Study and Explain

Your topic can be anything that interests you! Think about the things you enjoy doing or hobbies that you have. What kind of science is your favorite? Is there a particular type of scientist you'd like to be when you grow up? Here are a few topics to get you thinking, but you do not have to choose one of the ones listed below:

- Sports: basketball, gymnastics, football, soccer, golf, tennis, dancing, running, skating, baseball/softball, horseback riding, swimming
- Nature activities: plants, trees, gardening, soil, water, rocks, rain, heat, habitats, ponds, mountains
- Animals: spiders, ants, worms, hamsters, cats, lizards, dogs, snakes, beetles, fish, hermit crabs
- Pets: animal toys, pet food, treats, training
- Around the house: cleaners, paper towels, computers, paint, batteries
- People: moods, genetic traits (rolling the tongue), habits, reactions
- Foods: popcorn, cereal, chips, soda, juices, gum, snack cakes
- Structures: bridges, buildings, containers, packaging
- Weather: clouds, air pressure, patterns, disasters
- Science fields: plants, rocks, nutrition, the body, the environment, light, sound, magnetism, simple machines, chemistry, energy, engineering
- Other: electricity, recycling, probability, health, oceans

In your logbook:

1. **List all of your favorite topics.**
2. **Choose your three favorites.**
3. **Put a star beside the one that you want to use for your project. This is the topic you'll be learning about so that you'll think of a good question in Step 3.**
4. **Establish your purpose. Why are you doing an experiment on this topic? Maybe it will help you better understand something about what you read. Maybe the reason you are conducting this investigation is to learn something to help a friend of family member live a healthier lifestyle. Perhaps your experiment will help your classmates take better care of their pets. Only you know why your experiment is important.**

Other things to note when choosing your topic:

- Space is a topic that almost everyone loves, but it is a difficult topic to use for a science fair experiment. It can be done with a lot of thinking and hard work, but keep in mind it won't be easy.
- Great ideas can come from reading science magazines such as *Science News for Kids* and *Ranger Rick*. They have articles on topics scientists are currently researching.
- **Don't forget to list your topic on your project proposal sheet (found in your handbook) once you've decided.**

Step 2 in brief…

Record all of your brainstormed topics in your logbook and select your top 3. Record your final chosen topic and your purpose on the project proposal sheet.

STEP 3: Begin Doing Research

Find books, magazine articles, Internet sites, news articles, as well as professionals and other people and information to help you learn about your topic. Researching a topic will help you realize what questions you have and will eventually lead you to your testable question for your experiment. Your research will prove to the judges that you've taken time to learn about a topic and have developed questions based on your new knowledge. **You need at least three sources of information for your research. All three should not be Internet sites.** Use a variety of materials and follow all the directions below:

1. **Keep notes in your logbook** showing the NEW things you've learned about your topic. A great way to keep notes is to divide your paper into two columns as shown below:

New Facts I've Learned	**Questions I Have…**
1.	**1.**
2.	**2.**
3.	**3.**
4.	**4.**

2. **Keep track of your resources. You'll need them later for your reports.**

3. **Record the following information from your resources in your logbook and on your Project Proposal sheet:**
   a. Books: title, author, page numbers, publisher, and publication date
   b. Magazines: magazine title, volume number, title of the article, and page numbers
   c. Encyclopedia: name of the encyclopedia, copyright date, volume
   d. Interview with an expert: name, title, business, and date of interview
   e. Internet: website address, name of site

Step 3 in brief…

Learn about the topic you've chosen and keep track of the facts you've learned and the questions that came to your mind. List your resource information on your **Project Proposal sheet and your logbook**.

STEP 4: Write a Research Summary

Using your research from Step 3, **write a <u>one-page</u> research summary on your topic**. It may be handwritten or typed*. This research summary will help your teacher and the judges understand your topic and will let them know you've become an expert in this field. The information included in the summary will show what led to your testable question.

You must draft this research summary <u>in your logbook</u>.

Your research summary should include:

- **Paragraphs organized by subject**
- **Carefully chosen information**
- **Complete sentences and correct grammar**
- **Correct spelling**

* All typing for the science fair project should be done in black ink, 12 point font, double spaced, preferably Times New Roman.

Step 4 in brief…

Draft your research summary in your journal, then publish by writing or typing your one-page research summary on your topic. This is just research, not how you plan to do your experiment.

