NAME:

DATE:

SCIENCE EXPERIMENT

A science experiment journal!

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Complete the KWL chart and then list your proposed science fair topic here!

Science Project KWL Chart

OUR TOPIC



I ALREADY KNOW THAT



I WANT TO KNOW ABOUT



I HAVE LEARNED THAT

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SCIENTIFIC INVESTIGATION PROCESS

Even the youngest students can use the scientific process to study science! When scientists study science, a process of investigation is always used. These are simple steps designed to help us logically come to a conclusion.

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?

DO YOUR RESEARCH

Use the library and internet to help you find the facts and information about your questions.

CREATE A HYPOTHESIS

After gathering all the facts or research, scientists will make an educated guess or "hypothesis." This is more than just a random guess, but is based on the research and facts gathered. A hypothesis will state the anticipated cause and effect that will be observed in the experiment.

A good hypothesis allows you to then make a prediction:
"If _____[I do this] _____, then _____[this]_____ will happen."

EXPERIMENT

Your experiment will test your hypothesis. It is very important that your experiment be a fair test. Try to make sure that the procedure is followed exactly with each experiment that you do, keeping all conditions the same. Be prepared to test over and over - this is called iterative experiments.

CONCLUSION

Once your experiments are complete you gather all of your data and analyze them. You can determine how the data or results from your experiment answer your initial questions. If you find that your predictions were not accurate you may want to revisit your first few steps and try again.

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YOUR QUESTION

This is the very first step in the scientific process, once you decide on a topic for your investigation you need to create a related scientific question. A good question will make your science fair project much easier to work through. The question should always start with the How, What, When, Who, Which, Why, or Where. Here are some characteristics of a good science fair project question:

- It should be interesting to you and to your readers. Is this something people want to learn more about?
- You should be able to find at least 3 resources on your topic. If not, choose another topic.
- Your question should have at least one variable that you can change with each experiment

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RESEARCH

Researching your topic is very important to the investigation process so that you can understand your experiment.

-Identify the keywords in your science project
- Use a chart to generate answers to your key questions.

WHAT IS THE DIFFERENCE BETWEEN AN ALLERGENIC AND A TOXIGENIC MOLD?
WHEN DOES A PLANT GROW THE MOST, DURING THE DAY OR NIGHT?
WHERE ARE THE CARDINAL POINTS OF A LENS?
HOW DO THE TWO TYPES OF APPLETS WORK?
DOES A TRUSS MAKE A BRIDGE STRONGER?
WHY ARE MOSQUITOES ATTRACTED TO HUMANS?
WHICH CLEANING PRODUCTS KILL THE MOST BACTERIA?

-Collect all relevant formulas and equations that will need to be used.
-Find similar experiments to see what methods worked previously - do not copy.
-Ask others for advice!

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BIBLIOGRAPHY

Research is very important! Keeping track of where you got your information and giving them credit is just as important. Here are a few tips on how to gather the important information for your bibliography (a list of the resources you used to find your facts.) Most of the information you need to gather will be found in the front portion of your book or printed resource.

ONLINE SOURCES

- author or editor names
- title of the work
- the company who hosts the page
- the web address for the page (URL)
- date you last looked at the page

PRINTED SOURCES

- author name
- title of the work
- date of publication
- place of publication
- publishing company
- volume number
- page number

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HYPOTHESIS

GOOD VARIABLES?

A good experiment will always have variables that can be changed and tested with each trial. Before you get started use this guide to determine whether your variables will work or not.

GOOD VARIABLES	SHOULD BE "YES"
• Is the independent variable measurable?	• yes/no
• Can you change the variable while doing the experiment?	• yes/no
• Have you determined all the dependent variables?	• yes/no
• Are they all dependent on the independent variable?	• yes/no
• Are the dependent variables measurable?	• yes/no
• Have you noted all relevant controlled variables?	• yes/no
• Can all controlled variables be held steady during the test?	• yes/no

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HYPOTHESIS

FORMULATING YOUR THEORY

The whole point of a science experiment is to test your hypothesis. Don't worry if your experiment proves it right or wrong... the point was to engage in science investigation and test your initial theories. This is what science is all about!

CHECKLIST FOR A GOOD HYPOTHESIS

- Can you clearly identify your independent and dependent variables?
- Can you test your hypothesis? Can you design an experiment that would give proof that it is either true or false?
- Is your experiment safe and ethical?
- Is there are simpler clearer way to write your hypothesis? Then rewrite it. Remember: A good hypothesis allows you to then make a prediction:
- "If _____[I do this] _____, then _____[this]_____ will happen."

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Name: *Date:*

EXPERIMENT

YOUR RECIPE FOR SUCCESS!

When we conduct the experiment, we should have written notes that show step by step what we did during the experiment. Your experiment will have certain materials that are required to make it a success. Make sure that you get exactly what is needed and list those items clearly so that you can document what you used during the experiment.

DETAILED MATERIALS LIST

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PROCEDURAL LIST

When we conduct the experiment, we should have written notes that show step by step what we did during the experiment. Just like you would have a recipe card when you bake a cake, your experiment should have its own recipe as proof of what you did.

A good procedure will have a recipe that someone else can duplicate with the same results.

REPEAT YOUR EXPERIMENT TO VERIFY RESULTS

DETAILED MATERIALS LIST

1. a notebook to record our experimental observations
2. a camera to take pictures during the experiment
3.

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DATA ANALYSIS

WHAT DOES IT TELL YOU?

After completing your experiments, you should have data that you can analyze. Ask yourself some questions when you do this.

1. Is my data complete? Did I miss anything?
2. Should I collect more data? Is this enough to determine a conclusion?
3. Was I able to replicate my experiment successfully to validate it?
4. Did I make any mistakes?
5. Have I clearly labelled everything?
6. Have I made a chart detailing my data results? HINT: place your independent variable on the x-axis and the dependent on the y-axis.

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EXPERIMENT JOURNAL

YOUR STEP BY STEP PROCESS

Use these pages to document your experiment (or grab a small notebook at the store). Duplicate this sheet as many times as needed.

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