

Science Fair Projects



**HOW TO
COMPLETE A
PROJECT!**



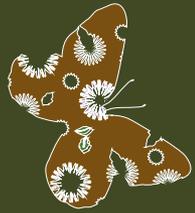
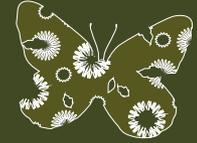
What's in your Research Paper?

- ✦ Title page (Sci) (SS) (LA)
- ✦ Question
- ✦ Hypothesis
- ✦ Research (paragraphs) (LA) (Sci) (SS)
- ✦ Materials (list) (Sci) (Math)
- ✦ Procedures (pictures and paragraph) (Sci) (SS)
- ✦ Results (data and paragraphs) (Sci)
- ✦ Conclusions (paragraphs) (Sci) (SS)
- ✦ Acknowledgments (as needed)
- ✦ Abstract (Sci) (LA)
- ✦ References (alphabetical list) (LA) (Sci) (SS)

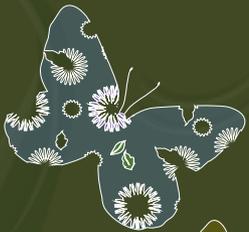


Project Experimentation

(Conduct an experiment and find out if your hypothesis was right or wrong.)



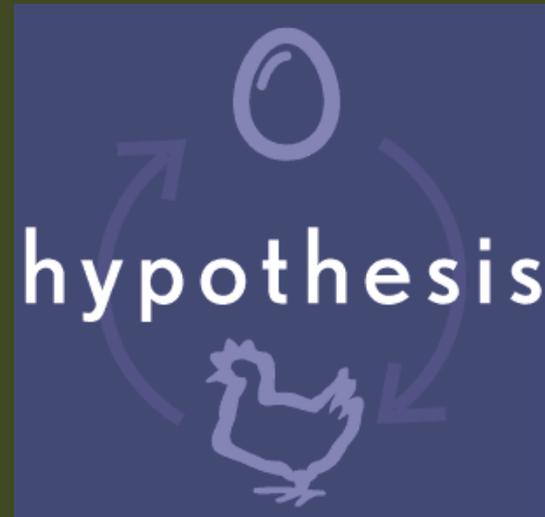
- ✿ Project experimentation is the process of testing a hypothesis. The things that have an effect on the experiment are called variables. There are three kinds of variables that you need to identify in your experiments: independent, dependent, and controlled.
- ✿ The independent variable is the variable you purposely manipulate (change). (light changed to dark)
- ✿ The dependent variable is the variable that is being observed (the mold), which changes (or may change) in response to the independent variable. (the light)
- ✿ The variables that are not changed are called controlled variables. (white bread)



Hypothesis

(What do you think will happen during your experimentation?)

- A hypothesis is an idea about the solution to a problem, based on knowledge and research.
- It is a single statement that is the key to a successful project.



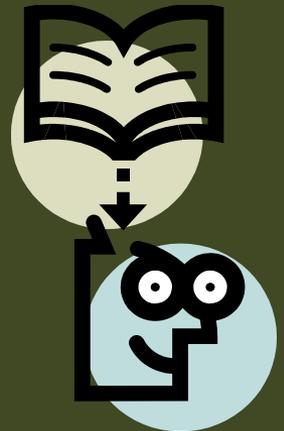
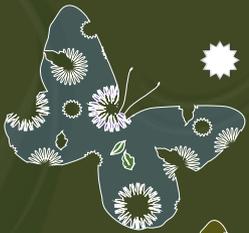
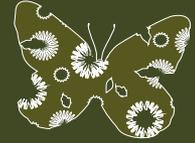
Hypothesizing

- ✦ Do state facts from past experiences or observations on which you base your hypothesis.
- ✦ Do write down your hypothesis before beginning the project experimentation.
- ✦ Don't change your hypothesis even if experimentation does not support it. If time permits, repeat or redesign the experiment to confirm your results.