STEP 5: Choose a Testable Question and Form a Hypothesis

Now that you've researched and learned more about your topic, you'll need to choose one question that you want to answer. Think about what you found interesting while learning about your topic. Then choose a simple question that you are going to have fun answering. Look at the following examples:

Topic: Containers
Testable Question: Which shaped container is the sturdiest?

Topic: Birds
Testable Question: Do cardinals eat a particular type of seed?

Topic: Cereal
Testable Question: Do name brand cereals stay crunchier in milk than generic brands?

You might try phrasing your question in one of these ways:

What is the effect of _____ on _____?
How does _____ affect _____?

Make sure you can collect data (information) to answer your question!
For example, if you just ask, "What paper towel is the best?" then you don't know if people like the towel because of its design, absorption, thickness, or brand name. You might ask instead:

"Which paper towel absorbs the most liquid?"
"Which paper towel absorbs fastest?"

There is only one correct answer to each of the above questions. The results can be measured. Usually, this is where most people get stuck. Try rewriting your question so that you can only get one correct answer. Keep in mind, you don't need to know the answer yet. That's why you're doing the project! Choose a question that captures your curiosity. That's what science is all about, and it will make your project much more fun!

Once you have chosen a testable question, **form a hypothesis by creating a statement that answers the question**. For example, if your testable question were, "Which paper towel absorbs the most liquid?" your hypothesis might be, "Brawny paper towels will absorb the most liquid, because they are the most expensive."

Step 5 in brief…

Choose a testable question that you'll enjoy trying to answer. You should be able to measure your results and collect information over time to help you determine your answer. Form a hypothesis and **record this in your logbook and project proposal.**

STEP 6: Design an Experiment

Decide how you're going to answer your question. What experiment can you design to help you answer your question? See the information about the Scientific Method in the appendix of your handbook. Use the following guidelines to help you design your experiment:

- Write your directions very clearly. Anyone should be able to read your directions and repeat exactly what you did. This means including specific amounts (in metric units), times, and types of materials.
- Test your experiment **at least three times in exactly the same way.** If you only get the result one time, it could just be a fluke. Scientists must demonstrate that the results of their experiments are repeatable. In order to be eligible for higher levels of competition, you must show proof of at least three trials. The project doesn't have to turn out as you predicted, but the results should be consistent.
- Your materials must stay the same throughout your entire investigation. The only exception would be if you were changing something on purpose for your experiment. For example, you can't use one brand of potting soil for one group of plants and another brand for the second group UNLESS you are testing to see the effect of different types of potting soil.
- Keep in mind that it is not a good idea to use yourself as a test subject. Your opinions might influence the way you act or think. Keep the role of the scientist and choose others to participate in your experiment.
- **Follow the Scientific Method.**
- **Develop a way to collect your data.** You may want to create a chart to display your data. This step is important. It is awful to complete your investigation and think, "I should have…" ***Here is an example:***

Trial 1		Trial 2		Trial 3	
Brand	Time in seconds to absorb 5 ml of water	Brand	Time in seconds to absorb 5 ml of water	Brand	Time in seconds to absorb 5 ml of water
Brand X		Brand X		Brand X	
Brand Y		Brand Y		Brand Y	
Brand Z		Brand Z		Brand Z	

Step 6 in brief…

Design an experiment to test your question. Write out your detailed procedure step-by-step, following the Scientific Method. **Draft this in your logbook and then record it on your project proposal.**

***Note: This is a good place to check your work against the rubric in your handbook.**

STEP 7: Write the First Part of Your Report

You should write the first part of your report. Each of these sections is approximately ½ page in length or less. The research page will be the longest section, and it is already complete (from Step 4). Complete the following sections:

- **Title Page**: Write a title for your experiment. Underneath, list your name, your teacher's name, grade level, school name, and date.
- **Purpose**: State your reason(s) for conducting your experiment (see Step 2).
- **Research Summary (one page):** From Step 4.
- **Question**: State the question you are trying to answer (see Step 5).
- **Hypothesis**: State your prediction for your experiment (see Step 5).
- **Materials**: List specifically all the materials you used. Be sure to include measurements when possible (see Step 6). For example: ½ liter of soil, 3 centimeters of string, 2 liters of water.
- **Procedure**: List step-by- step exactly what someone else would need to do to repeat your experiment. Number each step and explain each one (see Step 6).
- **References**: List the books, magazines, newspapers, Internet sites, and other resources you used to learn about your topic (see Step 3).
- **Cover**: Design a nice cover.

