Science Fair Project

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Due: Jan 27th

Science Fair topics template

TITLE A

Step-: 2 Project Ideas Proposal

Assigned: 10/27

Deadline: 11/05

1st Idea: Topic___Which type of light bulb projects the brightest light_____

(Please circle one: engineering/ science)

2nd Idea: Topic_will Carbon Dioxide or helium make a ball bounce higher?_____

(Please circle one: engineering/science)

My Final idea: ___Brighter lights_____

Question:____Which type of light bulb projects the brightest light_____

Resource(s): __standard, spiral, and floodlight bulb. A lux meter_____

Science Fair Topics - Draft

Write down the topic you chose:

The Brightest Light

What made you want to pick this topic?

I've always had dim lights in my house and everything felt a bit darker so I wanted to change that.

Do you find these topics interesting? Why?

I've always found lumens and the different light types interesting and want to learn more about them.

Science Fair Topic and Question - Final

Write down the topic you chose:

The Brightest Light

What question(s) are you going to answer?

We will be answering the question of which light bulb projects the brightest light.

How are you going to test your hypothesis?

We will have one lamp and three different light bulbs. The light bulbs will be a floodlight, a standard, and a spiral light bulb. We will test these at night in a dark room and project each light 2 feet away from the lux meter. We will get the results and then put them in graph. We will have three trials to make sure our results are the best. The final article talked about how diameter and LED light bulbs affect the brightness of a light bulb. This will be important for our experiment to make sure each light bulb type is the same and only thing we are changing is the diameter.

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

Summary: This article gives a detailed overview overviewed of all the different types of lightbulbs and their uses. This article tells us about the different types of light bulb shapes and sizes. The second article tells us about light beam spread and how to measure it. The article tells us how to calculate the beam spread with a special equation which is Beam spread= 2 x Distance x tan(Beam Angle/2). The article says that the smaller the beam spread the brighter the light will be.

Step 3 Background Research Source 1

TITLE B

Source 1

Title: Light Bulb Shapes And SIzes :Why It Matters In Lighting Projects

Summary:

What's the big idea about the article?

The article give you a background knowledge on light bulbs and they different types of lightbulbs. The article talks about the importance of knowing the size, type, and end of the lightbulb to make sure it it is the brightest and most compatible with your lamp The article talks about the effects of well looking light bulb and how it can improve the look of your room.

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

The author about this article is the company of PacLights. This article is made on the PAcLight website. This article gives you a walkdown of the many different types of lightbulbs and what they could be used for. This article was made to give users info about light bulbs before they bought them. The date this article was created on is not specified.

Source 1 Website

This source is a: ___yes___ Website _____ Other **The URL is http://** https://www.paclights.com/explore/light-bulb-shapes-and-sizes-why-it-matters-in-lighting-projects/ **Last Date of Access:**
Title of Article: Light Bulb Shapes And Sizes: Why It Matters In Lighting Projects
Author's Name: PacLights(this is the company's name the authors name wasn't specified)
Date of Article: **not specified**

Background Research Source 2

This source is a: ___yes___ Website _____ Other

The URL is http://
https://ledlightsdirect.com/blogs/news/a-light-beam-spread-guide-understanding-measuring?srsltid=AfmBOoquo6odOjUIZY7wAWyykhUALt651gszwVWhxznooVxEtYnPTnWA

Last Date of Access: June,5,2023

Title of Article: A Light Beam Spread Guide: Understanding & Measuring

Author's Name:
LLD

Date of Article:
6/5/2023

This source is a: ___yes___ Website _____ Other

The URL is
http://https://www.paclights.com/explore/led-bulb-diameter-vs-other-in-lighting-what's-more-important/

Last Date of Access: not specified

Title of Article: Led Bulb Diameter: vs. Other in Lighting: What's More Important?

Author's Name:
PacLights

Date of Article:
not specified

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?

Tip: Make your Hypothesis after the background research

Hypothesis: The floodlight light bulb will project the brightest light. Some evidence is that the spiral and standard light bulb have a beam spread of 360 degrees. On the other and the floodlight has a beam spread of 45 to 112 degrees. This will result in the brightest light. This is due to floodlight having the lowest beam spread out of the three. The lower a light bulbs beam spread is the brighter the light will be due to its ability to focus on one general area better than the standard and spiral light bulb.

