My Science Fair Packet

Student Name _____

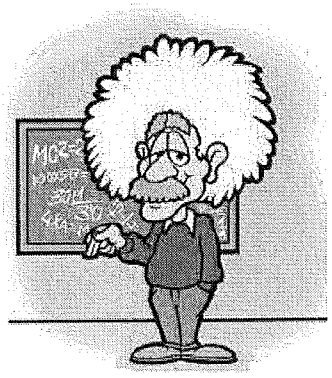
Choosing a Science Problem
Self-Check List

There are many categories from which to choose a **problem** on which to base your science **project**, such as astronomy, biology, chemistry, physics, geology, and general science. You should be able to answer "yes" to every question below for the problem you have chosen. If any answer is "no," reconsider your choice; it may be a good idea to choose a different problem or to alter the focus of your project.

Yes	No		
___	___	1.	Is this a problem that **I** am interested in?
___	___	2.	Will I have enough **time** to complete the project for the Science Fair?
___	___	3.	Will I **learn something new** about this subject through my observations and experiments?
___	___	4.	Is this problem specific enough so that I will be able to **define exactly** what I need to do?
___	___	5.	Do I have sufficient **knowledge and experience** to conduct the experiments that will be necessary for the project?
___	___	6.	Will I be able to obtain all of the **equipment** necessary to do the project?
___	___	7.	Is this a project that I will be able to accomplish with **very little or no outside help**?

After Choosing Your Problem

State your problem in the form of a **question** which gives you a clear and simple idea of what your project needs to be.



Planning Your Science Project

When you have completed your research, you will need to create a work schedule for the project itself. Your work schedule will include gathering the materials and equipment you'll need to conduct your experiments, doing the experiments and recording the data, writing your report, and designing and building your science fair display. Always give yourself more time than you think you will need for each step, so unexpected problems don't cause you to become anxious or to rush through the steps.

When working out your schedule, think about the following:

1. How will I go about solving my problem? What is my goal? What do I want to show, prove, or disprove?

2. What materials and equipment will I need? Make a detailed list of everything you will need for the project, including the experiments and the science fair display.

3. What experiments will I need to conduct? Remember that you will need to run your experiments several times to get truly accurate and valid data.

4. How will I go about collecting and recording my observations, data, and conclusions?

5. How much information will I want to include in my final report?

6. How do I want my science fair display to look? What kind of background would look best? How will it be built?

7. What should I include in my display? Consider including samples, models, illustrations, graphs, charts, tables, photographs, diagrams, written reports, and equipment from your experiments.

IT IS IMPORTANT that you do not become discouraged if your experiments or projects do not work out exactly as planned. Scientists learn as much from their many "failed" experiments as from the few which prove successful. Often, with a little thought, you can develop a new way to state your conclusions that will be more satisfying than reporting a negative result. Remember: no project is a failure; you learn from it no matter what its results are. Don't give up too soon!

Pre-Approved Science Fair Project Ideas (If you have an idea NOT on this List, MAKE SURE IT IS APPROVED PRIOR TO BEGINNING EXPERIMENTATION!) These project ideas range in 5th grade difficulty level....easy to challenging! E=Easy, M=Medium, C=Challenging

1. What factors increase the rate at which milk sours? (E)

2. What is the hydroponic method used to grow plants? (C)

3. What kind of plants can be grown hydroponically? (C)

4. How does the pH of tap water compare with the pH of purified water? (E)

5. How would you go about creating an EFFECTIVE way to control ONE type of pollution? (Identify the ONE type of pollution (such as an oil spill, etc.) AND create and perform an experiment using your solution. (C)