****Each section should have a heading at the top of each page.**

You must draft this in your logbook and then publish a final copy to turn in to your teacher.

Step 7 in brief…

Write the first part of your report. Include the sections listed and put them behind the cover. It may be handwritten or typed.

STEP 8: Conduct the Experiment

Keep very accurate notes of everything you do in your logbook. Include what you see, measurements you take, and questions that arise during your experiment. **Log the date beside everything you write.** Use these other ideas to work toward an outstanding project:

- **Take photos and/or draw pictures** for your notes and display board. This will not only help you remember what happened, but will help the judges see what you really did. Keep in mind, you do not want to be in the photographs. Take pictures of objects with which you are working instead. This is especially important if you make it to higher levels of competition. You can't take plants or animals into the fair, only pictures!
- **Log and date all observations in your logbook**. You may also include measurements and other questions that arise while you are experimenting. Use your collection sheets to track your data. Make sure they go in your logbook.
- Charts and graphs will help you stay organized. Record the originals in your logbook. When you make final drafts, they will look impressive on your display board.
- Take your time and do as many trials as necessary. The more trials you complete, the more convincing your results will be.
- **You must conduct each trial the exact same way three times.**
- Make sure you're measuring in metric units. See the appendix if you need help.
- **Record all results in your logbook**.

Step 8 in brief…

It's time to conduct your experiment. Keep accurate notes of everything that happens and note any questions that arise during your experiment in your logbook.

STEP 9: Draw Conclusions

Your conclusions sum up your project. You should include the following information:

- Tell what happened. Consider reporting the following:
  - I observed…
  - When I ____, _____ happened.
  - In my first trial…
- Did your results support your hypothesis? If they did, state this fact in your writing. If they didn't, state what you learned. Explain why you think the experiment turned out as it did.
- What did you learn about your topic by completing this experiment? Would this information be of help to anyone? For example, maybe you learned that plants do grow better under a certain kind of light. This information would be helpful to business owners who grow plants.
- What questions did you have while you were experimenting? Did your results make you wonder about how changing something in your experiment might make a difference? Did you find that you were curious about another part of your topic once you started investigating?
- What worked and what didn't work in your experiment? What could have been improved? Would your results have been stronger if you had collected more data?

Write your rough draft in your logbook. Once you've decided on all the information you would like to include in your conclusions, use this information to write this section of your report.

Step 9 in brief…

In your logbook, write the conclusions you drew after experimenting. This information will be written in a final draft for your report.

STEP 10: Finish Writing the Report

Complete the last sections of your report:

- **Observations**: What did you see, smell, feel, and/or hear? Do not give opinions at this point. Only state the facts. Use the information you recorded in your logbook to write this part (see Step 8). All of your observations are facts that can be proven. These observations will be listed according to trial, number, or day.
- **Results/Data**: Use the information in your Observations section to create graphs, charts, and tables. Your Results/Data section should reflect how the data changed/didn't change. (See Step 8.)
- **Conclusions**: Use your rough draft from Step 9 to write this section.
- **Future Studies:** Generally explain what you might want to investigate next if you were to continue experimenting on this topic. What new questions do you have based on what you learned during this project? Where could you go next? Also, think about using this idea for next year's study. If you are truly interested in your project, try studying it for multiple years.
- **Acknowledgements**: On this page, thank your parents and other adults for helping you complete your project. You'll want to explain what they did to help you during this process. For example, maybe your mom helped you set up your experiment, or your neighbor, the vet, met with you and gave you information on birds.

There is one more part you may wish to include in your report, but it is optional. It is required for those who want to advance to higher levels of competition.