Materials

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

- Feit Electric 100-watt dimmable standard light bulb(4-pack)
- 100-Watt Equivalent A21 Spiral Non-Dimmable E26 Medium Base CFL Compact Fluorescent Light Bulb, Daylight 5000K (4-Pack)
- Universal Select 65/75/90-Watt Equivalent BR40 Dimmable LED Flood Light Bulb with Selectable Color Temperature (4-Pack)
- Lamp
- Light Meter LM 3000 app
- PAR METER Lightray Diffuser & Cosine Corrector

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

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.

1. Plug in your lamp to a wall socket
2. Set up your lux meter app with the diffuser in a pitch black room
3. Plug in your standard light bulb into the lamp
4. Turn on your lamp
5. Measure the amount of lux projected from the lightbulb from a 56 inch distance away
6. Repeat steps 1-4 but with the floodlight bulb
7. Repeat steps 1-4 but with the spiral light bulb

Variables

What are the Variables of your experiment?

Dependent Variable? The illuminance score of the light bulb.

Independent Variable? Type of light bulb

Control Variable? The lamp

Testing the Hypothesis - Experiment

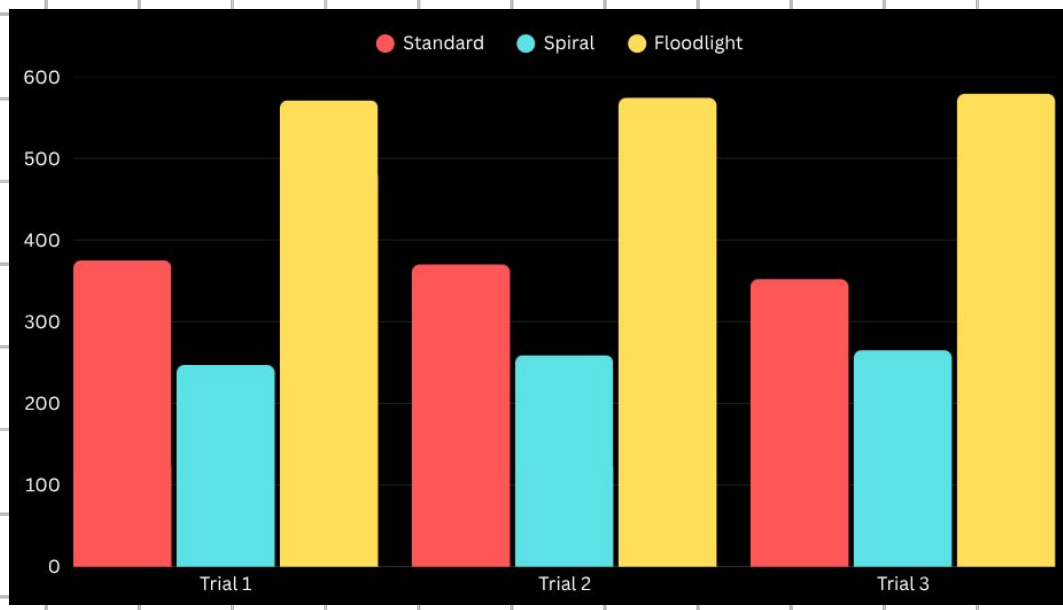
EXPERIMENT Collect and record data. Take pictures. Write everything in your science fair notebook, even mistakes and problems! Conduct your experiment multiple times to see if anything changes.

Trial 1:Trial 1 was a good start to the experiment resulting creating a baseline of expectation for the following trials. The standard light bulb started pretty good although it did seem that the light was somewhat dim. The spiral light bulb seemed the brightest but had the lowest lux(aka illuminance) score. The floodlight light bulb had the highest lux score by a longshot. I think that the reason why is because the floodlight light bulb concentrated on one area the most unlike the other light bulbs which spread out more.