6. Do roots of plants always grow downward? (M)

7. Does magnetism affect plant growth? (M)

8. Does it matter in which direction seeds are planted? (M)

9. How is the growth of bean plants affected by different fertilizers? (M)

10. What conditions favor the rusting of iron? (M)

11. Do mint leaves repel ants and or insects? (E)

12. Does temperature affect the growth of plants? (M)

13. Do different amounts of soil hold different amounts of water? (M)

14. Will more air inside of a basketball make it bounce higher? (E)

15. Do plants grow bigger in soil or in water? (C)

16. Can you separate salt from water by freezing it? (C)

17. Will water with salt in it evaporate faster than water without salt? (E)

18. Does the color of water affect its rate of evaporation? (E)

19. Does a plant grow bigger if watered by water or Gatorade? (E)

20. What percentage of flower seeds in a package will germinate? (E)

21. Does the viscosity of a liquid affect its boiling point? (M)

22. What materials provide the best insulation? (E)

23. What keeps things colder....plastic wrap or aluminum foil? (E)

24. Does the size of a light bulb affect its energy use? (M)

25. What type of soil filters water best? (M)

26. Does the color of a material affect its absorption of heat? (E)

27. Do sugar crystals grow faster in tap water or distilled water? (M)

28. What common liquids are acids, neutrals, or bases? (E)

29. What is the affect of chlorine on plant growth? (E)

30. Does music affect plant growth? (M)

31. What chemical can you put in roses' water to keep them alive longer? (M)

32. Does temperature affect the life of a battery? (M)

33. Does the amount of air inside a football affect how far it travels? (E)

34. Which metal is the most rust resistant? (E)

35. Which bridge is stronger: a beam bridge or a suspension bridge? (C)

36. Is there a way to prevent or slow down the weathering of sidewalks? (C)

37. Do coffee grounds (mixed in soil) help plants grow? (E)

38. What materials are the best conductors of heat? (E)

39. Compare the effectiveness of two or more composting materials: which is the best for plant growth? (C)

40. Does electricity move better through thick or thin wires? (C)

41.Make a fruit battery: Compare two or more fruit batteries, is this a practical solution to generate electricity? (C)

Where can I find extra information?

There are a lot of places to go to find extra information. Read on for a list of resources.

Your local library and school library: Libraries are still a fantastic tool to use and one that is often forgotten about. What's even better is they are free! Librarians have a true love for books and learning, if you ask for help you are sure to receive.

Bookstores: If you don't mind spending money on a book consider buying one at a bookstore. They are full of great projects and will help you in writing it out. Although, from a teacher's point of view, they tend to take away the learning process for the student. If you choose to use one of these use it as a guide to help your child, not to give them the answers.

Websites: Of course there is a lot of information online and it's mostly free, as well. Most teachers don't mind students using the internet as a tool, however they strongly encourage students using another source in addition, especially if the project requires research. Below are a few sites to get you started.

www.sciencebuddies.org

www.education.com/science-fair

https://www.scienceproject.com

Science Fair Project Planning Packet

✓	Due Dates	Things To Do
		Choose topic and write project question.
		Get approval from your teacher.
		Research your topic and write key words and paragraph.
		Write a hypothesis.
		Design an experiment; list variables and write procedure.
		List and gather your materials (bring after winter break).
		Conduct experiment and record data and observations.
		Create a table, chart, or graph of the data.
		Draw conclusions.
		Make the project display.
		Write and Print Abstract
		Turn in Planning Packet to teacher.
		Present your project at the science fair.

1. Think of a Question - Your question will drive your entire project. Make sure that your question is something that can be measured and answered by following the scientific process. Your question will also be the title of your project.

Project Question

_____

_____

_____

2. Research Your Topic - spend some time with your group learning more about your topic. Use reliable Internet sources, books from the library, your science book, or other resources. Not only do you want to be an expert on your topic, but you want to teach others about your topic.
    1. *Key Words* - locate at least 3 key science words related to your topic. Your science book is an excellent place to find these. Make sure that the words you choose are directly related to your topic. Provide a definition of each key word IN YOUR OWN WORDS.
    2. *A paragraph describing the science behind your project* - after you have completed your research give us (your audience) some background information on your topic in a complete and well-written paragraph (5-7 sentences). Give us specific, rather than general information. Use the space provided to write a draft. You will edit a final copy to place on your display

board.

Key Words

Key word	Definition

Research Description

3. State Your Hypothesis - In your group decide what you think the outcome of the project will be and make a good guess as to what you think the answer to your question will be. **Also explain WHY you think that will be the outcome.** Remember, it is ok if you don't have the right answer; that is how scientists make discoveries. Make sure that your hypothesis is written in a complete sentence.

Hypothesis

4. Design Your Experiment - Clearly write out the procedure you are going to follow. Remember that your experiment needs to follow the scientific process and that you need to have one variable that you are going to change.
    1. *Variables* - List the variables that you are going to keep the same and the one variable that you are going to change. You need to have at least one control (normal) variable and at least two to three other variables.
    2. *Write your procedure* - Think through each step very carefully and list them in numbered order.

Variables

Variables to keep the same:

Variable to change (Independent Variable):

Procedure

5. Gather Materials - list all the materials that you will need to complete your experiment.

Materials

6. Conduct experiment – when you do your experiment you need to collect data and make observations. You will complete these in your Experiment Log. After you have completed the experiment use your log to write down the data and observations below. In your log you will need to:
    1. *Collect Data* - you will need to collect numerical data; that means you need to take measurements during the experiment. It can be temperature, distance, height, etc. You will analyze the data later to determine the results of your experiment.
    2. *Make Observations* - as you conduct your experiment you will use your senses (sight, smell, touch, etc.) and write down any observations you make during the process.

Data

Observations

7. Determine the Results - Now it is time to review your data and observations to find out what happened. Think about the best way to show your data: bar graph, line graph, chart, etc. and then create a table or a graph using your data. Write out the results of each test in the experiment in paragraph form using complete sentences. Make sure that you include the numerical data (measurements) as well as any other important observations that you made.

Results (graph or chart)

Use this space, or a separate sheet in your notebook, to sketch 1 or more tables, charts, or graphs to analyze your data.

Results (paragraph)

8. Draw Conclusions - After you have determined the results it is time to decide the answer to your original question. Write your answer in a complete sentence using the question to begin your answer. You also need to tell whether your hypothesis was correct or incorrect. If it was incorrect explain why you think so. End this paragraph by saying how you could change or improve your experiment in the future.

Conclusions

Answer to your original question:

You're your hypothesis correct or incorrect? If incorrect, why?

If you were to complete this experiment again, what changes would you make? How would you improve this experiment?

9. Display board - Now that you have completed your experiment you will begin setting up your display board to communicate the results of your experiment to others. Remember, the board is graded on the information not how colorful or pretty it looks. Your display board must have ALL of the following components located in the same places. Other board guidelines:
    - Font should be easy to read and at least a size of 16pt or greater.
    - Photos should not include faces of students
    - Information on the board can be typed or written neatly by hand.

Display Board

Question

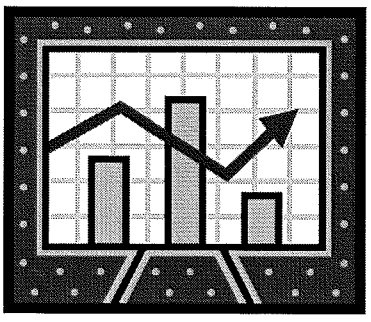
Hypothesis

Procedure and Materials

Title

Photos or Drawings

Graphs



Results

Conclusion

*Triple A

*Extension Piece

10. Abstract – The abstract is a short version of your science fair final report. It should be no more than 250 words. Most of the information you will put in your abstract is already written, you will just need to copy it over. You must have the following five components in your abstract:
    - Introduction
    - Project Question
    - Procedures
    - Results
    - Conclusions

    The only new thing you will need to write it the **Introduction**. This is where you describe the purpose for doing this experiment or project. Tell why people should care about the work you did. How does your experiment give us new science information? Can this information be used to improve our lives? If so, how? This is where you want to interest the reader in your project and motivate them to read the rest of it.

Abstract Introduction

Finally, you will type up the abstract, edit and revise it, and then print it. Make sure that your abstract is written in Times New Roman or Arial font at size 12pt.

If you need to use the school's computer and or printer to do this, it is YOUR responsibility to see me to schedule time!

Acknowledgments

Bibliography (References Used)

Science Fair Grading Rubrics

Group Members: _____

Science Fair Project Components

Component	Points Possible	Points Received
Science Fair Project Planning Packet	10 pts	
Display Board with: • Question/Title • Hypothesis • Key Words • Research • Procedure and Materials • Photos/Drawings • Chart or Diagram • Results • Conclusion *Triple A only- (Extension)	10 pts	
Experiment Log	10 pts	
Abstract	10 pts	
TOTAL →	40 pts	

Science Fair Project Content

Content	Points Possible	Points Received
Question * Question is relevant and testable through experimentation	5 pts	0 1 2 3 4 5
Hypothesis * Hypothesis is based on observations	5 pts	0 1 2 3 4 5
Research * Key words and research are relevant to the question being tested	5 pts	0 1 2 3 4 5
Procedure * Procedure is clearly outlined and presents a controlled experiment	5 pts	0 1 2 3 4 5
Results * Results are communicated clearly through graph/chart and well written explanation	5 pts	0 1 2 3 4 5
Conclusion * Conclusion includes appropriate evaluation of data and proves or disproves the hypothesis	5 pts	0 1 2 3 4 5
TOTAL →	30 pts	

0 = Not Presented	1 = Below Standard	2 = Minimum Standard	3 = Average Standard	4 = Above Standard	5 = Exceptional/Outstanding