- Abstract: A four part, one-page summary of your project. Briefly describe the following on the same page:
  - The purpose of your experiment
  - A brief description of your procedures
  - A summary of the data you collected
  - The conclusions of your experiment

<u> You must draft this in your journal and then turn in a final published copy.</u>**

Step 10 in brief…

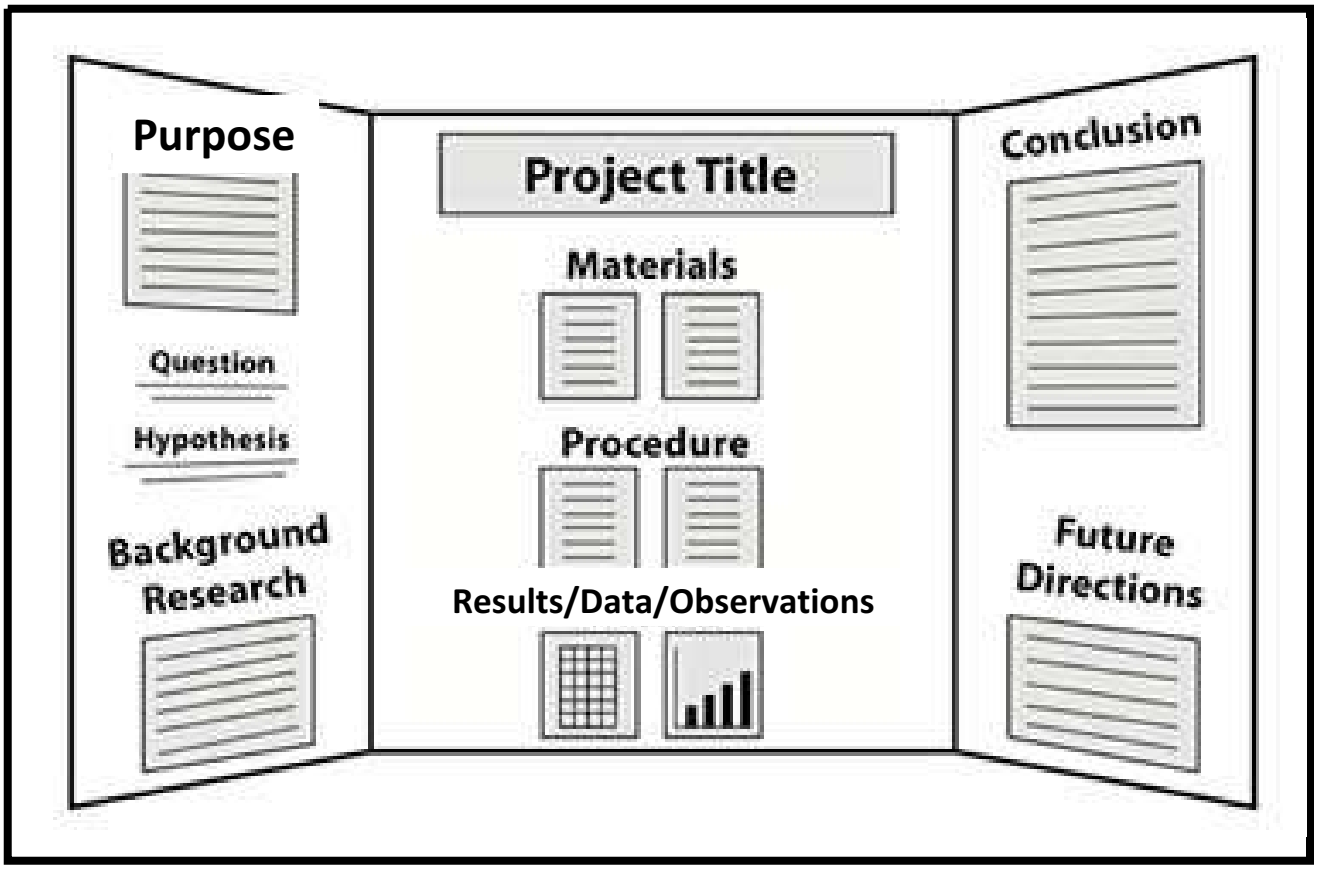
Write or type the last parts of your report. Include visual aids, such as graphs, charts, or pictures.

STEP 11: Design the Display

Your display is a summary of your project. Neither your classmates nor the judges were with you when you carried out your experiment. Your display board will help them understand what you did. Include the same sections as your report, but don't put as much information on your board. Summarize each section. You'll want each section clearly labeled and placed on the board in a logical sequence. Your board should tell the story of your experiment from left to right and top to bottom, just like a book.

