Temperature Effect On Gases

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Due: Dec 2nd

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Science Fair topics template

TITLE A

Step-: 2 Project Ideas Proposal

Assigned: 10/27

Deadline: 11/05

1st Idea: Topic Glowing water

(Please circle one: engineering/science)

2nd Idea: **Effect of temperature on gases.**

(Please circle one: engineering/science)

My Final idea: **Effect of temperature on gases.**

Question: How the change in temperature affect the balloon volume and shape?

Resource(s): bottle, balloon, table, glass bowl, hot water, normal water, cold water,

:

Science Fair Topics - Draft

Write down the topic you chose:

Effect of temperature on gases.

What made you want to pick this topic?

Well I was playing with a balloon after a party celebration and I saw that it gotten smaller and it was floating less so I was like hmmm… I can use this for a project. I noticed during winter the balloons does not last as long and floats less.

Do you find these topics interesting? Why?

Yes I find it interesting because I wonder when it is cold is it getting smaller and float's less. If it's in a hot room is it the opposite?

Science Fair Topic and Question - Final

Which topic did you choose?

Effect of temperature on gases.

What question(s) are you testing?

How the change in temperature affect the balloon volume and shape?

How are you going to test your hypothesis?

I will get a empty plastic bottle and poke a hole in the cap and cover the hole with the balloon then I will place this est up in different temperatures and see if it balloon get big or small.

Background Summary

Find information and record the sources you use that help you make an educated guess to your testable question.

Write a 1 paragraph summary for each of your sources.

Tip: Make your hypothesis after this is done

The balloon will shrink due to lower temperatures, which causes gas molecules to contract and compress, which makes the balloon float less.

Background Research Source 1

TITLE B

Source 1

Title: Density Of Helium Gas Vs Temperature And Pressure

Summary: What makes the gas in a balloon expand or decrease.

What's the big idea about the article? What makes the gas in a balloon expand or decrease.

In complete sentences, describe a few details (who, what, where, when, why, and how)

This website talks about how cold air or hot air makes it float more or less. Well, if the temperature is hot, the helium balloon will expand, and it will also float more than usual. When the temperature is cold, the helium balloon shrinks, and it will not float as much.

This source is a: _____ Website _____ Other **The URL is http://ud.goldsupplier.com/blog/density-of-helium** **Last Date of Access: 11/10/25**
Title of Article: Density Of Helium Gas Vs Temperature And Pressure
Author's Name: UDMachine [=
Date of Article: July 1, 2025

Background Research Source 2

Source 1

Title: Does Cold Weather Make a Helium Balloon Float More or Less?

Summary: The effect of gases in a balloon is observed when it is tucked in a cold temperature. Will it get bigger or smaller? Will the gas in the balloon get bigger or smaller in a hot temperature? In both rooms, would the gases in the balloon become smaller or bigger?

What's the big idea about the article? The effect of gases in a balloon is observed when it is tucked in cold temperature. Will it get bigger or smaller?

In complete sentences, describe a few details (who, what, where, when, why, and how)

The effect of gases in a balloon is observed when it is tucked in a cold temperature. Will it get bigger or smaller? Will the gas in the balloon get bigger or smaller in a hot temperature? In both rooms, would the gases in the balloon become smaller or bigger?

This source is a: _____ Website _____ Other

The URL is http://
education.seattlepi.com/cold-weather-make-helium-balloon-float-less-4166.html

Last Date of Access: **11/10/25**

Title of Article: Does Cold Weather Make gases in a Balloon **bigger or smaller?**

Author's Name:

[=Kate Beck

Date of Article: December 3, 2013

Background Research Source 3

Source 1

Title:Why do helium balloons deflate faster in cold air?

Summary: Gases in a balloons deflate faster in the cold because of the force pushing them, which makes them smaller. This also makes the balloon float less. But in the hot air, the helium balloon deflates much more slowly than usual, and it floats the same as a helium balloon when its normal temperature if not even more.

What's the big idea about the article? Does cold air deflate helium balloons faster?

In complete sentences, describe a few details (who, what, where, when, why, and how)

Helium balloons deflate faster in the cold because of the force pushing them, which makes them smaller, just like we human beings. If it's cold, it's like it's pushing us. If it's hot, the balloon will expand just like how we do it, but instead of expanding, we just sweat a lot.

