Sedgefield Elementary

Science Fair Handbook

2013 - 2014

Science Fair Projects Made Simple!

Table of Contents

"Steps to Success"

"Helpful Information"

"Necessities"

Welcome Letter

Dear Sedgefield Family,

Welcome to Sedgefield's Annual Science Fair! The following pages in this step-by-step handbook will help your son or daughter get the most from this experience. In order for your child to make the "Top 10" in his or her grade level and possibly make it to the Regional and State Science Fair, you will need to read and follow this guide.

Our goal in assigning this quarter-long project is to help your child learn how to become a true scientist. Learning how to find answers to things that make you wonder is the whole point of studying science. Your child needs to become familiar with the scientific process way of systematically searching for answers. They also need to realize that science does not always turn out the way they might expect.

This year, Pre-K through second grade students will participate with their teachers in class or group projects. Third through fifth grade students are **required** to complete individual projects. This experience will teach them how to carry out their own investigations from start to finish. The project will count as a test grade, and the grade will be averaged and reflected on their second quarter report card in January 2014.

Please read your Family Handbook from cover to cover, front to back. There are helpful hints, guidelines, explanations, schedules and a consent form included. I encourage you to guide your child through the entire process and empower him or her often. Your words of encouragement can develop healthy attitudes s/he needs to make this project a valuable learning experience. One way to guide your child is to take him or her to the public library several times in order to check out books and/or use a computer free of charge. Additionally, your child may need your guidance with skills that s/he may not have mastered such as managing his or her time, organizing, constructing, measuring, calculating, taking pictures and typing. In summation, your comprehensive support will lead to your child's independence over time and make a tremendous difference in the quality of the completed project.

All investigations and final projects should reflect the problem solving capabilities and work of an elementary child. Remember, we are showcasing your child's individual efforts and design.

Sincerely,
Ms. Gregory
Science-Fair Coordinator

The Scientific Process

Formal Scientific Process (for grades 3-5)	"OHEC" Modified Scientific Process (for grades Pre K-2)
Purpose- What do you want to find out? What question do you want answered? (must be a testable question) **Research**- Read nonfiction books, scientific journals, scientific magazines, encyclopedias, and scientific articles. Search the internet. Websites ending in ".**edu**, **.gov**, and **.org**" contain reliable information. Online encyclopedias contain articles that can be printed and read. Do not use Wikipedia.	**O- Observe.** Make observations using your five senses. Combine the purpose and research here. (See information in the left-hand column.)
Hypothesis- This is your best **educated** guess or prediction based on the facts that you learned or gathered from the research. Make sure to be specific and exact as to what you think the results will be. You may also state what you think will not happen.	**H- Hypothesize.** What do you think will happen? (See information in the left-hand column.)
Experiment- This is where you perform your experiment or investigation. Keep a data log book. A **data log book** is a composition notebook for recording your daily work (dated summary of what you did that day), your observations, and numerical data (numbers) collected while experimenting. Experiments or investigations can range from one day to many days and/or weeks.	**E- Experiment.** It is time to experiment or investigate! (See information in the left-hand column.)
Analysis- In this step, you will think about what your data is telling you. What have you discovered or learned? Discuss why things happened and why not. Give reasons to support your analysis.	
Conclusion- Was your hypothesis correct? This is a short paragraph summing up what you learned and why as well as answering the question. You may also state what you would like to investigate next IF it is related to the current topic.	**C- Conclude.** Draw conclusions. (See information in the left-hand column.)

Why Not to Choose A Project 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 as busy as everyone is, taking the time to do a science fair project is a bit overwhelming. The thought of "getting it done" is probably in the forefront of your mind right now.

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 Playstation, or instant explanations and answers from a computer 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 with simple solutions.

By completing a science fair project from the first (and one of the most difficult) task of finding a topic to study, students are learning valuable skills. They are researching, questioning, writing, measuring, note-taking, documenting, drawing, reasoning, calculating, graphing, summarizing, and that's just the beginning. The process of completing a project is filled with educational opportunities. Most importantly, students are seeing what science is truly about and what scientists really do. Your child will understand how scientists could dedicate their lives to finding answers, despite the fact that most times their experiments do not turn out the way they predicted. This is important for students to learn.