Your display should be free standing, neat, organized, and informational. You do not want to start your display the night before it is due. Be sure to use colors that stand out and lettering that can be easily read.

Your report will be in front of your display for the judges to read. You also want to display your original logbook. Show off all of your hard work!



****Measurement guidelines: Displays are restricted to a space 122 cm wide (side to side), 76 cm deep (front to back), 198 cm in height (from the tabletop), or 274 cm in height (from the floor to the top).**

Step 11 in brief…

Prepare a neat, organized, and colorful display board. **You must have all sections on your board clearly labeled.**

STEP 12: Prepare for Your Presentation and Interview

Practice explaining your project to your parents, siblings, and friends. You could practice in front of the mirror or videotape yourself. Some of the questions you might be asked include:

- What is your name, and what is the title of your project?
- Tell me about your project.
- What was the purpose of your project?
- How did you get interested in your project?
- Why did you choose to do your project the way that you did?
- Why do you think your results turned out the way they did? Explain whether or not the results answered your original question.
- In general, what did you find?
- What problems did you encounter? (Hint: Be truthful about ways you could have improved your project; this will show that you learned from your efforts!)
- If you were to continue experimenting, what would you test next? Why?

Everyone you talk to will be interested in what you did. They just want to hear more about it and listen to your ideas. Think of being interviewed as showing off your hard work.

THE SCIENTIFIC METHOD

Overview of the Scientific Method

The Scientific Method is a process for experimentation that is used to explore observations and answer questions. Scientists use the Scientific Method to search for **cause and effect** relationships in nature. In other words, they design an experiment so that changes to one item cause something else to vary in a predictable way. Just as it does for a professional scientist, the Scientific Method will help you to focus your science fair project question, construct a hypothesis, design, execute, and evaluate your experiment.

Steps of the Scientific Method

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?

In order for the Scientific Method to answer the question, it must be about something that you can measure, preferably with a number.

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.

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. Of course, your hypothesis should be constructed in a way to help you answer your original question.

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.

Analyze Your Data and Draw a Conclusion: Once your experiment is complete, you collect your data 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.

Communicate Your Results: To complete your science fair project you will communicate your results to others in a final report and a display board. Professional scientists do the same thing by publishing their final report in a scientific journal or by presenting their results on a poster at a scientific meeting.

THE SCIENTIFIC VARIABLES

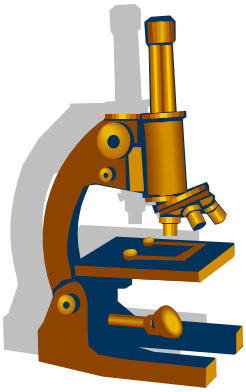
Your investigation should test only one thing. You want to control your experiment so that little differences don't interfere with your results.

Anything that could change the way your experiment turns out is called a ***variable***. The key to a good experiment is keeping all the variables the same except for the one you're testing.

The variable you purposely change and test is called the ***independent variable***. If you are testing the differences in plant growth with different colored light bulbs, the different colored lights will be the ***independent variable***.

All the variables you plan on keeping the same for the project are called your ***controlled variables***. You'll want to be very careful to make sure as many parts of your experiment as possible are the same. For example, you'd want to give the plants the same amount and same kind of water. If you gave one plant distilled water and the other tap water, you won't be sure if the light bulbs or the water made the difference in the plant growth. Anything you can control and make the same during your investigation is great!

The last variable is the ***dependent variable***. This is the effect, or what happened, when you used your independent variable (the cause). The ***dependent variable*** changes because of what you did in your experiment. For example, the dependent variable in the plant experiment is how much the plants grew. You would measure the plant growth (the dependent variable) in response to your light bulbs (the independent variable).



THE METRIC SYSTEM

All scientists use the Metric System of measurement, and you should, too!

There are 3 basic units: the ***meter*** (used to measure length), the ***liter*** (used to measure volume), and the ***gram*** (used to measure weight).