This source is a: _____ Website _____ Other **The URL is http://** **zephyrsolutions.com/why-do-helium-balloons-deflate-faster-in-cold-air/** **Last Date of Access:** **11/9/25**
Title of Article: Why do helium balloons deflate faster in cold air?
Author's Name: Kathi Leiden [=
Date of Article: January 7, 2016

Science Fair Hypothesis

TITLE B

Hypothesis: Use your background research to help you create a HYPOTHESIS that predicts the outcome of your experiment

What is your Hypothesis? The balloon will shrink due to lower temperatures, which causes gas molecules to contract and compress, which makes the balloon float less.

Tip: Make your Hypothesis after the background research

My hypothesis is that the balloon will shrink in cold temperatures because the gas molecules slow down and move closer together. Cold temperatures make the gas compress. Hot temperatures make the balloon expand because the gas molecules spread out. If the gas gets too hot, the balloon could even pop. When the balloon is warm and then moved to cold water, it will deflate a little.

Materials

Make a list of all the Materials you used for this experiment:

Materials:

1.balloon

2. thermometer

3.measuring scale

4. Bowl with cold water

5. Bowl with hot water

6. Bowl with normal water

7. Measuring tape

8. isolated box setup

Make a list of all the Materials you used for this experiment

Materials:

1.balloon

2. thermometer

3.measuring scale

4. Bowl with cold water

5. Bowl with hot water

6. Bowl with normal water

7. isolated box setup

8. Measuring tape

Procedure

What are the steps you followed during this experiment?

Write all of them down. Make sure they are exactly what you followed while doing the experiment.

Step 1: Get a empty plastic bottle then poke a hole in the cap, after that insert a balloon on the cap. Screw the cap back on the plastic bottle then measure the balloon's circumference and initial volume

Step 2: Be ready to put hot water in a glass vase . Do the same thing but with cold water and normal water make sure it is cold for the cold vase and very hot for the hot vase but for the normal vase just put normal water. We will be using 3 different types of hot water, Luke warm water,Hot water, Very hot water.

Step 3: Put the hot water vase on the table and measure the temperature of the hot water. Then right it down on paper do the same things for the normal water vase and the cold water vase.

Step 4: Get the bottle and put it in the normal water first then measure the balloon's circumference and initial volume
, then transfer it to the hot water. Observe when it goes to the hot water, the bottle will shrink. The the gas in the bottle will transfer to the balloon which will increase the size.

Step 5: When the balloon seems like it’s in it’s max size measure the balloon's circumference and initial volume. After you measure the balloon's circumference and initial volume transfer the balloon to the cold water then observe how the balloon will decrease in size.

Variables

What are the Variables of your experiment?

Dependent Variable? circumference/volume/density of Gas

Independent Variable? Water temperature, hot water, cold water

Control Variable? The amount of gas added in the bottle. Bottle, cap, balloon.

Testing the Hypothesis - Experiment

Temperature vs Circumference

	Trial 1	Trial 2	Trial 3
25	7	8	7
50	11	11	12
75	14	13	14
100	18	19	18

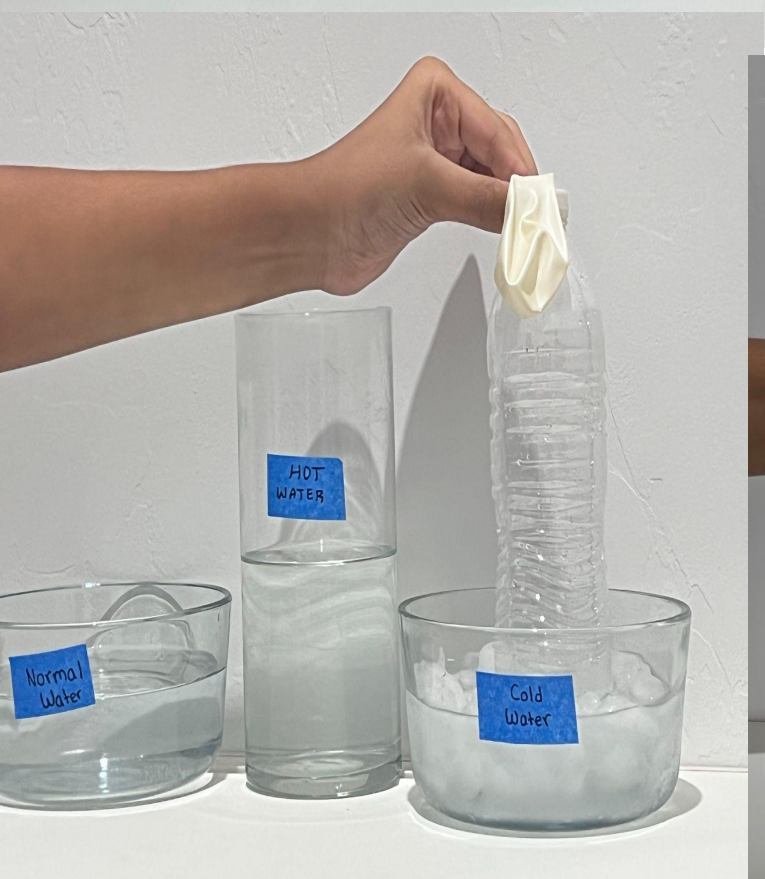
Temperature (Celsius)