When students choose a quick and easy science fair project from a book, they miss out on the process. Many times these same books give the needed background knowledge, the materials list, and even the conclusions with the explanations. They've given your child their project, but have taken away the entire process. They've truly robbed them of a wonderful (but difficult) experience. Your child will neither experience all the thinking that is required, nor the joy that comes from accomplishing such a huge undertaking.

I beg you, despite your busy schedule and never-ending to do list, to make time for this project and the especially the process. It can be a fun family event where you and your child are learning together.

Where Do I Start?

Step 1: Buy a logbook

Before you do anything, invest in either a composition notebook or a 3-ring Binder to use as a logbook (project journal)! This notebook will contain rough drafts of **EVERYTHING** about your science fair project. *A complete notebook will help you earn an A+ in science this quarter and is critical if you are trying to get the county and state fairs.*

Your logbook should include at least the following sections:

- a planning calendar
- evidence of where you chose your topic and question
- your research notes and rough draft of the writing
- a bibliography
- notes where you where planning and designing your investigation
- your observations and data as you actually experimented,
- rough drafts of charts and graphs
- your conclusions
- and ideas for future studies on this same topic (now that I know _____, I wonder...)

Your logbook should be in its original format when you hand it in with your project in January. 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 in the fall and worked on it through the winter. It is your evidence that you didn't throw together a project at the last minute. Judges look VERY hard at the logbook, especially at the regional and state fair.

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 1 in brief...
Buy a logbook and keep notes of EVERYTHING! True scientists always keep notes of everything they do and think during an experiment. Plus, this will make writing your report a piece of cake!

Step 2: Choose a general topic to study

Your topic can be anything that interests you!! Think about the things you enjoy doing, or hobbies 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 a few topics to get you thinking, but **you <u>do not</u> have to choose one of the ones listed.**

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

- List all your favorite topics and choose your 3 favorites. (Do this in your logbook so your work is recorded!) Put a star beside the one you want to use for your project. This is the topic you'll being learning about so that you'll think of a good question! (See step 3)

- 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 the handbook) once you've decided.

Step 2 in brief...
Find a topic that interests you. Next, you'll research this topic to learn more (even if you already know a lot!) and to figure out what questions you have!

Step 3: Before you try to come up with a question, learn about your topic (begin doing research)

Find books, magazine articles, Internet sites, news articles, professionals, and other 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 3 sources of information for your research. All three should not be Internet sites. Use a variety of materials and follow all the directions below...

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:

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

Keep track of your resources! You'll need them later for your reports. Record the following information from your resources in your logbook:

Books: title, author, page numbers, publisher, and publication date
Magazines: magazine title, volume number, title of the article, and page numbers
Encyclopedia: name of encyclopedia, copyright date, volume
Interview with an expert: name, title, and business
Internet: website address, name of site

Step 3 in brief...

A. Learn about the topic you've chosen and keep track of the questions that come to your mind.

B. List your resource information on your Project Proposal sheet

Step 4: Write a one-paged report about your topic

Combine all the cool new facts you learned about your topic into a one-paged report. This will help everyone who looks at your project understand your topic before they look at your experiment. (No one is an expert on every topic, so you need to teach them about it!)

This 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 you share will let the judges know what you learned in order to come up with your testable question.

Do:

Organize your paragraphs by subject.

Choose your information carefully. You don't have to include everything you know about the topic. You want your information to lead your audience to understand your project.

Use complete sentences and good grammar.

Check your spelling.

Step 4 in brief...
Write a one-paged report about your topic.

Step 5: Ask a testable question

Now that you've researched and learned more about your topic, you'll need to choose one question that you want to answer. Your question doesn't have to be Earth-shattering or involve test tubes and chemicals. It doesn't have to look like something from a research lab!! **Choose a simple question that you are going to have fun answering!** Think about what you found interesting while learning about your topic. Look at the following examples...

Topic: Containers
Testable Question: What 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 it's design, absorption, thickness, or brand name. You might ask instead...

Which paper towel absorbs the most liquid?
Which paper towel absorbs the 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 to where 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! AND...choose a question that captures your curiosity. That's what science is all about! This will make your project much more fun!

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.

Step 6: Design an experiment to answer your question

Decide how you're going to answer your question. What experiment can you do to find your answer? (See the information about the scientific method at the back of the handbook.) There should be no doubt about your findings. Use the following guidelines to help you design your experiment...