When you conduct research to better understand your topic:

- ✿ Do use many references from printed sources—books, journals, magazines, and newspapers—as well as electronic sources—computer software and online services.
- ✿ Do gather information from professionals—instructors, librarians, and scientists, such as physicians and veterinarians (interviews).
- ✿ Do perform other exploratory experiments related to your topic.



References

- Use APA style to cite your resources

Go to www.citationmachine.net and type in the name of your resource to get the proper format.

- Give credit for ALL resources used



References - EXAMPLE

Gray, William D. (1970). What we find when we look at molds. New York: McGraw-Hill Book Company.

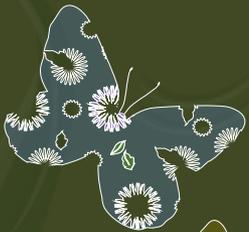
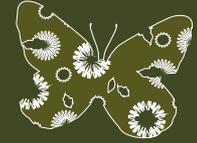
Guidelines for Formal report. Retrieved on 9/19/07 from

<http://www.uga.edu/oasp/Science%20Fair/GSEF.ISEF%20Rulebook.pdf>

Haduch, Bill. (2002). Science Fair Success Secrets. New York: Dutton Children's Books.

"Mold." The World Book Encyclopedia (2001), Volume 13, pg 689. Chicago: World Book, Inc.

The Scientific Method. Retrieved on 9/24/07 from <http://school.discoveryeducation.com/sciencefaircentral/>

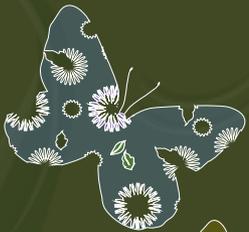
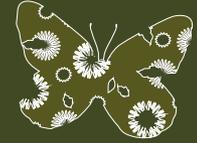


Experimenting to test the Hypothesis



All of your project experimenting will be performed to test the hypothesis. The hypothesis should make a claim about how two factors relate. For example, in the following sample hypothesis, the two relating factors are light and bread mold growth. Here is one example of a hypothesis for the earlier problem question:

- * **"If bread mold does not need light for reproduction on white bread, then mold will grow in a dark environment."**
- * **I base my hypothesis on these facts (gathered through research):**
 - * **Organisms with chlorophyll need light to survive. Molds do not have chlorophyll.**
 - * **In my exploratory experiment, bread mold grew on white bread kept in a dark bread box.**



Materials List

- ✿ Create a list of all your materials

- ✿ Things you used to complete your project

Project board

cut-out letters

Paper, pencil, markers 6 loaves of bread

Sealed box

Thermometer

Timer

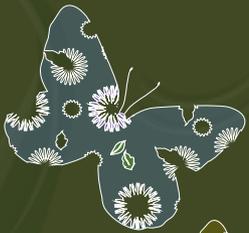
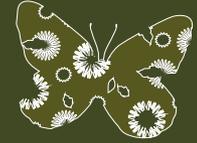
Lamp

Refrigerator

Camera

- ✿ Make sure that you list the amount of each item.

- ✿ Include the measuring scale used for the items (Metric/Standard English).

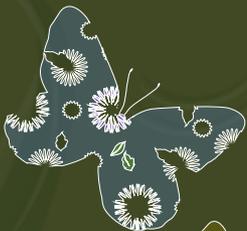
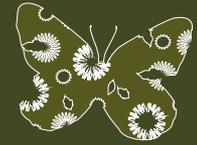


Procedures

- ✿ Methods (paragraph)

- ✿ Steps you did to complete your project (example)

- ✿ To complete my project, I bought 3 loaves of bread and placed the control in the refrigerator to keep it from molding. I placed one loaf in a dark, sealed box and I left one loaf out on the counter in the light. I took pictures of the 3 loaves.
- ✿ I wrote down the beginning time for the 3 loaves and then observed them each day – once in the morning and once in the evening – to check for mold. I wrote down my observations in my log book.
- ✿ No mold was observed until the 5th day. It was on both loaves in the same place – on the bottom.



Results

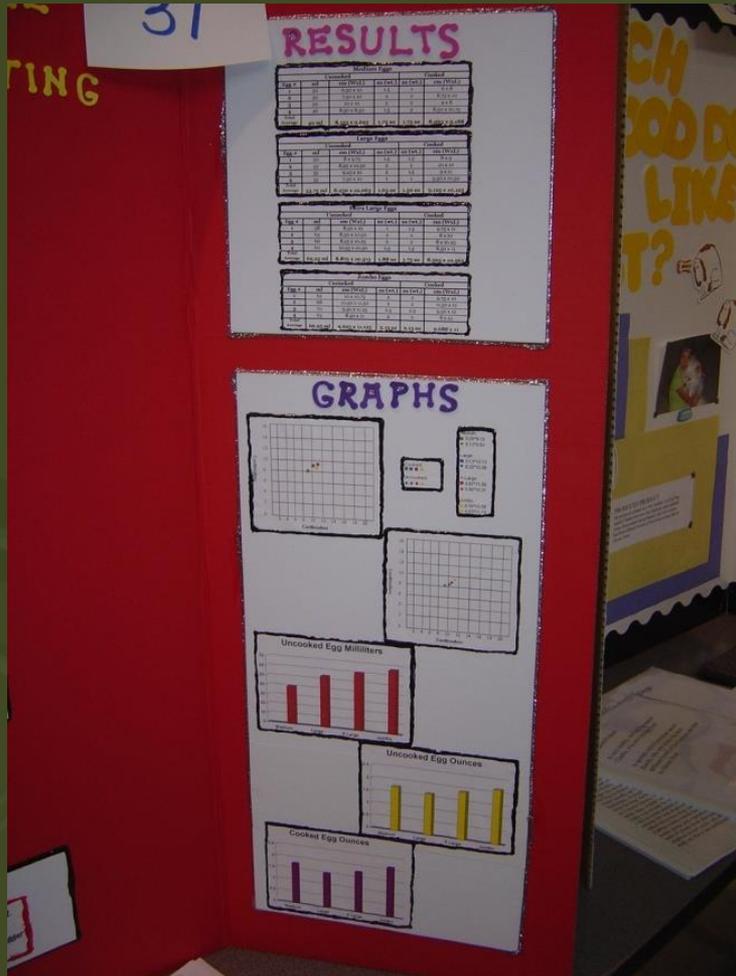


* Results

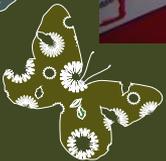
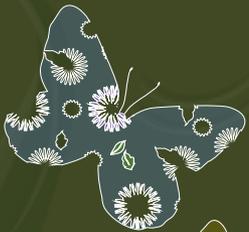
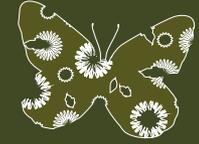
- * Data (information you collected as you did your experiments)
 - * Time it took for mold to start growing
 - * Amount of mold each day on each loaf
 - * Temperatures of bread loaves
- * Analysis (what you decided that your data showed you)
 - * Mold grew first on both, but faster on the loaf in the dark, possibly due to higher temperature and ...
- * Include statistics, graphs, charts, etc.



Results



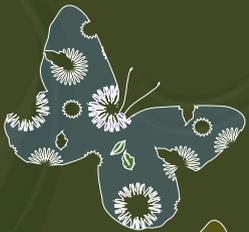
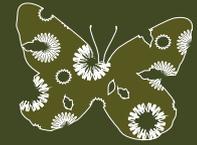
- ✿ Include charts, graphs, or other visual displays that help explain your project results.



Project Conclusion

(What did you learn? Explain thoroughly. What really happened during your experiment – were you right? Be honest!)

- ✦ The project conclusion is a summary of the results of the project experimentation and a statement of how the results relate to the hypothesis.
- ✦ Reasons for experimental results that are contrary to the hypothesis are included. If applicable, the conclusion can end by giving ideas for further testing.
- ✦ *If your results do not support your hypothesis:*
 - ✦ **Don't** change your hypothesis.
 - ✦ **Don't** leave out experimental results that do not support your hypothesis.
 - ✦ **Do** give possible reasons for the difference between your hypothesis and the experimental results.
 - ✦ **Do** give ways that you can experiment further to find a solution.



Conclusion

The hypothesis is incorrect.

The type of ball made little difference. The X-Cat ball went the farthest but it was barely farther than the other balls. The different types of balls traveled very close to the same distance. The difference between the longest average and the shortest average was only 0.6 of a yard or 21.6 inches.



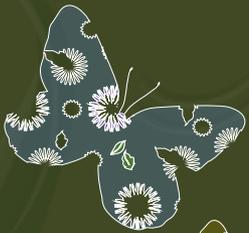
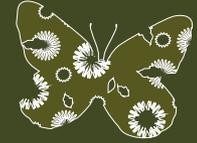
Acknowledgments

- ✿ In this paragraph, you will give credit for help given by teachers, parents, or people you have interviewed.
 - * I would like to thank my mom for typing the final draft of my project.
 - * I would like to thank my science teacher for finding the graph template for me.
 - * I would like to thank Dr. Science for allowing me to interview her.



Abstract

- ✦ The abstract is a short version of your science fair project, no more than 250 words. It should include:
 - ✦ 1. Introduction—“So what” are we learning about
 - ✦ 2. Problem Question
 - ✦ 3. Procedures
 - ✦ 4. Results
 - ✦ 5. Conclusion—“So why” is this experiment important to us

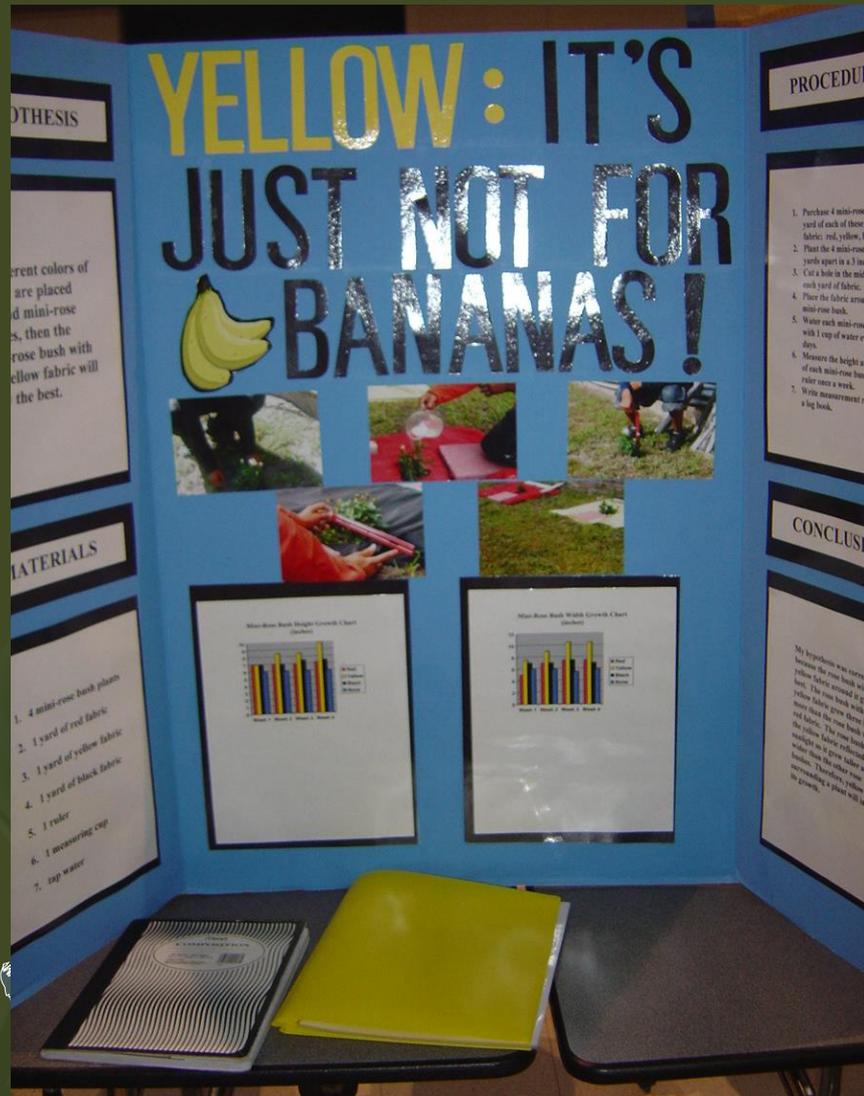


Dos and Don'ts

*Do NOT experiment on perishable items.

*Do include pictures of the experiment process. This is a requirement.

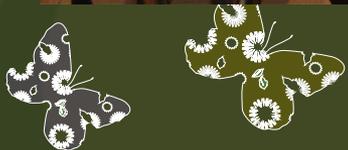




DISPLAY

Please make sure you have the three materials shown for the day of the Science or Social Science Fair.

PROJECT BOARD
RESEARCH PAPER
LOG BOOK



BEAM Robotics

Meet the Bots



Factor Bot

Factor Bot is a small, portable robot that can be used for a variety of applications. It is designed to be easy to use and is suitable for both educational and professional environments.



Light Seeking Bot



This robot is designed to seek out and follow a light source. It is a great example of how simple sensors can be used to create intelligent behavior in a robot.



This robot uses a sensor to detect the presence of an object. It is a simple but effective way to demonstrate the use of sensors in robotics.



This robot uses a camera to see its environment. It is a more complex robot that can be used to demonstrate advanced robotics concepts.

B E A M

Biology- The use of biological principles in the design of robots.

Electronics- The use of electronic components in the design of robots.

Aesthetics- The use of artistic principles in the design of robots.

Mechanics- The use of mechanical principles in the design of robots.

Purpose

Test Results

Factor Bot

Factor Bot was tested in a series of experiments. The results show that it is capable of performing a variety of tasks with high accuracy.



Light Seeking Bot

The Light Seeking Bot was tested in a series of experiments. The results show that it is capable of following a light source with high accuracy.



Robot with Sensor

The Robot with Sensor was tested in a series of experiments. The results show that it is capable of detecting the presence of an object with high accuracy.

Robot with Camera

The Robot with Camera was tested in a series of experiments. The results show that it is capable of seeing its environment with high accuracy.

Hypothesis

By using BEAM technology these robots will be able to perform complex functions and will be cost effective. Much of the cost effectiveness comes from using basic found in the field and not having microprocessors or programmable logic.

Conclusion

From the experiments it can be concluded that BEAM robots can perform complex functions and will be cost effective.

BEAM History

The BEAM Robotics Project began in 1993 as a hobby project. It was started by a group of people who were interested in building simple robots. The project grew and became a major focus of the Robotics Society of America. Today, BEAM Robotics is a well-established and successful project that has inspired many people to get into robotics.

Current and Future Uses

BEAM Robotics has many current and future uses. It is used in education, research, and industry. It is also used in entertainment and as a hobby. The future of BEAM Robotics is bright and there are many exciting possibilities for its use in the years to come.

ROBOWARNER.COM



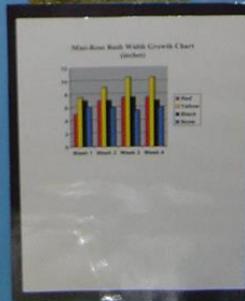
THESIS

erent colors of
are placed
d mini-rose
s, then the
rose bush with
ellow fabric will
the best.

MATERIALS

1. 4 mini-rose bush plants
2. 1 yard of red fabric
3. 1 yard of yellow fabric
4. 1 yard of black fabric
5. 1 ruler
6. 1 measuring cup
7. tap water

YELLOW: IT'S JUST NOT FOR BANANAS!



PROCEDURE

1. Purchase 4 mini-rose bushes, one of each of these colors: red, yellow, black, and white.
2. Plant the 4 mini-rose bushes in a 3' x 3' area, 3 yards apart in a 3' x 3' area.
3. Cut a hole in the middle of each yard of fabric.
4. Place the fabric around each mini-rose bush.
5. Water each mini-rose bush with 1 cup of water every 2 days.
6. Measure the height and width of each mini-rose bush once a week.
7. Write measurement results in a log book.

CONCLUSION

My hypothesis was correct because the rose bush with yellow fabric around it grew the most. The rose bush with red fabric around it grew the least. The rose bush with black fabric around it grew the most. The rose bush with white fabric around it grew the most. Therefore, yellow is the best color for surrounding a plant with fabric.

Display Board

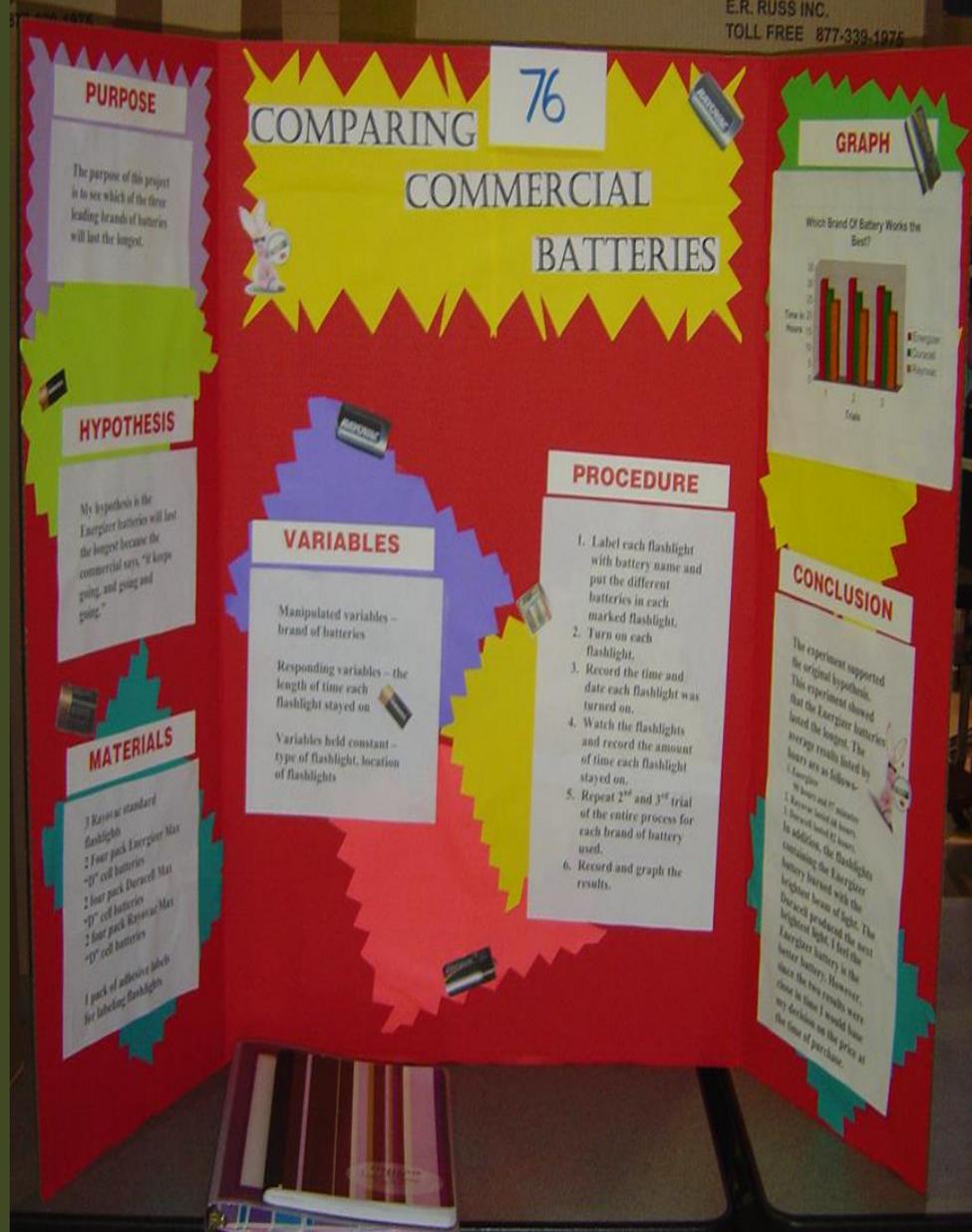
List of Materials

Please make sure you have the three materials shown for the day of the Science Fair.

Project Board, Log Book and Report



MAKE IT COLORFUL!



WHICH

GOLF

BALL



TRAVELS FARTHEST?

Problem

Which golf ball goes farthest when hit by my subject?

- Titleist DT Soft
- Titleist Pro V 1
- Cougar X-Cat
- Nike EZ Distance

Hypothesis

If my subject hits twelve golf balls with the same club, then the Nike EZ Distance ball will have the longest average distance.

My subject has a nice accurate soft swing. The EZ Distance ball is designed for your player. The package says the softer you hit it the further it goes.

Procedure

1. Gathered 5 balls of each different type
2. Mixed all the balls together
3. The subject hit all 20 balls
4. Measured distance that each ball traveled
5. Calculated the average distance of each ball type

Experiment



91.4



91.2



91.0



90.8

Results



Conclusion

The hypothesis is incorrect. The type of ball made little difference. The X-Cat ball went the farthest but it was barely farther than the other balls. The different distances between the longest average and the shortest average were only 0.6 of a yard or 21.6 inches.



OTHESIS

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ATERIALS

YELLOW: IT'S JUST NOT FOR BANANAS!



PROCEDURE

17

1. Purchase 4 mini-rose bushes, 1 yard of each of these colors of fabric: red, yellow, black.
2. Plant the 4 mini-rose bushes 3 yards apart in a 3 inch hole.
3. Cut a hole in the middle of each yard of fabric.
4. Place the fabric around each mini-rose bush.
5. Water each mini-rose bush with 1 cup of water every 3 days.
6. Measure the height and width of each mini-rose bush with a ruler once a week.
7. Write measurement results in a log book.

CONCLUSION

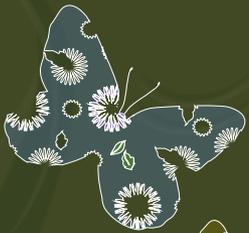
Mini-Rose Bush Height Growth Chart (Inches)



Mini-Rose Bush Width Growth Chart (Inches)



My hypothesis was correct
because the rose bush
yellow fab-



GOOD COOKIES

THE EFFECT OF FAT ON TASTE AND TEXTURE



Unsalted Applesauce



Unsalted Butter



Butter Flavored Crisco



Unsalted Applesauce Cookies



Unsalted Butter Cookies



Unsalted Crisco Cookies



Applesauce Cookies



Butter Cookies



Crisco Cookies

Experiment, Procedures, Materials

Three batches of cookies were made using the recipe and ingredients listed below. The experiment was designed to determine the effect of fat on the taste and texture of cookies.

Thick and Chewy Chocolate Chip Cookies

- Ingredients:**
- 2 cups flour
 - 1/2 cup baking soda
 - 1/2 cup salt
 - 1/2 cup Crisco
 - 1/2 cup butter
 - 1/2 cup applesauce
 - 1/2 cup brown sugar
 - 1/2 cup white sugar
 - 1/2 cup vanilla extract
 - 1/2 cup eggs
 - 1/2 cup chocolate chips
- Materials:**
- Mixing bowls
 - Measuring cups
 - Measuring spoon
 - Aluminum foil
 - Cookie sheets
 - Rolling pin
 - Cookie cutter
 - Cookie tray
 - Oven

- Directions:**
- Preheat oven to 350 degrees Fahrenheit.
 - Line cookie sheets with parchment paper.
 - Combine flour, baking soda, and salt in a large bowl.
 - Use an electric mixer to beat the butter, Crisco, and applesauce until creamy.
 - Add the ingredients to the bowl and mix well.
 - Add the eggs, one at a time, and mix well.
 - Roll the dough into balls and place on the cookie sheets.
 - Bake for 10-12 minutes.
 - Remove the cookies from the oven and let them cool on the cookie sheets.
 - Store the cookies in an airtight container.

Results

Appearance	Applesauce	Butter	Crisco
Texture	Soft and chewy	Crumbly	Thin and crisp
Flavor	Like cake	Like cookies	Like butter
Consistency	Not sticky	Sticky	Not sticky