Circumference (cm)

Pictures

HOT WATER
Normal Water
Cold Water

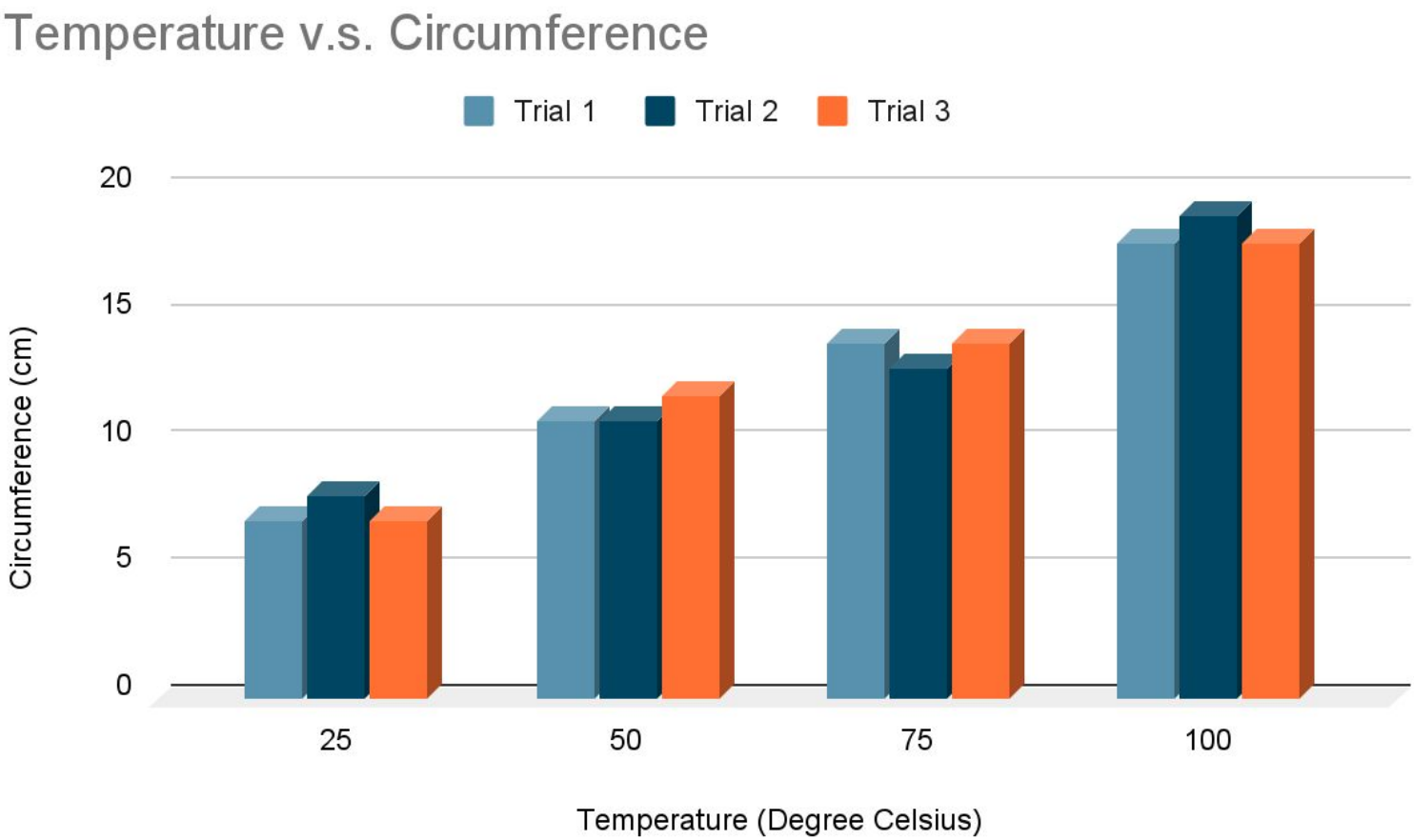
HOT WATER
Normal Water
Cold Water


HOT WATER
Normal Water
Cold Water

HOT WATER
Normal Water
Cold Water

Results

Put your data into graph form and study you graph to see what kinds of trends you notice.



Conclusion

Based on your results, what was the outcome?

Does your data show that your hypothesis was correct?

What kinds of problems did you have?

What would you do differently next time?

I have found out that temperature can change how much space air(gas) takes up. I learned that when gas gets hot, the volume increases, and when the gas cools down, the volume decreases. I used balloons to help us see this. When the air was cold, the balloon got smaller because the air inside shrank, and the air molecules compressed. When the air was hot, the balloon got bigger because the air inside spread out, which led to more molecule collisions. In conclusion, when the air gets warmer, it takes up more space, and when it gets colder, it takes up less space.

Rough draft

1. Have you ever wondered why a balloon gets smaller or bigger? If it is higher temperatures it means faster moving gases. Higher temperatures mean higher average speed . This experiment was fun learned so much stuff out of this experiment. One of my key questions was how did temperature affect the gas in the balloon to make the balloon bigger or smaller.

2. My hypothesis is the balloon will shrink due to lower temperatures, which causes gas molecules to contract and compress. Cold temperature make all the gase comprese to the middle. While hot temperatures make the balloon expand and stretch out. Hot temperature make all the gase spread around and has too much gas molecules in it it might explode. When the gas in the balloon is hot and then you transfer it to the cold it will deflate a bit.

3. To test this experiment I will have to get a empty bottle and remove the cap. Then i'll have to poke a hole in the cap then put the balloon on the cap of the bottle and put it back on, make sure to have air in it. After that put hot water in a glass vase or a glass bowl do the same thing but with also cold water, normal water, warm water, and lukewarm water. Put the glass vases or bowls on a solid platform. Put the bottle in the normal water first after 5 seconds transfer it to the hot water observe what it does to the bottle and balloon . After that measure the initial circumference, then after 5 more seconds put it in the cold water and observe what it does to the balloon.