- ☐ Your directions need to be written 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.
- ☐ Make sure you can prove your answer more than once. If you only get the result one time, it could just be a fluke the way it turned out. Scientists have to show that they got the same results at least 3 times. (For an award-winning project, you must show proof of this!) The project doesn't have to turn out like you predicted, but it should either work 3 times or not work 3 times. (Either way, you'll learn something about your topic.)
- ☐ 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.
- ☐ Make sure you are controlling your experiment. See the scientific method section of the handbook for help.
- ☐ Make sure you've devised a way to collect your data. You should create and turn in your data collection sheet with your proposal. This way, your teacher can check to make sure you are on the right track. This is an important step! It is awful to be through with your investigating and think, " I should have..."
- ☐ Keep in mind it is not a good idea to use yourself as a test subject. Your opinions might influence the way you act or think. You keep the role of the scientist and choose others to participate in your experiment.

Your teacher will help you make sure you've designed a proper experiment!

Step 6 in brief...
Plan a way to test your question. Write out your plan step by step and make sure you are keeping the materials the same throughout your investigation.

Step 7: Double-check your plans against the scoring sheet

Look at what you've decided so far and check your plans using the first few parts of the scoring guide. (You can double check the rest of your project at a later point. It is included here so you can see how much everything is worth.)

Creative Ability – 20 points
Did you choose an original idea? Is your project creative?

Scientific Thought – 20 points
Does your project follow the scientific method? Did you control your experiment? Is your investigation designed to answer the question you asked?

Skill and Thoroughness – 20 points
Is your project complete? Did you list specific amounts of the materials needed? Did you measure accurately? Was enough data collected (at least 3 trials/samples)? Did you choose the best form for recording your observations?

Logbook & report – 15 points
Is your logbook complete? Does every page have a date on it? Is there evidence that you used your logbook throughout the entire process? Does it show all your ideas, rough drafts, and data collection?
Does your report contain all the suggested sections? Did you come up with your question by reading and learning about your topic? Could someone else easily read your report and repeat your exact experiment? Is it neat and well written?

Interview – 15 points
Can you explain your topic? Can you explain how and why you designed your experiment the way you did? Can you explain how you might continue your project?

Presentation – 10 points
Is your display neat, organized, and informative? Can someone quickly find the main idea and the conclusions? Is the board labeled correctly?

Step 7 in brief...
Make sure all of your decisions so far are good ones! Look at the scoring guide above and double check yourself.

Step 8: Begin writing the first part of your report

The first seven parts of your report can be written NOW!! Don't wait until your project is over. By then, you'll need to begin your display board. Most of these sections are less than a ½ page each. The research page will be the longest (about one page). Go ahead and finish these sections...

- ☐ **Title Page**: Write a self-explanatory title for your experiment. Underneath, list your name, class, grade level, and date.
- ☐ **Research Summary** (one page): This is your report from step 4. This page will help the judges understand what you learned and how your question came from this research. You are helping the judges and your friends learn more about the topic you chose so they'll be able to understand your experiment. (Not all adults know about baseball, rocks, gymnastics, etc.) You're the expert!
- ☐ **Question**: State the question you are trying to answer.
- ☐ **Purpose**: Why are you doing the experiment? Maybe this experiment 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 or 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.
- ☐ **Hypothesis**: What is your prediction for your experiment? What do you think will happen and most importantly, WHY? You must explain why you think your investigation will turn out a certain way AND base your explanation on what you learned about your topic. This is where you tie together your question and what you learned in your research.
- ☐ **Materials:** List specifically all the materials you used. Be sure to include measurements when possible. (For example, ½ cup of soil, 3" of string, 2 quarts of water, etc.)
- ☐ **Procedure:** List step by step EXACTLY what someone else would need to do to repeat your experiment. Number each step and explain each one.
- ☐ **References:** What books, magazines, newspapers, Internet sites, and other resources did you use to learn about your topic? Type this list in a neat format from your notes you took during step 3.
- ☐ **Cover:** Design or buy a nice cover. Either way, get this out of the way.

Step 8 in brief...
Write most of your report now! You'll have plenty to do in January besides your report. Go ahead and type the parts listed and put them in the cover.

Step 9: Conduct your experiment

The most important thing to remember during this fun part of the process is to keep very accurate notes in your logbook. Write down everything including what you see, what measurements you take, what questions your experiment is making you think of, etc. Also, don't forget to log the date beside everything you write down. (A good scientist dates everything!)

Use these other hints to work towards an A+ project...

- ✓ Remember to 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 the objects you are working with instead. This is especially important if you make it to the regional fair. You can't take plants or animals into the fair...only pictures!!
- ✓ Log and date every measurement, observation, and question you have <u>while you are experimenting</u>. Use your collection sheets you turned in with your proposal for keeping track of your data. Make sure these go in your logbook.
- ✓ Charts and graphs will help you stay organized. They will also look impressive on your display board. (You'll make final drafts of these for your display.)
- ✓ Take your time and do as many trials as necessary. <u>The more trials you complete, the better your results will be!</u>
- ✓ Make sure you're measuring in metric units like other scientists. See the metric measurement section of the handbook if you need help.

Step 9 in brief...
It's time to try out your plan. Keep accurate notes of everything that happens and of questions that you have while experimenting.

Step 10: Draw your conclusions

Your conclusions basically sum up your project and let your reader know how it turned out. You'll want to write several paragraphs here including the following information...

1. Tell what happened.
2. Did your results support your hypothesis? (It is fine if they didn't. You still learned from doing the project!) If they did, state this fact in your writing. If they didn't, tell why you think the experiment turned out differently than you thought.
3. What did you learn about your topic by doing this experiment? Would this information be of help to anyone? (Maybe you learned that plants do grow better under a certain kind of light. This information would be very important to business owners who depend on growing plants. Your mom or dad might be thankful for this information too! Their houseplants might grow much better if they knew your findings.)
4. 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?
5. What worked and what didn't work in your experiment? What could you have improved? (Maybe your results would have been stronger if you'd 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 10 in brief...
In your logbook, write your conclusions that you came up with after experimenting. These will be rewritten in a final draft for your report!

Step 11: Finish writing your report

Begin here after you've collected all your data and information. You only have 5 sections left to write! You're almost to the finish line.

☐ **Observations:** What did you see? Smell? Feel? Hear? Do not give opinions at this point. Only state the facts. Use the information you logged in your logbook to write this part. Measurements are an excellent observation. For example, you might log that the snail moved 10 centimeters. All your observations are facts, truths that can be proven. These observations will be listed according to trial number or day.

☐ **Results/Data:** This is a GREAT place for graphs, charts, and tables. In the observation section, you listed the measurements or summarized your daily log. Now, combine all of these facts onto charts and/or graphs so the judges can easily see how the numbers changed (or didn't) over time.

☐ **Conclusions:** Write a neat couple of paragraphs answering the same questions you did in step 10. This time, you'll take your rough draft of this information from your logbook and create a sharp looking version for your report.

☐ **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 by doing 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 type your entire report or your neighbor the vet met with you and gave you information on birds.

☐ **The Abstract:** (Optional...but necessary for those wanting to possibly advance to the regional fair)
The abstract is a four part, one-page summary of your project. Briefly describe on the same page...

a) the purpose of your experiment
b) a brief description of your procedures
c) a summary of the data you collected
d) explain how your project turned out (your conclusions)