Added to these basic units are prefixes, which tell you how many times greater or smaller than a meter, liter, or gram the amount is:

kilo (kilometer, kiloliter, kilogram)	1000 times greater than the basic unit (1000 meters, 1000 liters, 1000 grams)
hecto (hectometer, hectoliter, hectogram)	100 times greater than the basic unit (100 meters, 100 liters, 100 grams)
deka (dekameter, dekaliter, dekagram)	10 times greater than the basic unit (10 meter, 10 liters, 10 grams)
deci (decimeter, deciliter, decigram)	10 times smaller than the basic unit (.1 of a meter, .1 of a liter, .1 of a gram)
centi (centimeter, centiliter, centigram)	100 times smaller than the basic unit (.01 of a meter, .01 of a liter, .01 of a gram)
milli (millimeter, milliliter, milligram)	1000 times smaller than the basic unit .001 of a meter, .001 of a liter, .001 of a gram)

Use the chart below to help determine which metric unit to use.

If you would have chosen to measure in …	**You need to be using the metric unit…**
Inches	Centimeters
Feet	Centimeters or decimeters (10 centimeters)
Yards	Meters (10 decimeters, 100 cm.)
Miles	Kilometers (10meters, 100dm., 1,000 cm.)
Teaspoons/Tablespoons	Milliliters
Cups	Milliliters
Quarts	Liters (1,000 ml)
Gallons	Liters
Ounces	Liters
Pounds	Kilograms (1,000grams)
Fahrenheit temperatures	Celsius temperatures

PROJECT PROPOSAL

Topic:	**Purpose:**

Resources (See step 3 in your family pack. List information about books, people, magazines, etc, that you gathered research from.)	1. 2. 3. 4. 5.

What **testable** question do you want to answer?

Does your question have…
◊ Something to measure?
◊ Only one thing to measure?
◊ A specific answer (to be determined)?

Hypothesis (Explain what you think the answer is going to be and WHY! Base your reason on your new knowledge!)	I think _____ _____ _____ because _____ _____ _____ _____

EXPERIMENT DESIGN

Materials (List materials you will need to conduct your experiment. Make sure to give specific measurements.)	Example: 1. 2 milliliters of soil per plant 2. 5 ½ centimeters of string

Procedure	How will you test your question? For each step, write **specific** directions. Continue on the back if needed.
Step 1:	
Step 2:	
Step 3:	
Step 4:	
Step 5:	
Step 6:	
Step 7:	
Step 8:	

Double check! Explain the one part of your experiment that you are controlling.

Project Schedule 2014-2015

Due Date	Assignment	Parent Initials	Teacher Initials
10/13/14	Read your **Family Handbook** with a parent. Submit this sheet with parent initials.		
10/27/14	**Step 1 & 2:** Submit topic section on **Project Proposal**.		
11/10/14	**Step 3 & 4:** Submit **completed research** about your topic. (This includes having notes in your logbook, resources listed, and questions that you have developed and recorded.) **Submit 1 page report (*research report*).**		
11/17/14	**Step 5,6 & 7:** Submit completed **Project Proposal**. (This includes resources, testable question, and hypothesis sections.) Submit **Experimental Design**. (This includes materials, procedure, and control sections.)		
11/21/14	Teacher will return approved **Project Proposal** and **Experimental Design**.		
12/19/14	**Step 8, 9, & 10:** Submit **Written Report** including: Title Page Final Research Report (from above) Purpose Hypothesis Materials Procedure References Observations Results and Data Conclusions Future Studies Acknowledgements *Abstract		
1/8/15	**Step 11:** Submit **Display Board** including: 3-sided board Neat labels Summarized information for each section Colorful, neat charts and graphs **Bound report and original logbook** to place in front of the display board Materials to display in front of the board (optional)		
1/8/15-1/12/15	**Class Presentations**		
1/12/15	**FINAL PROJECT DUE/SET-UP**		
1/13/15	**SCIENCE FAIR and Winners announced**		

*** Abstract is optional.** (The abstract is used for advancing to Regional and State Fair-2/23/12).

Cornelius Elementary Science Fair Grading Rubric

Student Name _____ Grade _____

	Not Evident	Some Evidence	Evident	Highly Evident	Score
CREATIVITY: • Chose an original idea	Score: 0-5 Idea is not creative and original	Score: 6-10 Somewhat creative and original idea	Score: 11-15 Creative and original idea	Score: 16-20 Very creative, imaginative, and original idea	
SCIENTIFIC THOUGHT: • Investigation guided by a question • Proposed hypothesis is an answer to question • Experiment includes control variables • Evidence of sited research using: Internet, books, encyclopedias, magazines, and/or interviews	Score: 0-5 Does not follow steps of Scientific Method	Score: 6-10 Followed some steps of Scientific Method	Score: 11-15 Followed most steps of Scientific Method	Score: 16-20 Followed Scientific Method throughout the project	
SKILL AND THOROUGHNESS: • Materials listed • Measurements used • Appropriate tools used to collect data	Score: 0-5 No trials conducted and no data collected or recorded	Score: 6-10 1 or more trials conducted and some data collected and recorded	Score: 11-15 2 trials conducted and ALL data collected and recorded	Score: 16-20 3 or more trials conducted and ALL data collected and recorded	
LOGBOOK AND REPORT: • Logbook includes all relevant data • Report includes: Cover, title page, research summary, question, purpose, hypothesis, materials, procedure, references, observations, results/data, conclusion, future studies, acknowledgements, abstract (optional)	Score: 0 Logbook not used (no entries and no Report included)	Score: 5 Logbook has 1-3 entries which include dates, ideas, and evidence of data collected throughout; Report includes some components	Score: 10 Logbook has 4-7 entries which include dates, ideas, and evidence of data collected throughout; Report includes all components	Score: 15 Logbook has 8 or more entries which always include dates, idea, and evidence of data collected throughout; Report includes all components	
PRESENTATION: • 3-sided display board • Neat labels for project title, problem, hypothesis, data, results, conclusion, abstract • Charts/graphs	Score: 0 No display is included	Score: 2 Display contains some data and labels	Score: 5 Display contains most data which may be in graph/chart form, labels contain most information	Score: 10 Display is neat, and organized, data is displayed in chart/graph form, labels contain all information	
TOTAL SCORE:					

Cornelius Elementary Science Fair Judging Rubric

Student Name _____ Grade _____

	Not Evident	Some Evidence	Evident	Highly Evident	Score
CREATIVITY: • Chose an original idea	Score: 0-5 Idea is not creative and original	Score: 6-10 Somewhat creative and original idea	Score: 11-15 Creative and original idea	Score: 16-20 Very creative, imaginative, and original idea	
SCIENTIFIC THOUGHT: • Investigation guided by a question • Proposed hypothesis is an answer to question • Experiment includes control variables • Evidence of sited research using: Internet, books, encyclopedias, magazines, and/or interviews	Score: 0-5 Does not follow steps of Scientific Method	Score: 6-10 Followed some steps of Scientific Method	Score: 11-15 Followed most steps of Scientific Method	Score: 16-20 Followed Scientific Method throughout the project	
SKILL AND THOROUGHNESS: • Materials listed • Measurements used • Appropriate tools used to collect data	Score: 0-5 No trials conducted and no data collected or recorded	Score: 6-10 1 or more trials conducted and some data collected and recorded	Score: 11-15 2 trials conducted and ALL data collected and recorded	Score: 16-20 3 or more trials conducted and ALL data collected and recorded	
LOGBOOK AND REPORT: • Logbook includes all relevant data • Report includes: Cover, title page, research summary, question, purpose, hypothesis, materials, procedure, references, observations, results/data, conclusion, future studies, acknowledgements, abstract (optional)	Score: 0 Logbook not used (no entries and no Report included)	Score: 5 Logbook has 1-3 entries which include dates, ideas, and evidence of data collected throughout; Report includes some components	Score: 10 Logbook has 4-7 entries which include dates, ideas, and evidence of data collected throughout; Report includes all components	Score: 15 Logbook has 8 or more entries which always include dates, idea, and evidence of data collected throughout; Report includes all components	
INTERVIEW: • Student can explain topic, hypothesis, procedure, results, and conclusion	Score: 0 Student cannot discuss any components of project with class	Score: 5 Student can discuss some (1-2) components of project with class	Score: 10 Student can discuss most (3-4) components of project with class	Score: 15 Student can expertly discuss all 5 components of project with class	
PRESENTATION: • 3-sided display board • Neat labels for project title, problem, hypothesis, data, results, conclusion, abstract • Charts/graphs	Score: 0 No display is included	Score: 2 Display contains some data and labels	Score: 5 Display contains most data which may be in graph/chart form, labels contain most information	Score: 10 Display is neat, and organized, data is displayed in chart/graph form, labels contain all information	
TOTAL SCORE:					