Rough draft page 2

4. Through this experiment I observed that when i put the bottle in the hot water all the gas transfer to the balloon. The balloon expand because of the gas and grows bigger when the gas goes in the balloon. On the other hand when i put the bottle in the cold water it decreased the size of the balloon. That's because the bottle regained its size back from the cold temperature and the gas gone it the bottle again. When the balloon increased in size when I put it in the how water I measured the initial circumference and it’s circumference is bigger than normal.

5. In conclusion I have found out that temperature can change how much space air(gas) takes up. I learned that when gas gets hot, the volume increases, and when the gas cools down, the volume decreases. I used balloons to help us see this. When the air was cold, the balloon got smaller because the air inside shrank, and the air molecules compressed. When the air was hot, the balloon got bigger because the air inside spread out, which led to more molecule collisions. In conclusion, when the air gets warmer, it takes up more space, and when it gets colder, it takes up less space.

Final Draft Report

1/25/26

The temperature effect on the volume of gases

Have you ever wondered why a balloon gets smaller or bigger? When the temperature is higher, gas molecules move faster. When the temperature is lower, they move slowly. This experiment was really fun, and I learned a lot from it. One of my main questions was how temperature changes the gas inside a balloon and makes it expand or shrink.

Gases in a balloon deflatten faster in the cold because of the force pushing them, which makes them smaller. This also makes the balloon float less. But in the hot air, the balloon deflates much more slowly than usual, and it floats the same as a balloon when its normal temperature is not even more.

My hypothesis is that the balloon will shrink in cold temperatures because the gas molecules slow down and move closer together. Cold temperatures make the gas compress. Hot temperatures make the balloon expand because the gas molecules spread out. If the gas gets too hot, the balloon could even pop. When the balloon is warm and then moved to cold water, it will deflate a little.