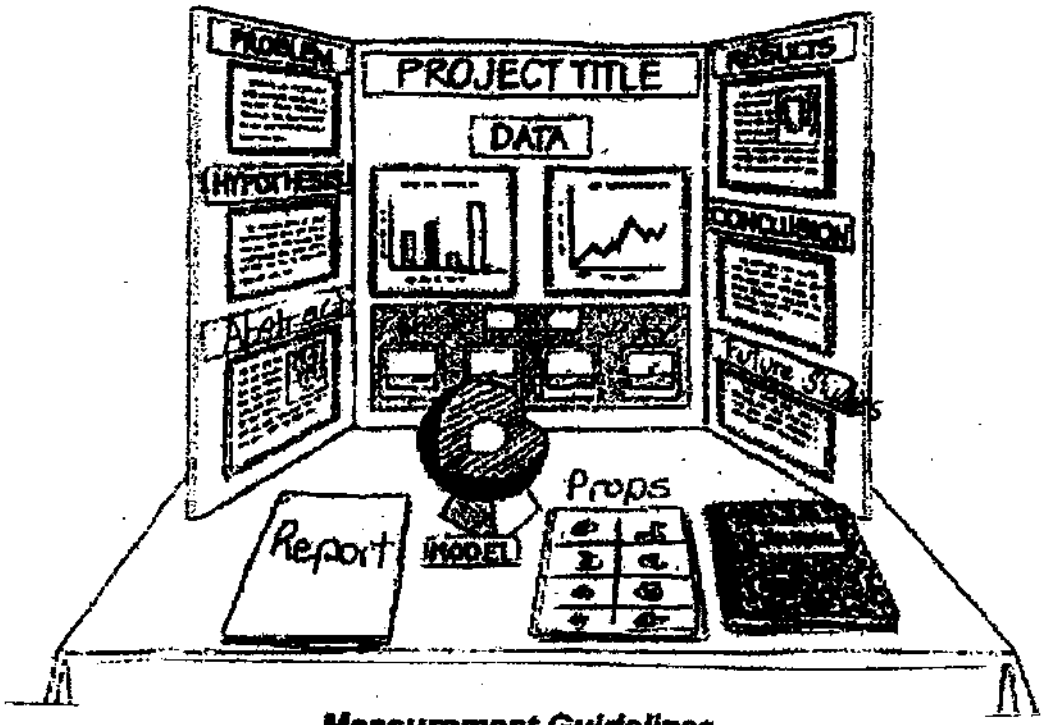
Step 11 in brief...
Write and type the last 5 parts of your report. Don't forget to include awesome graphs and/or charts to make your report look fantastic.

Step 12: Design your display

Your display is a summary of your project. Neither your classmates nor the judges were with you when you carried out your investigation. Your display board will help them understand your experiment. 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 form 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 on your display the night before it is due since a quality display will earn you 10 points towards a winning ribbon. 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 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 12 in brief...
Prepare a neat, colorful and organized display board.

Step 13: Prepare for your presentation and interview

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

a. What is your name and the title of your project?
b. Tell me about your project.
c. What was the purpose of your project?
d. How did you get interested in your project?
e. Why did you choose to do your project the way that you did?
f. Why do you think your results turned out the way they did? Explain if they answered your original question.
g. In general, what did you find out?
h. What problems did you encounter? (This will show you learned from your efforts. Be truthful about ways you could have improved your project.)
i. If you were to continue your 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 to listen to your ideas. Being interviewed is not something to be nervous about. Instead, think of it as showing off your hard work. Most likely, you'll only be speaking to one or two people at a time (besides presenting to your class and you know all of them!)

Step 13 in brief...
Be prepared to tell about your project. Think about why you chose to do things a certain way and what you found out.

Step 14: Celebrate! You're finally finished!!

The Scientific Method

The children do not have to know these terms to complete their projects. Many parents and adults tutoring children ask for a quick review. The information is written in kid friendly terms for those interested.

The main concern about your investigation should be that you are testing 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. If only the one variable you planned on can alter the way your investigation turns out, then you are *controlling the variables*.

The variable you plan on changing and testing is called the ***independent variable***. This is the part of your experiment that you purposefully change to see what happens. If you are testing the differences in plant growth with different colored light bulbs, the different colored lights will be your independent variable.

All the variables you plan on keeping the same for the project are called your ***constant variables***. (Remember that a variable is just a fancy name for something that can be changed. You aren't changing the variables just mentioned, so you are keeping them constant, or the same.) You'll want to be very careful here to make sure as many parts of your experiment as possible are the same. For example, you'd want to use the same brand of potting soil in the light bulb investigation. You'd also 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 two main things to make sure of is that you do enough trials to prove your answer several times and that you keep as many things as possible in the experiment the same. If you do these two things, your experiment will be great!

The Metric System

All scientists use the Metric System of measurement, and you should too! Actually, it is much easier to use than the standard US measurements.

