

STEM Expo Display Boards

- Science Inquiry Boards (Slides 1 – 10)
- Engineering Display Boards (Slides 11-15)

Possible layout

Question or Statement of Problem:

Short one sentence statement of the Problem you are trying to find an answer. It can be in the form of a Question (This could be omitted if Project Title clearly states this).

Claim/Hypothesis/Prediction:

Write a short clear statement of what you claim the solution is to the above Question or Statement of the Problem.

Procedure:

What were the steps needed to perform your experiment/investigation?

List and number steps in easy to follow way so judges can easily follow what you did, and could do the same experiment.

Discuss what your Independent/Manipulated and Dependent/Responding variables.

Project Title:

Catchy 3 to 10 words. Written with large font that is easily visible.

Materials:

List materials and equipment used to perform this investigation/experiment.

Evidence/Results:

Show data table(s), graph(s), and/or pictures that display your experiment results. Label axes and identify independent/manipulated and dependent/responding variables on graph and possibly on data table if helps show these.

Reasoning/Conclusion:

Did the evidence verify/support your claim?

If so discuss how the data supports your claim.

If No, explain why the data does not back/support your claim.

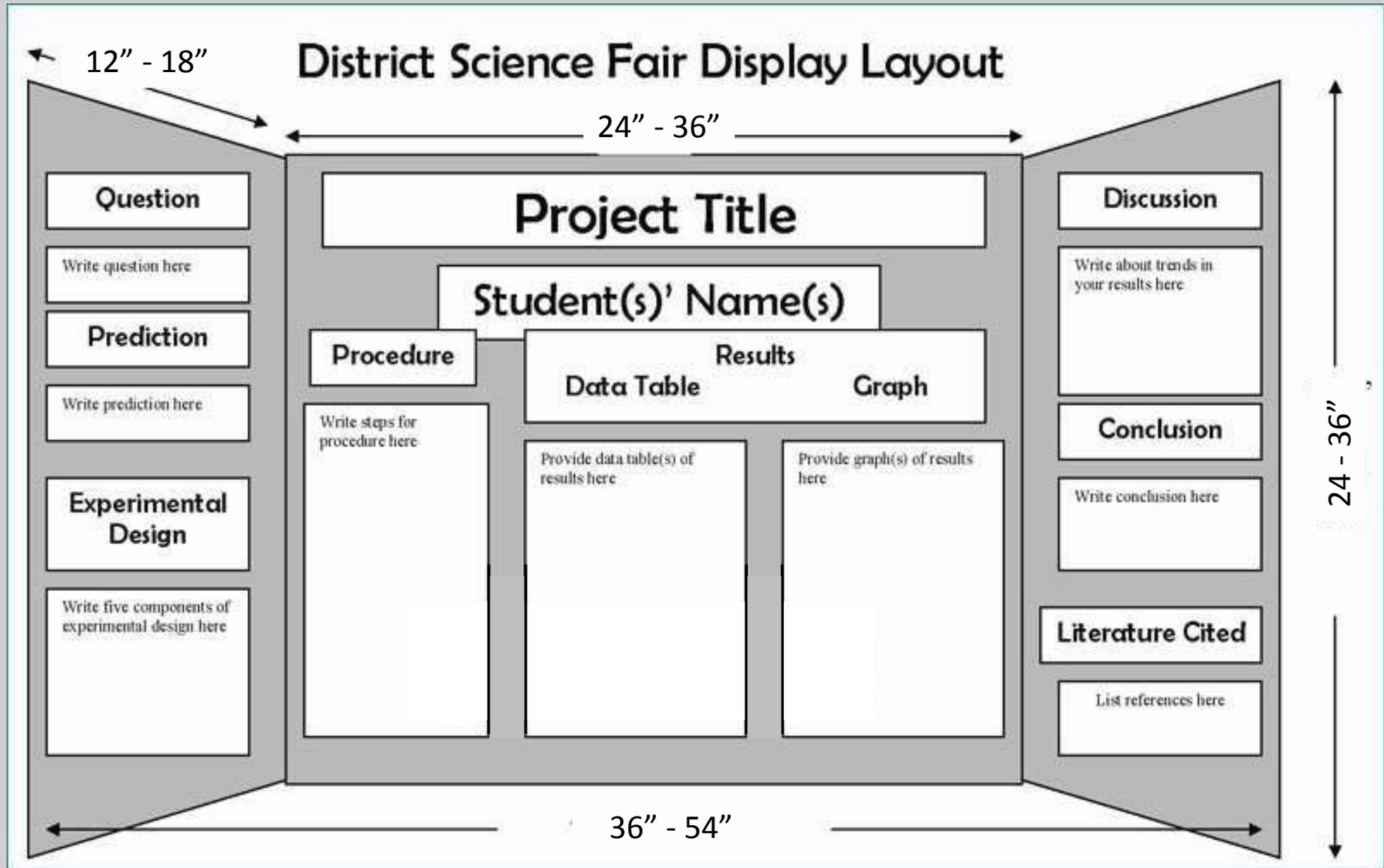
Applications:

Discuss how this subject/question could be applied.

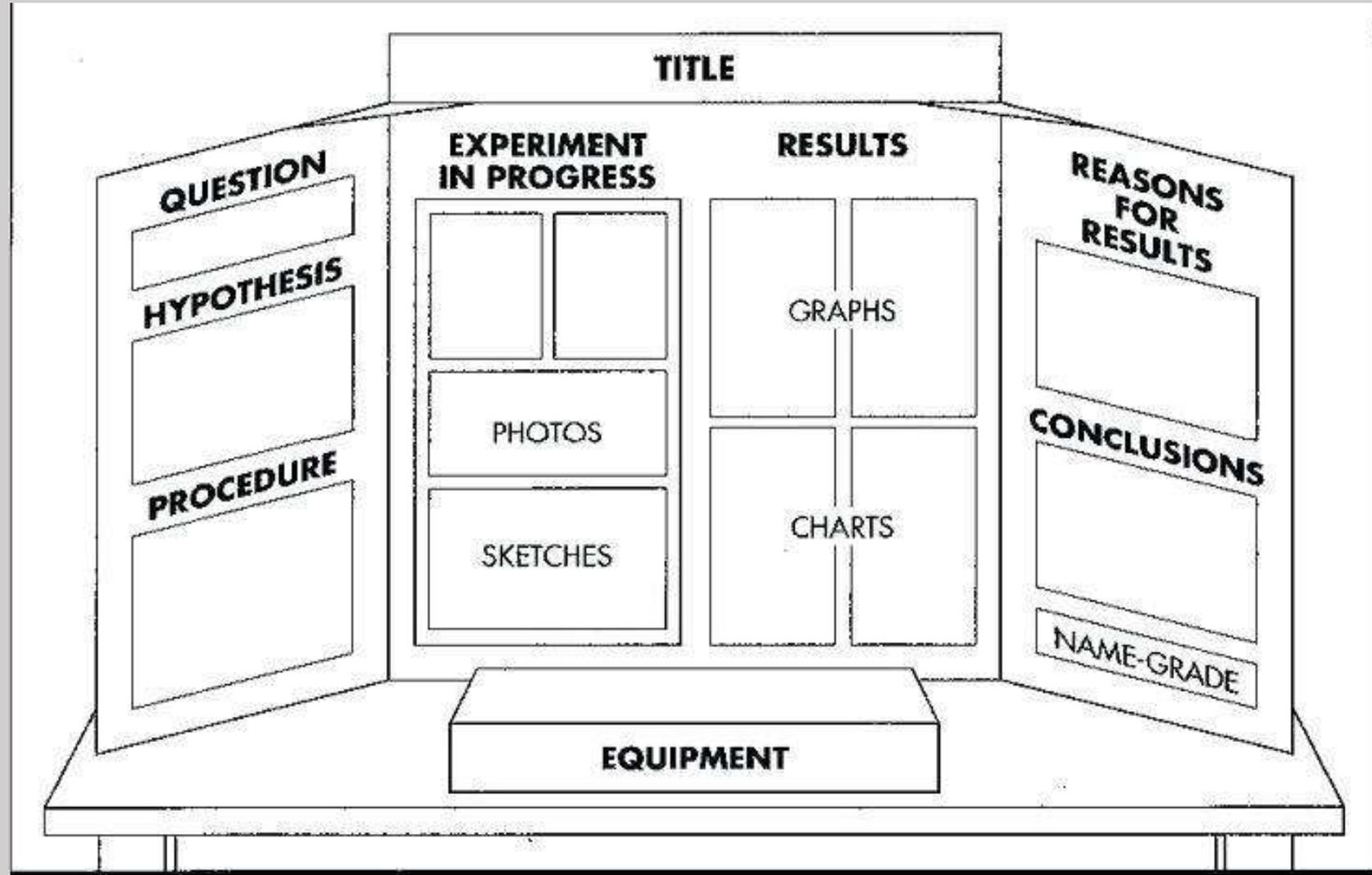
Future Work:

Write two to five sentences on additional experiments or research that could help improve your experiment or refine your results.

Another possible layout



And another



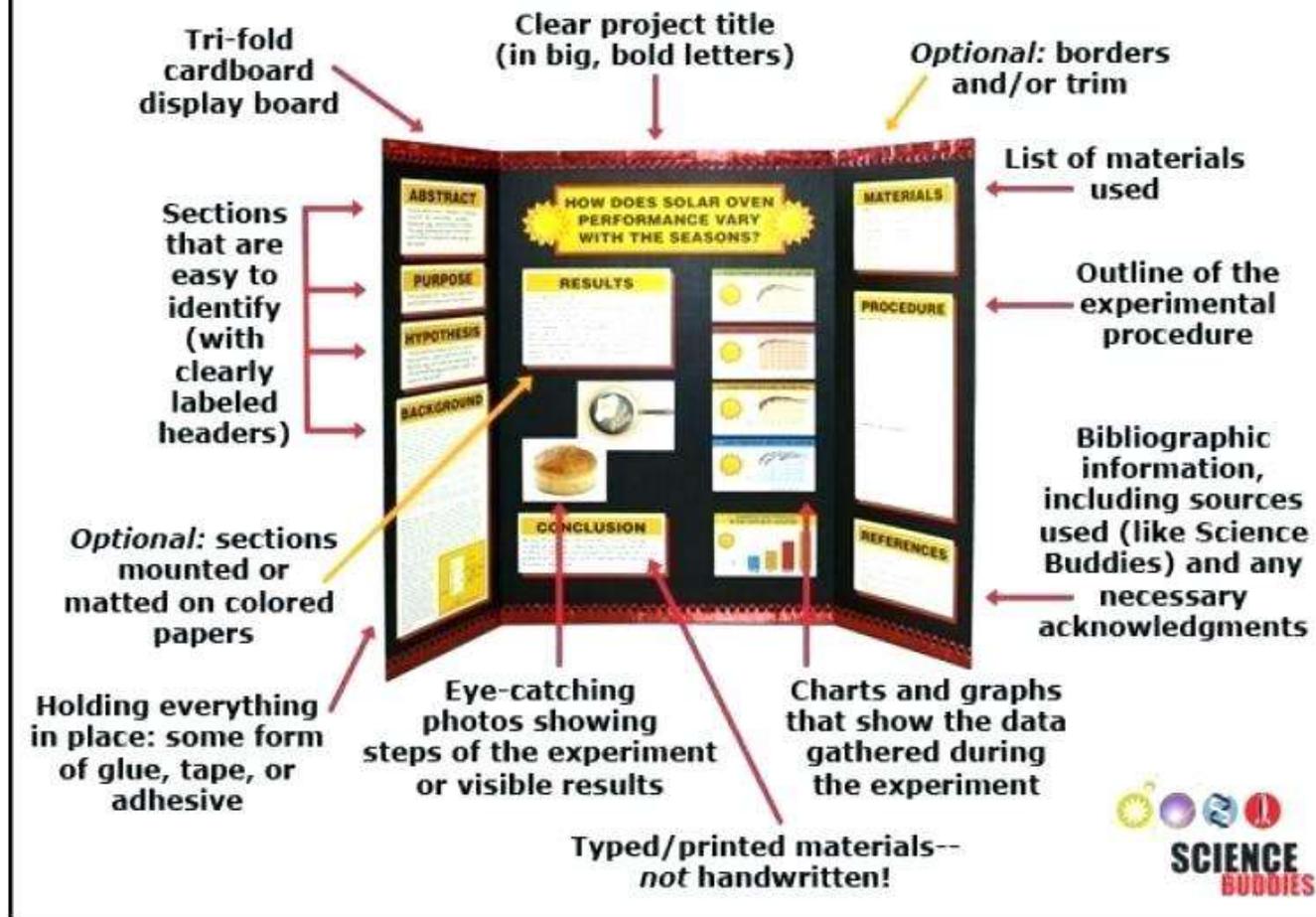
And last one

Engineering Project possible layouts are towards the end.

Keep going to see examples



ANATOMY OF A SCIENCE FAIR PROJECT DISPLAY BOARD



Example of Science Inquiry Display Board

Engineering examples towards the end.

What Color of Light is Important for Photosynthesis?

QUESTION

I read a story about a gardener who wanted his plants grow better. So, he covered his greenhouse with green color. A month later, he found all his plants died. I wonder what color is important for photosynthesis.

HYPOTHESIS

My hypothesis is that leaves under red and blue will grow the best, under yellow and green light will grow the worst. This hypothesis is based on the absorbance spectrum of chlorophyll.

MATERIALS

- 7 Black poster board
- Scissors
- transparency tape
- LED lights (green, white, blue, red, yellow, and green)
- 7 Black radish plants
- 5 D-cell batteries
- 6 thin coated wires (about 7ft)
- 10 disposable plastic drinking cup
- All purpose soil
- A digital camera

PROCEDURE

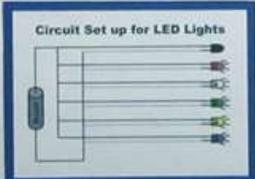
1. Make 6 cylinders and tops (height: 3", diameter: 4") with black poster boards.
2. Connect all 6 LED lights to the batteries to make a close parallel circuit.
3. Attach each LED light inside the top of cylinders.
4. 5 days before the experiment, buy a bunch of fresh radishes with leaves and roots on.
5. Cut off the old leaves, plant radishes into cups, and wait 3 days for new leaves to come out.
6. Pick 7 healthy radishes with leaves in similar size.
7. Put 5 of these plants under LED lights in the cylinder, one plant under no light, and leave another plant uncovered as control. Turn on the LED lights and keep them on for 72 hours.
8. Remove cylinders from the plants and record growth differences in color and shape changes of the leaves.

DATA

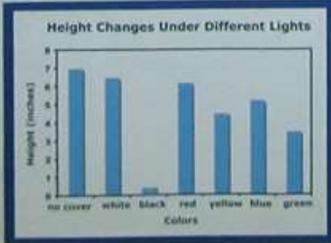


Changes	No Cover	White Light	Black Light	Red Light	Yellow Light	Blue Light	Green Light
Color	Dark green (normal)	Slightly less green	Not green	Light green, average to white light	Yellow-green	Light green, same as white light	Yellow
Size	Normal (standard)	Smaller than normal-sized leaves	Shriveled and wilted	Same as white, but new leaf is smaller	Smaller as white, but new leaf is much smaller	Same as white, but new leaf is barely smaller	Shriveled, almost half of normal size
Growth	Grow well (standard)	Grow well with new leaf same size as old	Stand, shrivel and dying	Grow, same as white, but new leaf is healthy as white	Grow, same as white, but new leaf is not same as white	Grow, same as white, but new leaf is barely same	Grow, same as white, but new leaf is shriveled, very new leaves not seen
Grow height	6.99 inches	4.8 inches	0.4 inches	5.1 inches	4.3 inches	6.1 inches	3.3 inches

Circuit Set up for LED Lights



Height Changes Under Different Lights



Colors	Height (inches)
no cover	7.0
white	6.8
black	0.4
red	6.5
yellow	4.3
blue	6.1
green	3.3

RESULTS

Plant in the dark did not grow, leaves shrunk. Plant under white light grow normal with new leaves coming out, but not really well as uncovered. Leaves under green light did not grow and turned to yellow after 72 hours. Yellow light affected leaves to grow slow. Blue and red are most essential to the photosynthesis of radish leaves. Red light gave stronger support of photosynthesis. Blue light made photosynthesis less efficient as to red light. The growth sequence of plants under different colors of light was: no cover > white > red > blue > yellow > green > black.

CONCLUSION

My experiments approved my hypothesis. Leaf has preferences for different color of sunlight. My results showed that red and blue are most essential color of light for photosynthesis. Plants were green and grow well under these lights. Green light was least needed since leaf reflect most green light. The impact of yellow light on leaf was in between green and blue light, which means yellow is needed but not essential. In my experiment, 72 hours continuously under light did affect the growth of plant, since plant uncovered grow better than the plant under white light. Overall, my results is supportive in that those set of experiments with different plants showed similar results. This finding provide important information to both farmers, gardeners, and house plant lovers. The finding could help plant grow by giving favor color, or it could save plant by avoiding harmful/unnecessary color of light.

ABSTRACT

Photosynthesis is a process producing food for plants. Chlorophyll captures sunlight in a leaf for photosynthesis. The purpose of this project was to find out what color of light is essential for photosynthesis. Radishes were covered under different colors of LED lights for 72 hours. Growth property and leaf color changes were recorded. As expected, radish in the dark wilted; radish under white light grew well. The results showed that red and blue light were most essential for radish photosynthesis. Yellow light was useful, but the efficiency of photosynthesis was dramatically reduced. Green light was least essential.

FUTURE CONSIDERATION

BIBLIOGRAPHY

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Example of Science Inquiry Display Board

HOW DOES SMELL AFFECT TASTE ?

PROBLEM

Does Smell Affect Taste?

MATERIALS

List of Materials:
cups
spoons
a blender
a blindfold
nose plug
salsa
strawberries
peanuts
straw
apple sauce
water

HYPOTHESIS

My hypothesis is that if a person cannot smell, they will have a harder time determining what the food is.

PROCEDURE

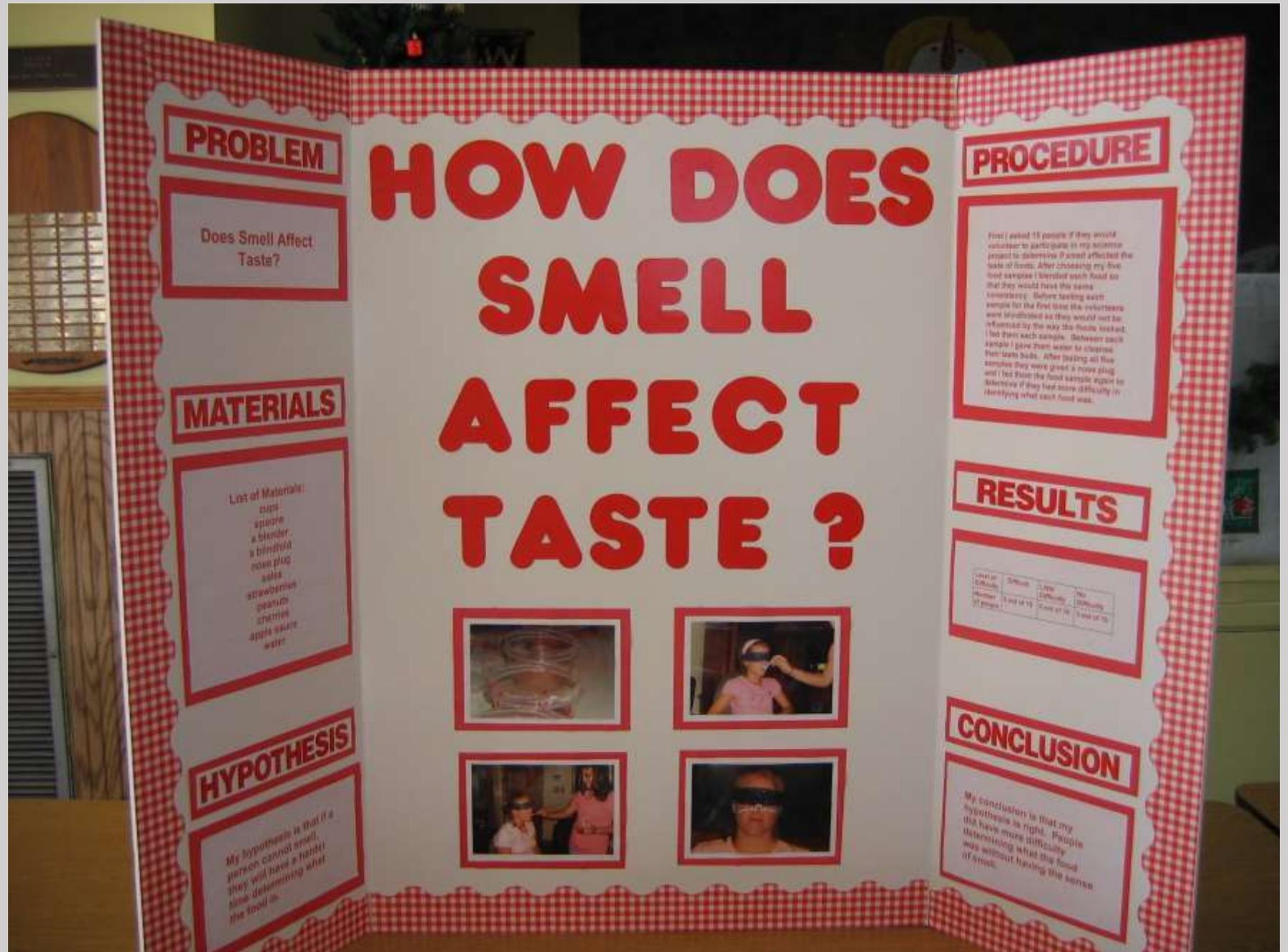
I asked 15 people if they would volunteer to participate in my science project to determine if smell affected the taste of foods. After choosing my five food samples I blindfolded each food so that they would have the same appearance. Before testing each sample for the first time the volunteers were blindfolded so they would not be influenced by the way the foods looked. I had them each sample. Between each sample I gave them water to cleanse their taste buds. After testing all five samples they were given a nose plug and I had them the food sample again to determine if they had more difficulty in identifying what each food was.

RESULTS

Food	Correct	Wrong	%
Strawberries	10 out of 15	5 out of 15	66.67%
Salsa	10 out of 15	5 out of 15	66.67%
Apple sauce	10 out of 15	5 out of 15	66.67%

CONCLUSION

My conclusion is that my hypothesis is right. People did have more difficulty determining what the food was without having the sense of smell.



Example of Science Inquiry Display Board

HOW DOES TEE HEIGHT AFFECT DRIVING DISTANCE?

Problem

The problem in this experiment is the effect of tee height on the distance of the drive.

Procedures

1. Place the equipment for a series of golf balls to warm them up.
2. Place the equipment for a series of golf balls using the tee height of one inch.
3. Measure the distance of the tee shot.
4. Place the equipment for a series of golf balls using the tee height of an inch and a half.
5. Measure the distance of the tee shot.
6. Place the equipment for a series of golf balls using the tee height of two inches.
7. Measure the distance of the tee shot.
8. Repeat all results with three.

Results

Tee Height	Distance	Average
Short - 1 inch	227 yards	226m
Short - 1 inch	222 yards	220m
Short - 1 inch	222 yards	220m
Short - 1 inch	227 yards	226m
Short - 1 inch	230 yards	229m
Short - 1 inch	230 yards	229m
AVERAGE DISTANCE - 226 YARDS		

Tee Height	Distance	Average
Medium - 1 1/2 inch	237 yards	237m
Medium - 1 1/2 inch	250 yards	250m
Medium - 1 1/2 inch	252 yards	252m
Medium - 1 1/2 inch	252 yards	252m
Medium - 1 1/2 inch	257 yards	257m
Medium - 1 1/2 inch	257 yards	257m
AVERAGE DISTANCE - 254 YARDS		

Tee Height	Distance	Average
High - 2 inch	242 yards	242m
High - 2 inch	252 yards	252m
High - 2 inch	252 yards	252m
High - 2 inch	252 yards	252m
High - 2 inch	247 yards	247m
High - 2 inch	250 yards	250m
High - 2 inch	255 yards	255m
AVERAGE DISTANCE - 249 YARDS		

Data



Materials

Material	Quantity
Golf Balls	18
Tee	3
Club	1
Clipboard	1
Pen	1
Ball Bag	1
Tees	3
Clipboard	1
Pen	1

Hypothesis

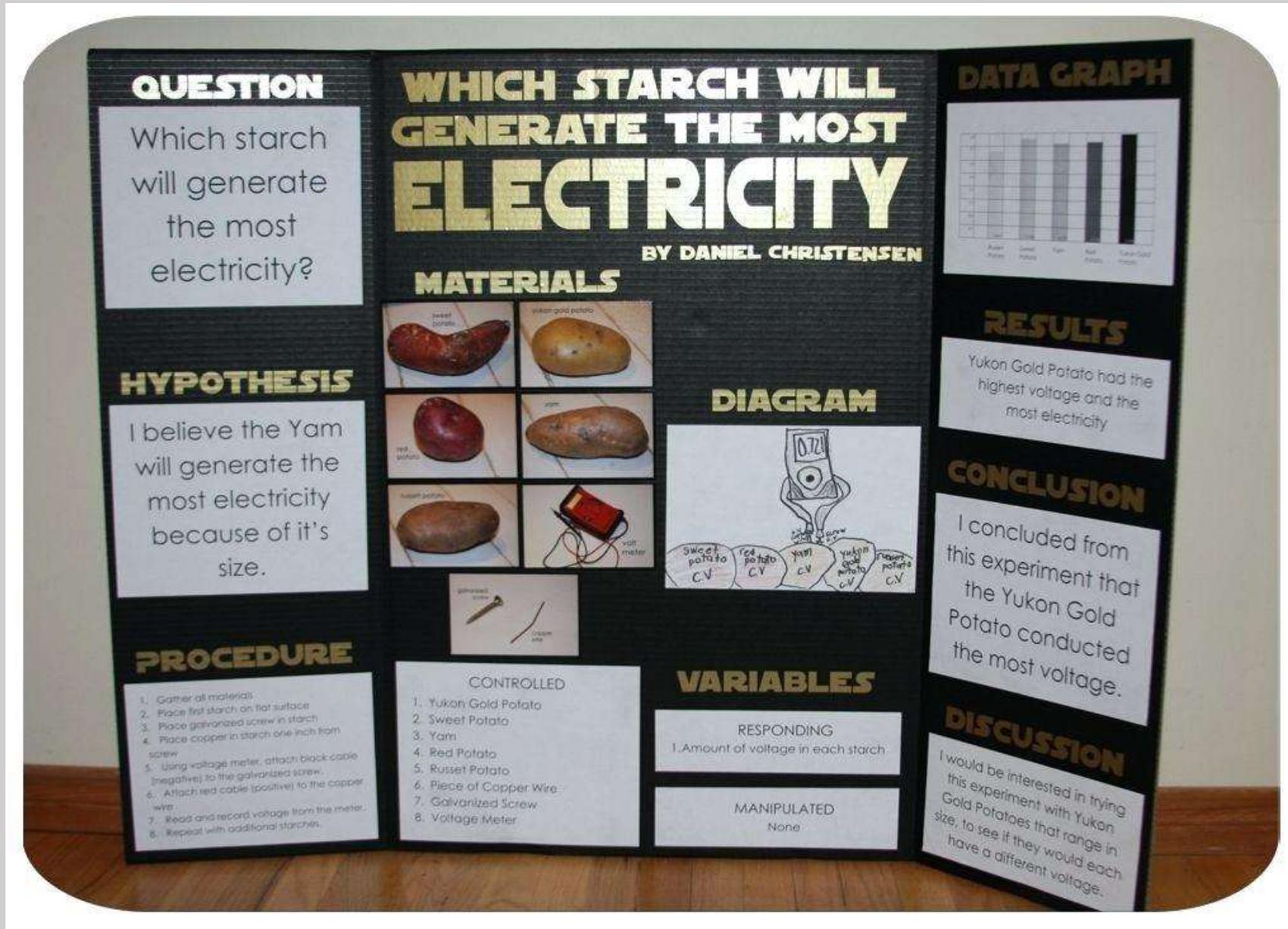
My hypothesis is that the high tee height will work the best!

Variables

Independent Variable- Tee Height
 Dependent Variable- Driving Distance
 Controlled Variable- Golf Club

Conclusion

Example of Science Inquiry Display Board



Example of Science Inquiry Display Board

Elevation Impact

Question

Is there a difference between the air temperature, the soil temperature and the soil moisture at four different locations between 60 and 698ft in elevation?

Hypothesis

If I measure the air and soil temperature and soil moisture at four different locations between 60 and 698 ft. in elevation, then the highest elevation would be the coldest and have the least soil moisture because there would be less air pressure. The atoms and molecules in the air aren't under as much pressure, causing them to move more slowly making less heat than the lower elevations that have increased air pressure. There also wouldn't be as much soil moisture at higher elevations because when it rains the water at the higher elevations would trickle down to the lower elevations causing them to have more soil moisture than the higher elevations.

Materials

- Four zip ties
- Four stakes (8 inches)
- Flash light
- Paper towel or rag
- Four mercury thermometers
- Soil thermometer
- Soil moisture meter
- Four strips of duck tape 1 1/2 in long
- One bag for carrying the materials.

Data

Procedure

1. Identify four different locations with unlike elevations. (Identify Fox Hill St., Sacans Lake, 140 ft., Downtown Canal St St., and Mt. Lewis St.)
2. Gather all of the materials and drive to five locations, Sacans Lake.
3. Push a stake into the ground to mark each measuring spot.
4. Wrap one 1 1/2 piece of duck tape around the stake so you can spot it easily.
5. Find a bush or tree to hang one of the mercury thermometers on with the paper. Wait a day for the thermometer to get used to the temperature.
6. Turn the moisture meter on and stick it at the same thing into the soil thermometer.
7. Record the temperature and moisture on a chart along with the time, date and weather conditions.
8. Turn thermometers and moisture meter off and wipe the excess dirt off with a clean cloth.
9. Place all items in a bag and drive to next location.
10. Repeat steps 3-8 once at every location, and 7-10 doing for two weeks at every location.

Variables

Manipulated Variable
One thing I will change is the different elevations that I will measure and observe at.

Responding Variable
I will measure the air temperature, soil temperature and the soil moisture at four different elevations.

Controlled Variable
What I will keep the same for each trial is I will measure both the soil temperature and soil moisture with the same measuring devices and the air temperature with 4 of the same kind of thermometer under a glass dome on the same day.

Conclusion

My hypothesis was inconclusive, the data that I collected did not show a consistent pattern of the elevation impacting the air and soil temperature. I believe that there were many factors that might have played a role in the differences of the temperature changes. However, for the soil moisture my hypothesis was supported by the moisture readings at the lowest location, A with an elevation of 60ft. Location A had the most moisture, higher elevations, B, C and D. Therefore, to improve the consistency of the air and soil temperature measurements, it would be beneficial to try to reduce the number of factors affecting the characteristics that I'm measuring, including the position of measurement, similar measurements along with similar soils that I would measure.

Example of Science Inquiry Display Board

Engineering Project Display Boards next

Problem
Do White Candles Burn Faster Than Colored Candles?

Hypothesis
I think that white candles will burn faster than colored candles.

Materials
Black Marker
Five white candles
Five colored candles
Candle holders
Timer
Tongs

Procedure
The candles were labeled and marked every half inch. A timer was set. The candles were lit. Every ten minutes the candles were measured and the results were written down.

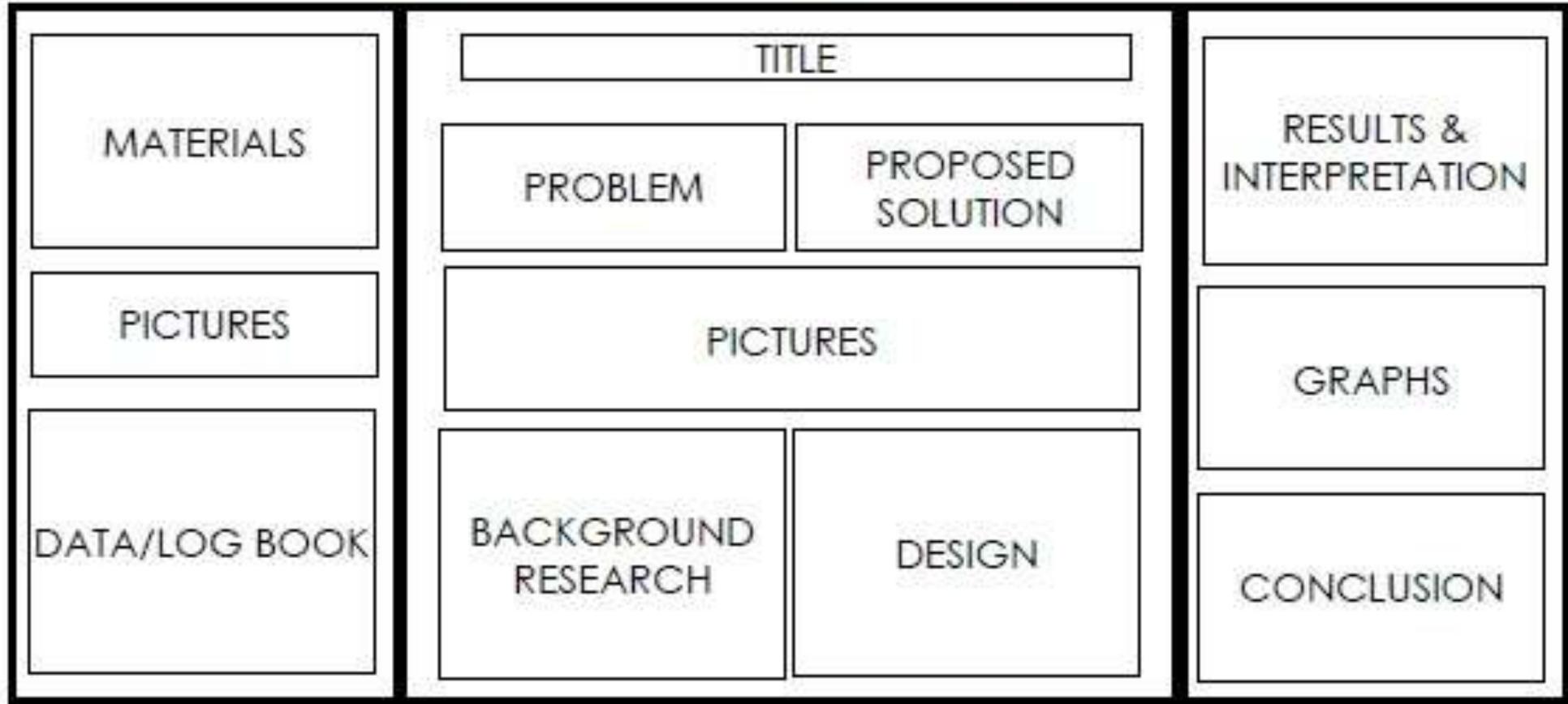
Variables
The independent variables in my project is the color of the candles where they burn. My dependent variables were measured every ten minutes and marked the candles every half inch. If you did know that you wanted to know, you might not get the same result.

Results
The candles that I tested will be white and colored candles. The white candle burned faster than the colored candles because it has less wax than the colored candles. The other colored candles burned slower.

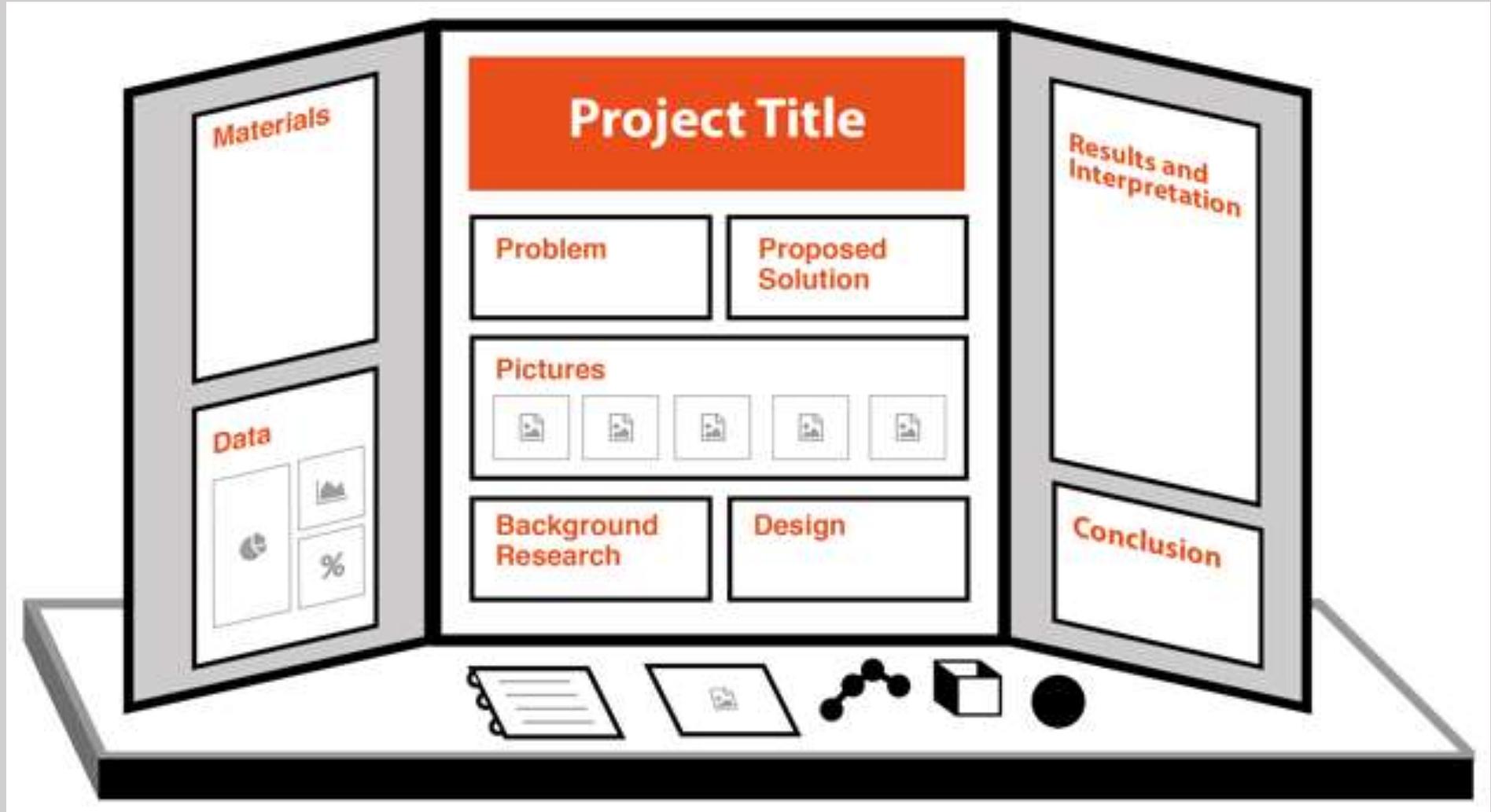
Candle Color	Burn Time (minutes)
White	15
Green	10
Red	10
Blue	10
Yellow	10

Conclusion
The white candle burned faster than the colored candles. This was because the white candle had less wax than the colored candles. The other colored candles burned slower.

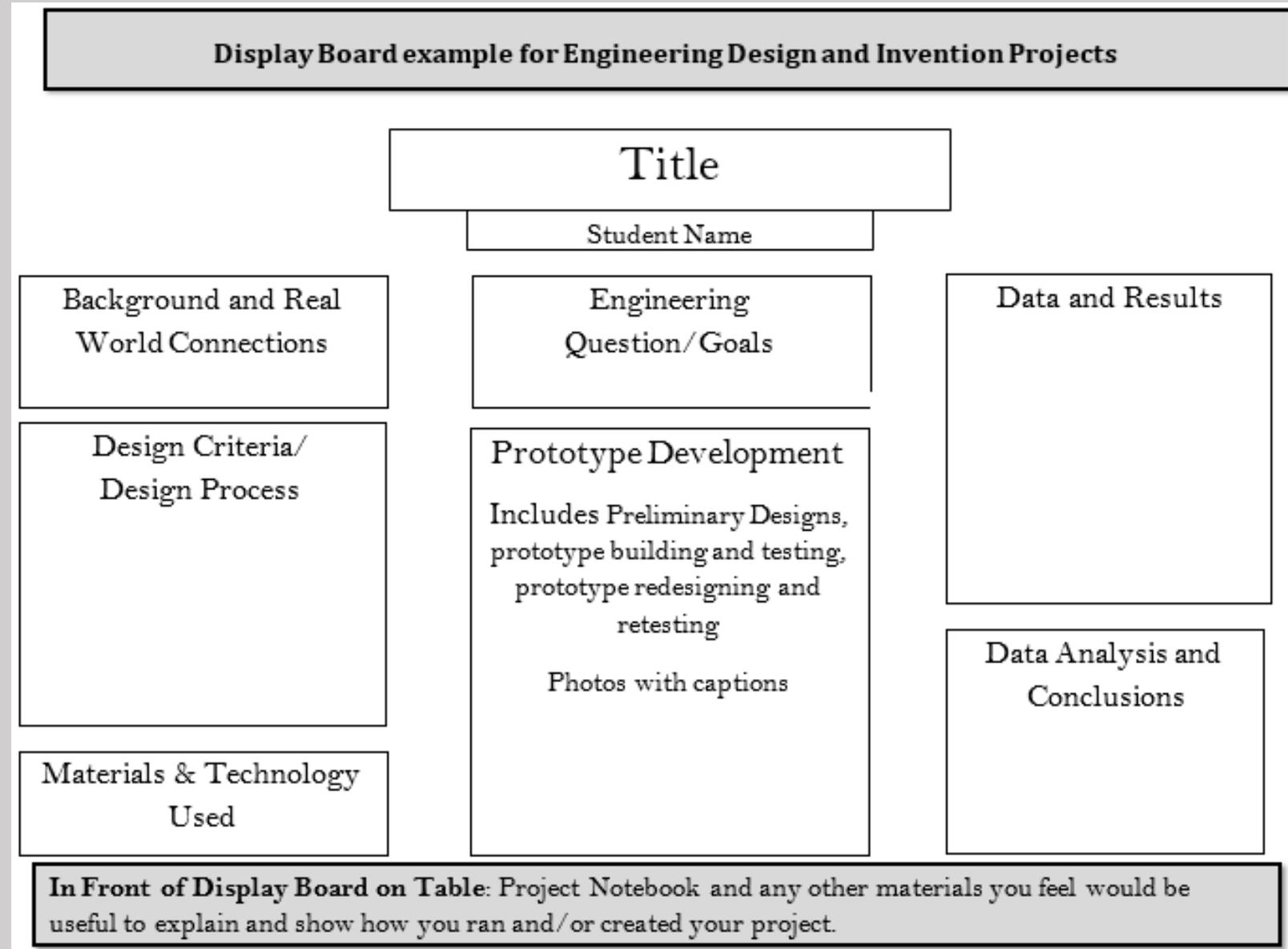
Engineering Projects



Engineering Project Possible Layout



Engineering Project Possible Layout



Example of Engineering Display Board