Final Draft continued

My materials are:

1. Balloon
2. Thermometer
3. Measuring scale
4. Bowl with cold water
5. Bowl with hot water
6. Bowl with normal water
7. Isolated box setup
8. Measuring tape

To test this experiment, I will have to get an empty bottle and remove the cap. Then I'll have to poke a hole in the cap, then put the balloon on the cap of the bottle and put it back on, making sure to have air in it. After that, put hot water in a glass vase or a glass bowl, do the same thing but with also cold water, normal water, warm water, and lukewarm water. Put the glass vases or bowls on a solid platform. Put the bottle in the normal water first, after 5 seconds, transfer it to the hot water, and observe what it does to the bottle and balloon. After that, measure the initial circumference, then after 5 more seconds, put it in the cold water and observe what it does to the balloon.

Through this experiment, I observed that when I put the bottle in the hot water, all the gas transferred to the balloon. The balloon expands because of the gas and grows bigger when the gas goes into the balloon. On the other hand, when I put the bottle in the cold water, it decreased the size of the balloon. That's because the bottle regained its size from the cold temperature, and the gas was gone from the bottle again. When the balloon increased in size when I put it in the how much water I measured the initial circumference, and its circumference is bigger than normal.

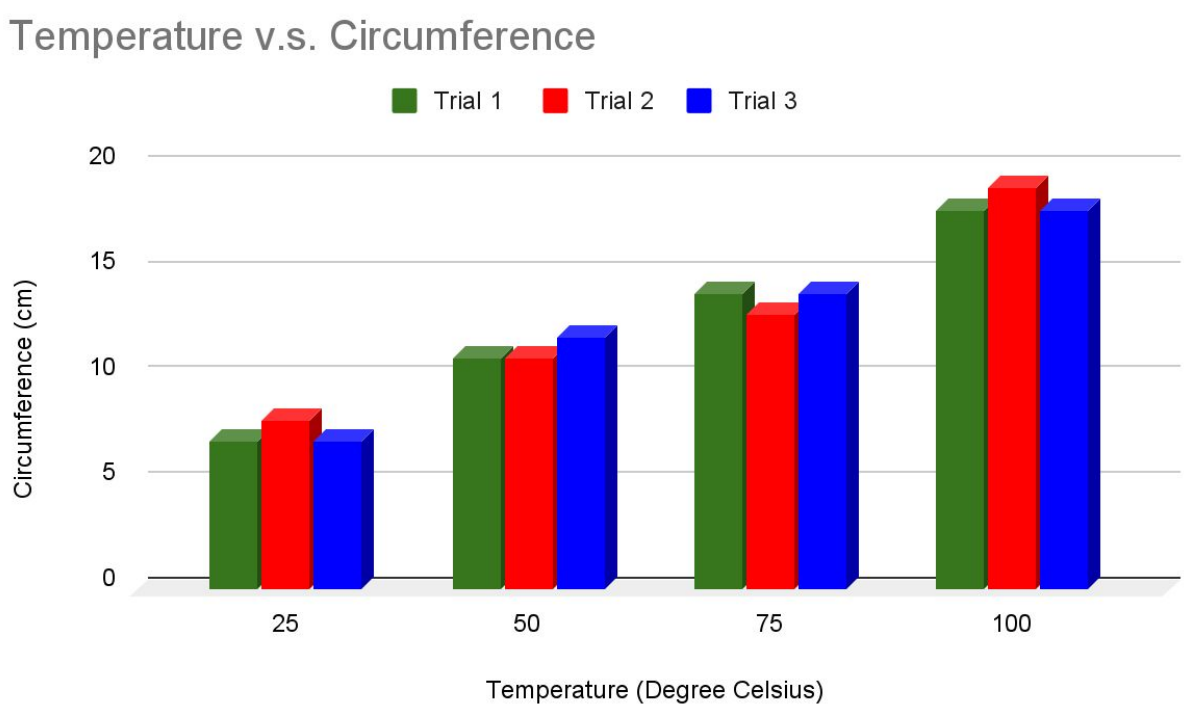
Final draft continued

Temperature vs Circumference

	Trial 1	Trial 2	Trial 3
25	7	8	7
50	11	11	12
75	14	13	14
100	18	19	18

Temperature (Celsius)

Circumference (cm)



Final Draft continued

In conclusion, I learned that temperature affects how much space gas takes up. When gas gets hot, it expands and takes up more space. When gas gets cold, it shrinks and takes up less space. The balloon helped show this clearly. In hot water, the balloon grew because the air molecules spread out. In cold water, the balloon shrank because the air molecules moved closer together. This experiment showed that warm air expands and cold air contracts.

Bibliography

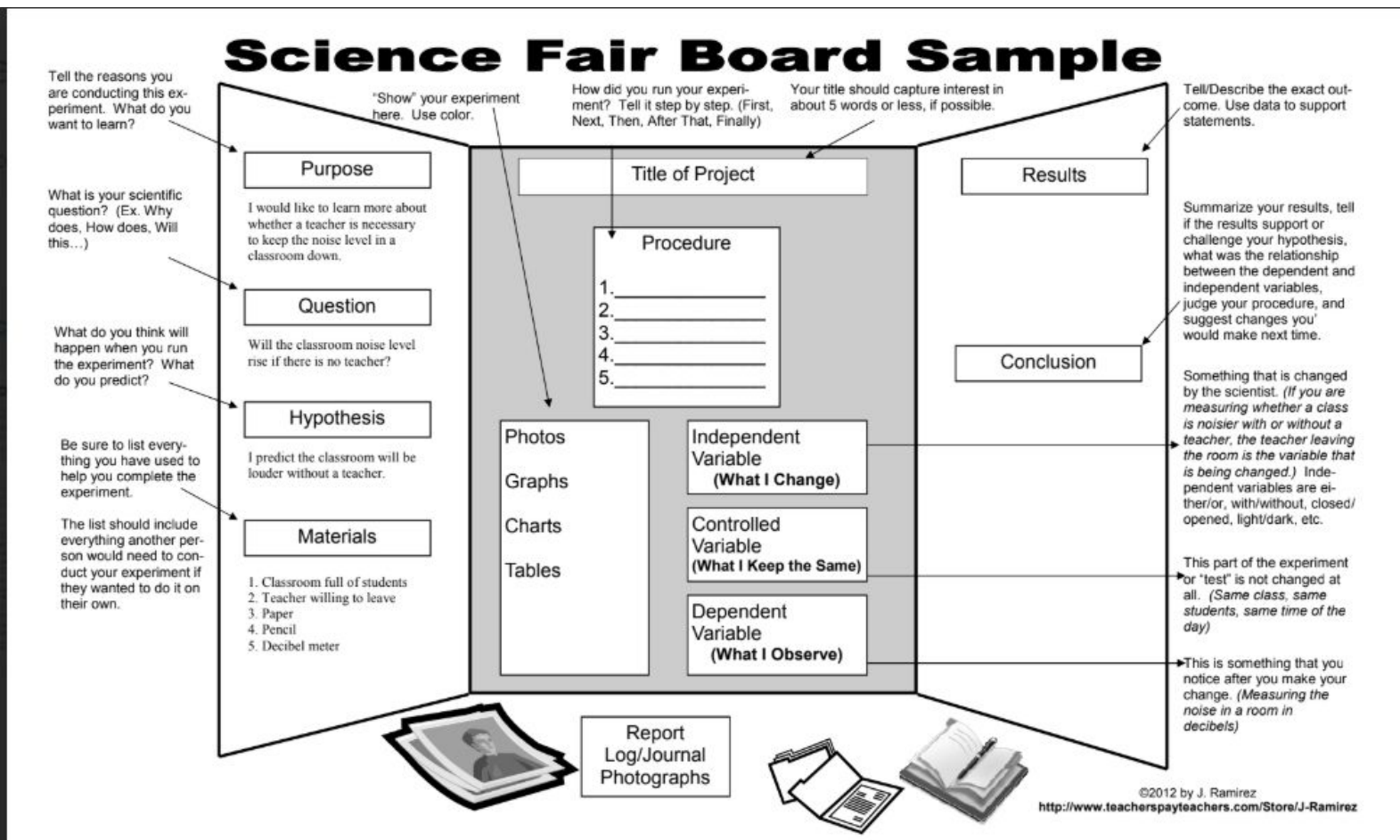
Site 1: **http://ud.goldsupplier.com/blog/density-of-helium**

Site 2:
http://education.seattlepi.com/cold-weather-make-helium-balloon-float-less-4166.html

Site 3:
http://zephyrsolutions.com/why-do-helium-balloons-deflate-faster-in-cold-air/

Final Project - Display Board Report

Make a Trifold Poster Board

Have it include all the components you have included in this Binder so far.

Your Finished Poster Board should look something like this: