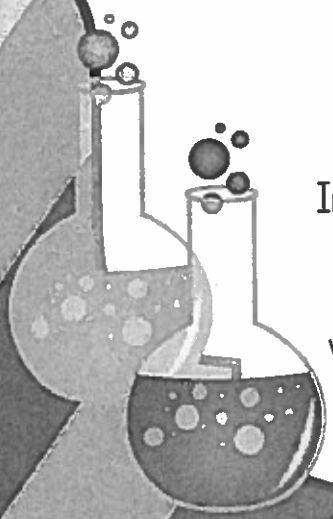
Common Core Aligned

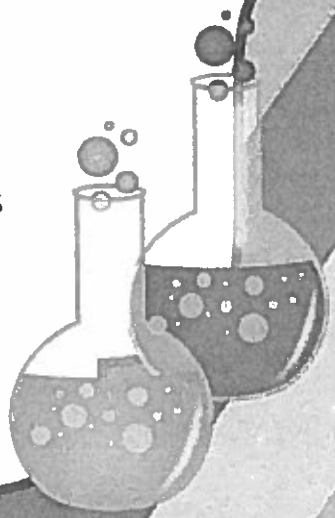
SCIENCE FAIR

Project Planner Pack

by Emily M. Brown

Instructions, ideas, and graphic organizers
for the perfect science fair project.
PLUS - CC aligned explanatory
writing instructions & graphic organizers
for science-based report writing.
RUBRIC INCLUDED





MY SCIENCE FAIR PROJECT

Planning Packet!

Name: _____

SCIENCE FAIR

Tips for a Great Science Project

• Avoid asking "Why" questions. Instead, focus on something that might ask "how" or "what happens if..." or that compares two or more different things.

• Avoid asking questions that include the word "best". For example, "Which detergent is the 'best'?" asks for an opinion. In science, we need to separate our opinions from facts. Instead, you might reword your question to say "Which detergent cleans more grass stains out of white t-shirts?"

• Don't choose a project that just demonstrates something. For example, do not create a volcano to watch it erupt. That isn't asking a scientific question. Focus on something that can be researched by actually doing some sort of experimentation.

• Don't make your project too complicated. Sometimes, less is more!

• Choose something that interests you. This is your project and you will spend a good amount of time on it, so make sure it's something that is interesting and fun to you. Be proud of your project.

• Don't rush. Take your time on this project, especially when it comes to writing your report.

• Take great notes. Don't forget to take notes throughout the entire experiment, even if it's an experiment that lasts a week or more. If you don't have good notes, you won't be able to write a good lab report

GLOSSARY

These are terms that you should be familiar with before you start your planning on your project. You have already learned about these throughout the school year, but read through them to make sure you remember!

Controlled Variables - variables that remain the same throughout all trials of the experiment.

Data - observations and measurements taken from the experiment. Should be organized using a graph in order to easily see the results.

Dependent Variable (Responding Variable) - the change that happens in your experiment as a result of changing the independent variable. This is usually what you are measuring.

Experiment - a scientific study of specific variables

Hypothesis - an educated response (or guess) to a proposed scientific question. This is what is tested for during an experiment.

Independent Variable (Manipulated Variable) - the ONLY THING that is changed throughout an experiment to see what affect it has on the outcome of the experiment.

Inference - a reasonable conclusion or opinion formed from known facts or evidence

Observation - things that you see or observe using your senses throughout an experiment

Procedure - a list of steps performed throughout an experiment. Procedures should be very detailed and specific so that someone else could read them and redo your experiment exactly as it was originally done.

Results - the outcome of your experiment.

The Scientific Method - a good rule of thumb to follow when conducting a scientific experiment. Includes 6 steps: Ask a Question, Form a Hypothesis, Create & Conduct an Experiment, Observe & Record Data, Analyze the Data and Communicate the Results.

Trial - the number of times an experiment is conducted.

Variable - any factor that can be changed, controlled, or measured in an experiment.

SCIENCE FAIR
Topic Ideas

Consumer Science!

Test the claims of popular consumer products that you can find at your local supermarket. Which paper towel is the strongest? Which carpet cleaning product cleans out grass stains (or any type of stain you choose) the most? Which freezer bag prevents freezer burn the most? The possibilities for consumer science experiments are endless. Be creative. And be on the lookout the next time you see a commercial claiming it does a better job at doing a task that another brand of a similar product!

Gardening or Outdoor Experiments

- Fertilizer tests on flowers, vegetables, etc.
- Which soil grows the largest {plant, flower, vegetable}?
- Do different types of seeds grow faster than others?
- How do different plants grow in different environments?

Big Thinking Science Experiments - Think Outside the Box

- Energy - can you use different types of energy to get something to work?
- Have an idea for an invention that might work? Design something new for your science experiment. Just remember, you need this invention to have a purpose and you need to be able to create a TESTABLE question before you start.
- Do certain foods affect people's moods?
- Can you perfect a recipe you (or someone else you know) have made before? You might use chemistry to think about this one! {If you add _____ , will it be {fluffier, moister, bigger, etc}?

The possibilities are endless! Check out these resources for more science fair ideas:

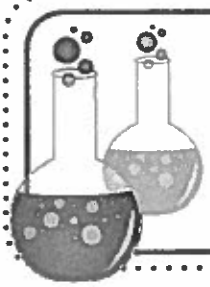
www.sciencebuddies.org

www.sciencebob.com

www.education.com/science-fair

www.stevespanglerscience.com/lab/experiments

Name: _____



CHOOSING YOUR TOPIC

Answer the following questions to help you decide what topic to pick for your science fair project. If you need help, take a look at the example and idea pages included in this packet.

What is my favorite hobby? _____

What is the BEST thing I have learned in science all year? _____

What did we NOT learn in science that I really wanted to learn about? _____

_____

Can I take any of these topics and create a testable experiment from them? If so, write the idea here. If not, talk to your partner and/or your teacher to help you come up with a good science fair topic.

_____

_____

Remember, at the beginning of the year, we learned that questions that we ask in science must be TESTABLE. This means that we can create an experiment so that we can TEST our question. Asking WHY questions should really be avoided. Here's an example of how you might reword your question to make it testable.

ORIGINAL QUESTION: "Why does bubble gum lose its flavor?" (Not testable) ✗

REVISED: "Which brand of bubble gum has flavor that lasts longest?" (Testable!) ✓

Try it Out

Make sure you understand how to change a non-testable question into a testable question. Turn the following non-testable question into a testable one. Check with your partner to make sure you did it correctly! {Hint: there may be more than one way to do this!}

ORIGINAL QUESTION: "How do paper airplanes fly?" (Not testable.) ✗

REVISE IT! : _____

FORMING YOUR QUESTION

Once you have your topic, use this dichotomous key to make sure you can develop your idea into a science fair project. You might have already come up with your question, but use this key to make sure your idea is perfect for the science fair.

Is your topic original?

YES → Can you come up with a question about your topic?

YES → Write your question here:

Then continue on here!

NO → Try to come up with something that no one else will be testing at the Science Fair!

NO → If you are choosing a topic that only demonstrates something, you need to think about choosing a topic that asks a scientific question.

Does your question ask WHY?

YES → Try to go back and reword your question so that it asks HOW or WHAT IF and can be tested. Write your re-worded question in the box above. {Erase the old question.}

NO → GREAT! You have a strong question. Continue on!

Does your project include materials that you can get? {Can you - or your parents/teachers - easily get the materials you will need?}

NO → If you don't have access to the materials, then you can't complete your experiment! Try to think about another topic that you could easily do using materials that you have at home or at school.

YES → GREAT! List your materials here:

And Congratulations! You have chosen your project topic and question! Now the fun can begin!

The Scientific Method

Now that you have your topic secured, you can start thinking about putting The Scientific Method into action.

What is your topic question? _____

_____

What is your hypothesis? _____

_____

Creating Your Experiment:

This part is very important! You have to plan out your experiment before you start to make sure that your experiment goes smoothly and is FAIR! You must have a dependent variable, an independent variable, and several controlled variables in order to be successful at completing this project. After you know these things, then you can begin planning your experiment. Use the glossary to help you remember what these terms mean. Make sure you read the example science fair project to help you better understand these variables.

INDEPENDENT VARIABLE: _____

This is the ONLY thing you are changing when you conduct your tests.

DEPENDENT VARIABLE: _____

This is what you are TESTING FOR. This is usually measured in some way.

CONTROLLED VARIABLES

These are the things that stay the same so that you know your experiment is fair. You will probably have more than one of these. List them here:

_____ _____

_____ _____

_____ _____

Procedures

List step-by-step procedures for how you will conduct your experiment. Use this page and make sure you number your steps (1,2,3,4,etc.) If you need more room to list the steps, use the back of this page. You will use this later to write up your final report.

Materials Checklist

List all of the materials that you will need to conduct your experiment on this page. Make sure that you can get all of the materials that you need for your experiment! You also need to include the materials that you will need for your science fair display. See page 14 for help! Once you have them, check them off of your list.

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Conducting Your Experiment

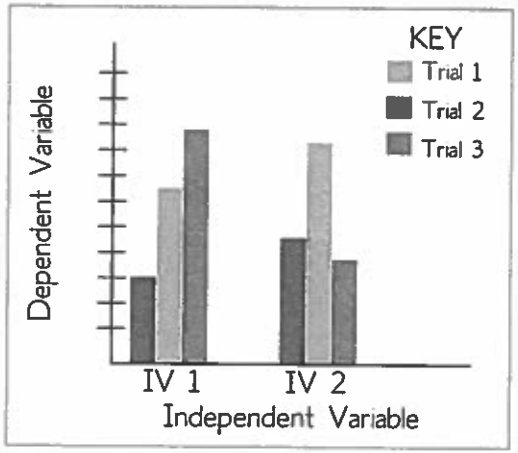
Once you have your procedures in order, your materials in place, and you have gotten approval from your teacher, you can begin your experiment!

Remember, some experiments will take days or even a week or two to complete. Be patient - and most importantly, don't forget about your experiment! Make sure you keep track of your experiment. Use the next page to help you decide how you are going to keep track of your data. You can use page 13 to draw your chart or you can use your own paper. Take photos of your experiment if you can. It's always good to have photographic evidence for when you are reviewing your data at the end.

When you begin your experiment, use your procedures from page 9. If you come across something that you forgot to include, make sure you correct it on that page so that your information will be accurate. Remember, at the end of this project, you will be required to write a report that will summarize everything that you did throughout this project.

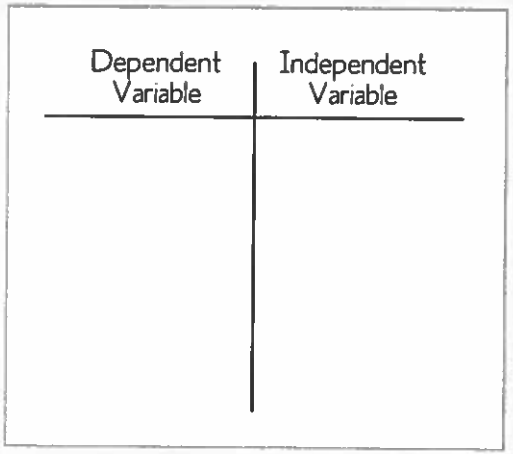
RECORDING DATA

You will need to take very good notes during your entire experiment so that you have lots of information about what you are doing. Do not wait until you are finished with your experiment to record your data! Make sure you record as you go. To organize your data, a chart might be helpful. Take a look at these example charts to decide which chart would be best for you to use to organize the data that you collect.



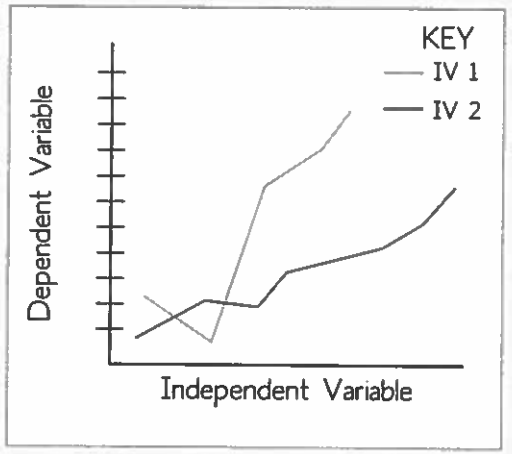
BAR GRAPH

This is a chart that records measurements. You might put the dependent variable on the y-axis and the independent variable on the x-axis.



T-CHART

You might use this chart if you are just looking to track the growth of something that you are measuring



LINE GRAPH

This is just like the bar graph, except you are using lines instead of bars. You might choose to use this one if you are just recording measurements of something.

Recording Data - My Chart

Use this space below to draw record the data from your experiment. Try to use one of the charts described on the previous page. Remember, this is just a rough draft, so if you mess up, it's OK! You will complete a final draft when you put together your display.

Analyze Your Results

Now that you've completed your experiment {hooray!!}, you need to answer your original question using the data that you collected.

What is the answer to your original question? _____

_____

Was your hypothesis correct? _____

_____

Summarize

Look over your data. In the space below, write a rough draft summary. Explain what you noticed, what surprised you, and your final conclusion. You may also want to include any other relevant or interesting points in this section. You will use this section when you write your final report. MAKE SURE YOU ANSWER YOUR ORIGINAL QUESTION IN YOUR SUMMARY!

_____

_____

_____

_____

_____

_____

_____

_____

Communicate Your Results

This is the part where you will begin planning how you will show off your work. You will need to create a display to showcase your fantastic work at the Science Fair!

Requirements

Use this checklist to check off the things that you are required to have on your science fair display:

- ☐ Title - Be creative! Make this large and colorful
- ☐ Your original testable question
- ☐ Your experiment data - use your data from [redacted] to create a final version of your chart. Make sure it's nice and neat and that it stands out.
- ☐ Your results
- ☐ Photos or a colorful drawing to make your poster stand out

Suggestions

You will probably want to use a tri-fold poster board to show off your experiment. You could also display any photos that you took or you could even display a few drawings that you might have. You might use bulletin board border, decorations, or even colored construction paper to make your display stand out. Either way, you want to make your display look GREAT. Be proud of your work!

Writing Your Report

You are required to write a final report that outlines what you did and what you learned throughout your project. Use the next few pages to develop your ROUGH DRAFT. You will then turn these pages into a final report, which you will turn in with your project. Use the Report Checklist on page 23 to help you.

Introduction (First Paragraph)

Briefly explain what it is that you experimented with. What was your question? What was your hypothesis? Write about these in your introduction paragraph.

Explain (Second Paragraph)

Provide some of your background information that you discovered from your research. Use the FACTS that you collected on pages 10-11 to help you.

Explain, continued

Expand (Third Paragraph)

Use the procedure steps that you listed from [redacted] to help you create a paragraph that would explain what you did. Use science vocabulary words to enhance your writing.

Expand, continued

Conclude (Fourth Paragraph)

Use your data to explain the results of your experiment. What happened in your experiment? Was your hypothesis correct? Explain all of this as you conclude your report.

Report Checklist

Once the rough draft of your report has been outlined using the previous pages, use this checklist as you turn your rough draft into a final report.

- ☐ You have a clear introduction that introduces your experiment and includes your original testable question and your hypothesis
- ☐ You have a good explanation paragraph that explains the background (the research that you did) of your experiment topic. You used the facts that you found and explained them in your own words.
- ☐ You have a third paragraph that expands (or adds more detail) what you did throughout your experiment. You used your procedures and turned them into sentences to explain your steps. You used some of the science vocabulary words from the beginning of this packet to help you.
- ☐ You have a great conclusion that describes what happened in your experiment and that explains the outcome. You made sure that your original testable question was answered.

Make sure that you can truthfully check off all of these items because this is part of what you will be graded on for your science fair project!

Great job! I know you will be proud of the work that you did.