There are 3 basic units: the **meter** (used to measure the length of something), the **liter** (used to measure how much a container can hold), and the **gram** (used to measure how much of something there is)

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 bigger than the basic unit (1000 meters, 1000 liters, 1000 grams)
hecto (hectometer, hectoliter, hectogram)	100 times bigger than the basic unit (100 meters, 100 liters, 100 grams)
deka (dekameter, dekaliter, dekagram)	10 times bigger than the basic unit (10 meters, 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)

* As elementary school students, you do not have to know all the prefixes in the metric system. It is just easier to see the pattern when they are all listed. For the most part, you are responsible for using centimeters, meters, kilometers, milliliters, liters, grams, and kilograms. Try using these units when measuring for your science fair project. Use the chart below to help you decide what measurement unit you might want 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 (10 meters, 100 dm., 1,000 cm.)
Teaspoons/Tablespoons	Milliliters
Cups	Milliliters
Quarts	Liters (1,000 ml)
Gallons	Liters
Ounces	Grams
Pounds	Kilograms (1,000 grams)
Fahrenheit Temperature	Celsius Temperatures

Project Schedule

This schedule is designed to keep you on track while completing your project. If you follow this schedule closely and use your Science Fair Handbook as your guide, then you will be successful. Remember, this project will account for a test grade during the second quarter.

Target Date Complete By...	**Assignment/Task**	**Completed?** Write "yes" or "no."
10/30/13	Read your ***Science Fair Handbook*** with a parent and complete the "Family Scavenger Hunt" on page 21. **Give it to your teacher.**	
11/4/13	Chose a topic. Share it with your parents and teacher.	
11/8/13	Complete the "Project Proposal" sheets on pp. 22-23. Sign the "Consent Form" on p. 24. **Give both forms to your teacher.**	
11/22/13	Research your topic!	
12/4/13	Write a one-page report and **give it to your teacher for feedback**. Include the following: • Testable question • Hypothesis • Procedures • Approved project proposal from above	
12/16/13	Write your final report. Include revisions. **Turn in a copy of your final report to your teacher** for more feedback and suggestions. Include... • Cover • Title page • Research report from above • Purpose • Hypothesis • Materials • Procedures • References • Observations • Results and data • Conclusions • Future studies/research • Acknowledgements • Abstract (only if your project advances to the Regional and/or State Science Fairs)	
1/10/14	Design your display board. **Take it to school on 1/14/14.** • Three-sided • Neat labels • Summarized information for each section • Charts, pictures, graphs... • Bound final draft of report (revised report), log book, and materials (to display in front of board) • Colorful, neat, and organized	
1/16/14	**Sedgefield Science Fair!**	

Family Scavenger Hunt

Use your Science Fair Handbook to find the answers to the questions below. This will get you on the right track to turning in an A+ project. Have Fun!!

1. The first step is the most important. What is the first thing that you need to find or buy? _____

2. Why should you research a topic BEFORE coming up with a question to investigate?

3. What will make your science fair project fun? (see step 5)

4. Which step gives you hints on how to plan your investigation? _____

5. How many points can you possibly earn for a great report and logbook?

6. Your research report should be how many pages long?

7. What system of measurement should you use for this project? _____ On what page can you find information on this topic? _____

8. How many sections of your report will you write up in step 8?

9. What is one question you might be asked during your interview?

10. What are the due dates for each of the following...
    An approved proposal: _____
    Your written report: _____
    Your final project: _____

11. How many signatures do you need to get your project proposal approved?

12. How much is a science fair board? _____

Student's Initials _____ *Parent's Initials* _____

Project Proposal

Your proposal must be approved by
Friday, November 8, 2013.

Topic	

Resources (See step 2 in your Science Fair Handbook. Include information about books, magazines, journals, people, etc. that were helpful.)	1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8.

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

_____

Does your question have…

1. something to measure?
2. only one thing to measure (independent variable- the one thing that will change)?
3. a specific answer (to be determined)?

Hypothesis (Think about what you learned as a result of your research efforts. Now, make an "educated guess" to explain what you think the answer to your testable question will be ***and*** why you think that.)	

Project Proposal

Materials List all of the materials that you will need to conduct your experiment. Specify the exact amounts.	**Example**: 1 kilogram (kg) of soil 4 pieces of string- each measuring 5 cm

Procedure	**How will you test your question?** *For each step, write specific directions.* ***Use additional paper 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- ***independent variable.***

Consent Form

I am ready to begin investigating. I have reviewed each part of my proposal with both my teacher and my parents. I have arranged a way to conduct research and to get the materials listed on my proposal sheets. Finally, I will not experiment on animals or humans.

No part of my project involves harmful or illegal substances that could bring danger or harm to my classmates and to myself.

Student's Name (Printed) _____

Student's Signature _____ Date _____

Parent's Signature _____ Date _____

Teacher's Signature _____Date _____