Trial 2: In this trial most of the light bulbs grew in illuminance except for the standard light bulb. The standard light bulb seemed to become dimmer. The spiral light bulb seemed to get dimer but it actually became brighter. The floodlight light bulb had the highest results again and seemed to stay at the same lux rate with the highest illuminance score. At this point the results for the brightest light were pretty obvious.

Trial 3: This trial was interesting due to the massive changes in illuminance scores. The standard light bulb dropped its illumination score by 18. The spiral light bulbs score grew by 4 which didn't seem like much but was still surprising to me. The Floodlight light bulb grew by four illuminance score maintaining its first place position. This cemented the fact that the floodlight light bulb was the brightest light. The reason being is likely due to the floodlights ability to focus on one specific general area better than the others.

Results


Standard
Spiral
Floodlight
600
500
400
300
200
100
0
Trial 1
Trial 2
Trial 3

Results

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

The Brightest Light	Standard	Spiral	Floodlight
Trial 1	375	247	571
Trial 2	370	259	574
Trial 3	352	265	579

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?

The brightest light bulb according to my experiment was the floodlight light bulb. My hypothesis was correct which was due to the fact that the floodlight was able to focus on one specific area with 180 degree area cover. I did not see any problems throughout the experiment but one mistake I made was not counting the amount of time I let each bulb illuminate. If I were to conduct this experiment again I would give each bulb a certain amount of time to illuminate. I feel like this would make sure the results are fair and accurate.

Rough Draft Report

You will use all the information from above to put together a rough draft report.

Have you ever wondered if the shape of a light bulb could affect how bright your house is? Well, in this experiment we will be testing which light bulb projects the brightest light.. The three light bulbs types we will be using are the floodlight light bulb, the standard light bulb, and the spiral light bulb. The reason why I chose this experiment is because in my household many of our lights are too dim to make specific objects visible. This can cause injuries too occur in households due to elderly adults not being able to see obstructions in their pathway. I wanted to test which light bulb could help illuminate each household better. The main question we will be answering is , which light bulb projects the brightest light.

My hypothesis is that the floodlight light bulbs will project the brightest light. The reason why is because the smaller the angle is for a light bulb the brighter the projected light will be. The reason why is because the light is better focused on one point rather than having a 360 degree light projection. The spiral and and standard light bulb both have a 360 degree light projection angle, while the floodlight light bulb and a 180 degree light projection.

Now, to test this hypothesis our we will need some materials. I used Feit Electric 100 watt standard light bulbs, CFI A21 100 watt spiral light bulbs, and Ecosmart 65w/75w/90w floodlight light bulbs. For your light meter you will need to download the Light Meter LM 3000 app as well as buy the diffuser that is linked through the app. A notebook and pencil are necessary to record your data. You will also chose a lamp of your choice(preferably without any side coverings). Then we must start with the experiment, here are the steps. First you will need to get your lamp and plug it into a nearby socket. Then you get your standard light bulb set it 100 watts and insert it into the lamp. Then you set up your lux meter app with the diffuser and turn on the lamp. Record your data in your notebook. Take out the light bulb and repeat the previous steps with the floodlight light bulb and the spiral light bulb My independent variable was the type of light bulb. My dependent variable was the illuminance score of the light bulb. My control viable was the lamp used during the experiment.

Now it is time to see the results: Trial 1 was a good start to the experiment resulting creating a baseline of expectation for the following trials. The standard light bulb started pretty good although it did seem that the light was somewhat dim. The spiral light bulb seemed the brightest but had the lowest lux(aka illuminance) score. The floodlight light bulb had the highest lux score by a longshot. I think that the reason why is because the floodlight light bulb concentrated on one area the most unlike the other light bulbs which spread out more.

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My results show that the floodlight light bulb had the highest illumination score which make it the brightest light. The flood light light bulb had an average score of 574.7. The standard light bulb had an average score of 356.7 making it the second brightest light bulb. The spiral light bulb had the lowest score with an average of 257.

The brightest light bulb according to my experiment was the floodlight light bulb. My hypothesis was correct which was due to the fact that the floodlight was able to focus on one specific area with 180 degree area cover. I did not see any problems throughout the experiment but one mistake I made was not counting the amount of time I let each bulb illuminate. If I were to conduct this experiment again I would give each bulb a certain amount of time to illuminate. I feel like this would make sure the results are fair and accurate.

TITLE

Final Draft Report

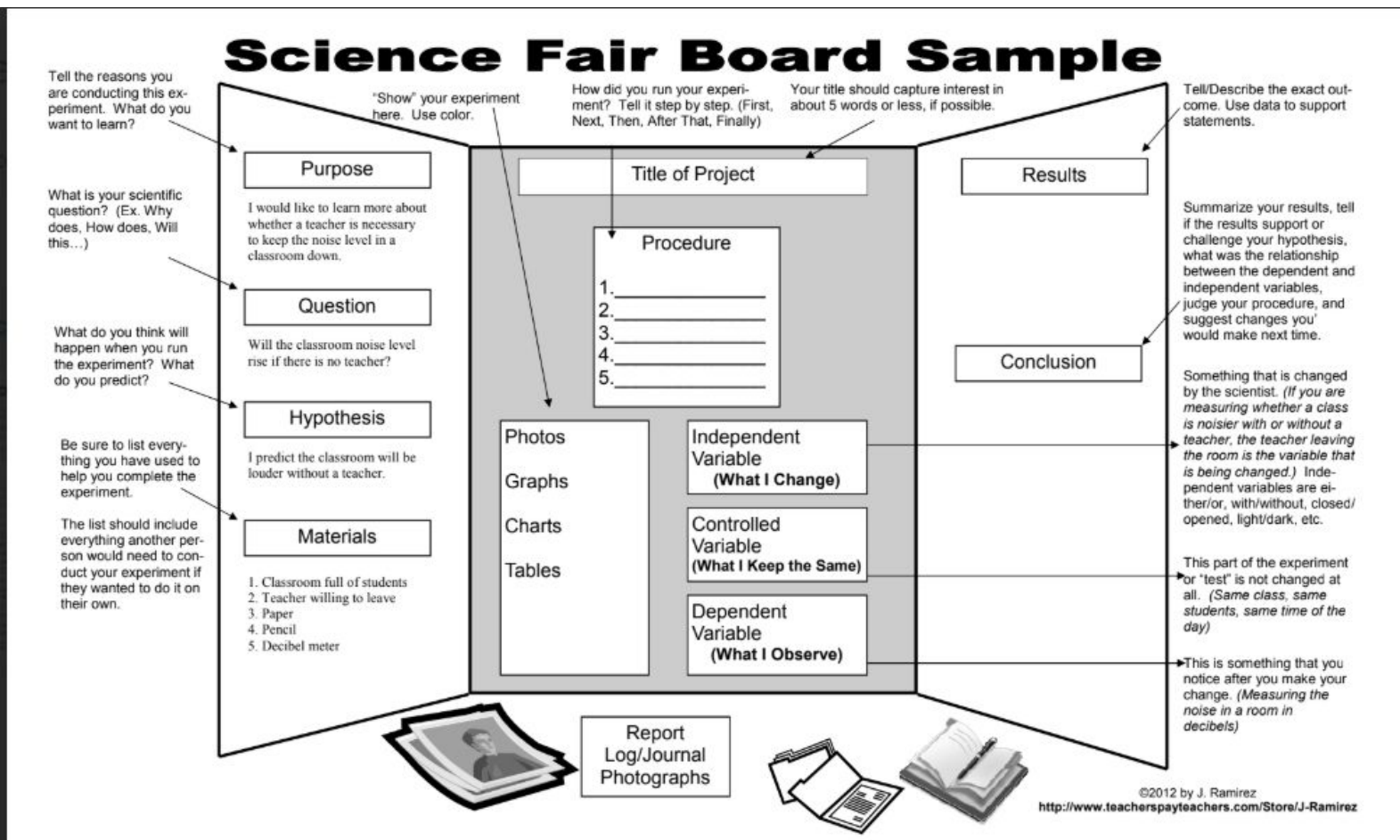
Go back to your Rough Draft Report and fix any mistakes.

Ask a teacher for their opinion.

Make final changes.

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: