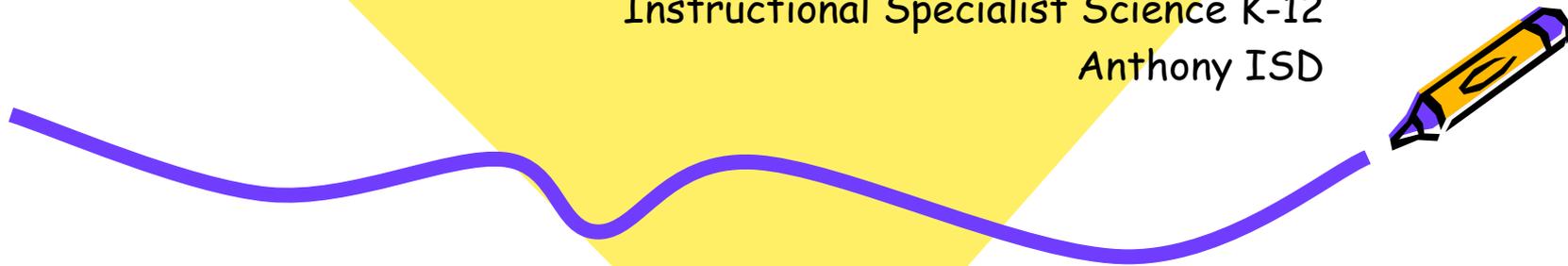
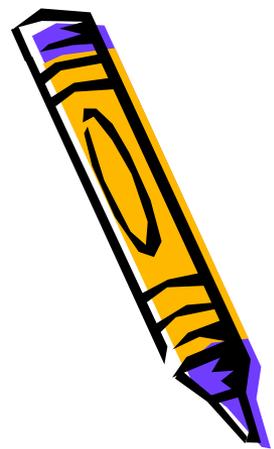


So You Have to Do a Science Project?

Lora Holt M.Ed.
Instructional Specialist Science K-12
Anthony ISD



For More Information Please use the...



Okay, now get to work on your project!!
What's that? You still need help getting started?

Introducing:
The Most Fabulous, Scientific, All Helpful,
Kid Friendly and Most Excellent Science Fair
Project Planner Known to Kid Kind:

**Tech20
Science Fair
Blast-off
Planning
Guide**

Just follow these easy steps and you too can create a wonderful
award winning science project, thought up entirely by you!!!

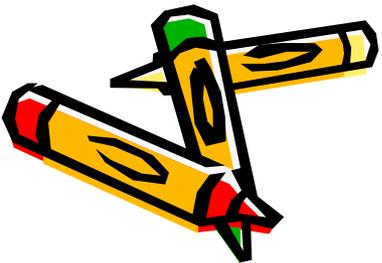
VERY IMPORTANT: Before you turn this page, recruit an
adult to help you. They come in very handy, especially if you
are nice to them and tell them you won't blow up any-
thing....
My adult's name is _____

From this point forward you are now... **A SCIENTIST!**

Lara Hen Copyright 2005

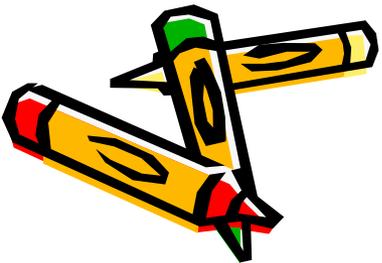
In English....

And In Spanish....



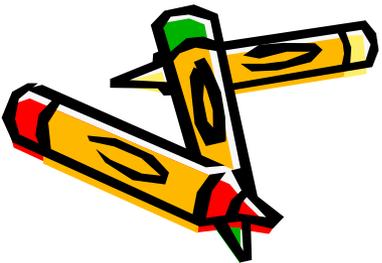
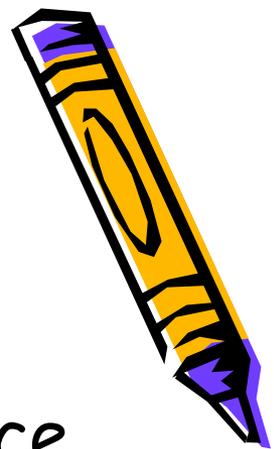
Did you know that at most Science Fairs:

- The students will **NOT** perform their project live for judges
- The students will only present their board and information at the fair
- The students cannot bring the items for their experiment to most science fairs.

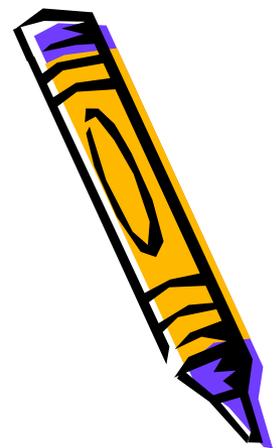


Did you also know that at most Science Fairs?

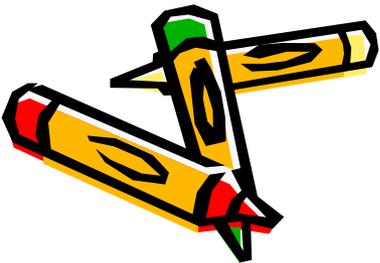
- Parents can help build and do the Science Project with their students
- Students will not be marked down for getting help from their parents
- This is because on the judging form students will be judged on their Scientific Knowledge gained from their experiment.



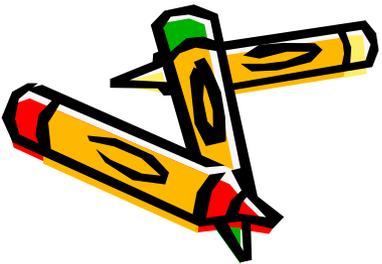
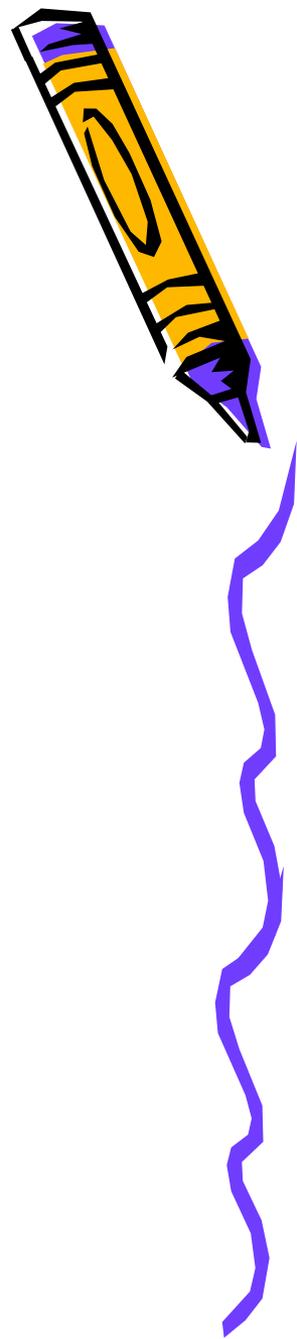
And at MOST Science Fairs...



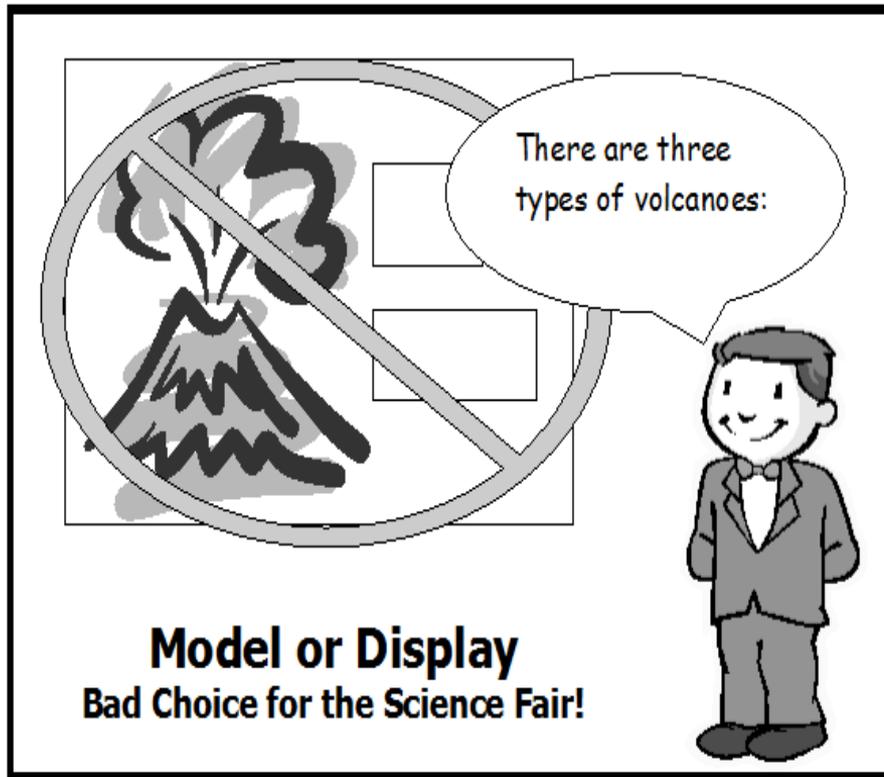
Since the use of the Scientific
Method is being judged, models,
collections and demonstrations
will not qualify...



SO WHAT IS THE
DIFFERENCE
BETWEEN A MODEL
AND AN EXPERIMENT?



Models, Displays, Collections

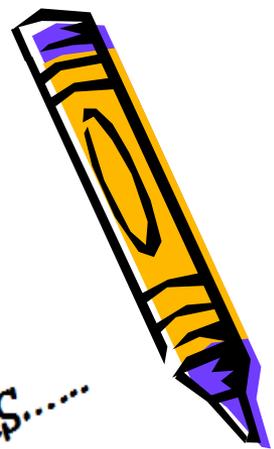
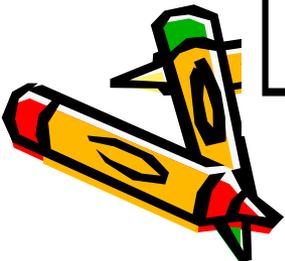


*BORING !!!!!
DONT DO THIS.....*

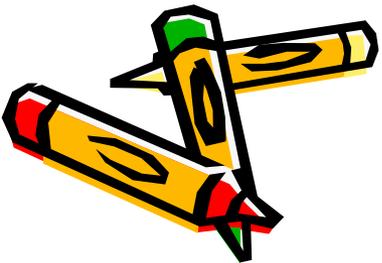
A Model, Display or Collection:

Shows how something works in the real world, but doesn't really test anything

Examples of display or collection projects can be: "The Solar System", "Types of Dinosaurs", "Types of Rocks", "My gum collection..." Examples of models might be: "The solar system" or "How an Electric Motor Works", "Tornado in a Bottle"



Model



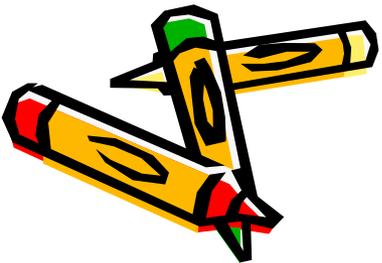
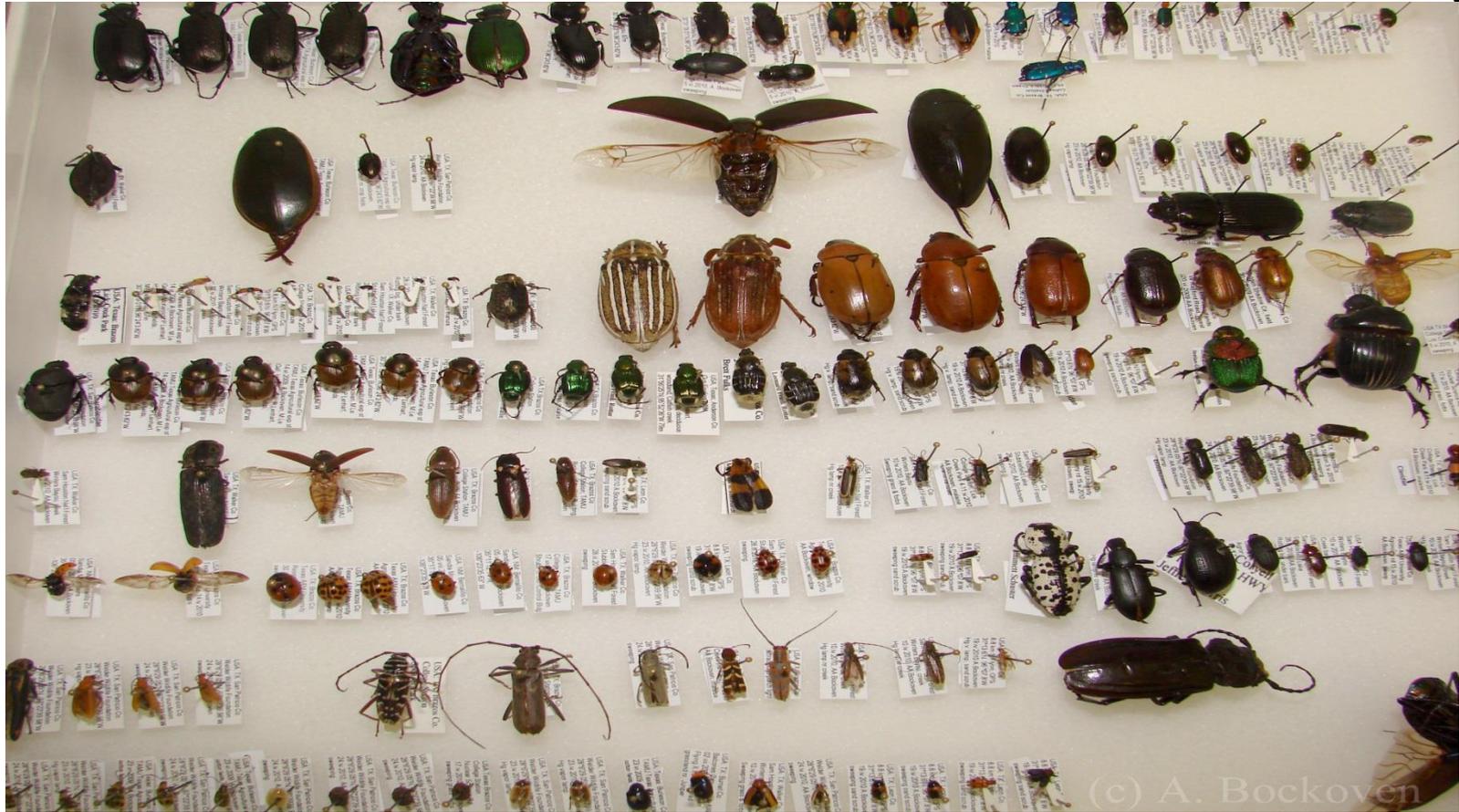
A volcano model is one of the most popular choices for Science Fair, however, although it looks cool, and may demonstrate a volcano eruption, it doesn't test anything!

Display



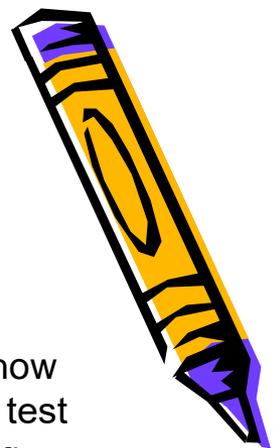
Doing a solar system display is also quite tempting! Even though these displays are quite beautiful, again, unless you have the ability to test a planet, this also does not qualify for science fair, sorry. ☹

Collection



This bug collection may have taken a long time to assemble, and you may have learned an awful lot about insects and how to identify them, but unless you created a test to test the bug's behavior, this also will not qualify.

Demonstrations



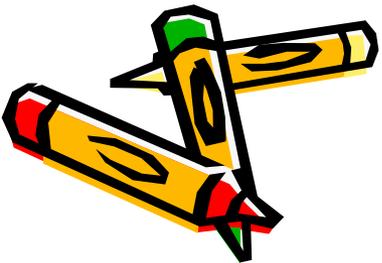
Carnations and food coloring

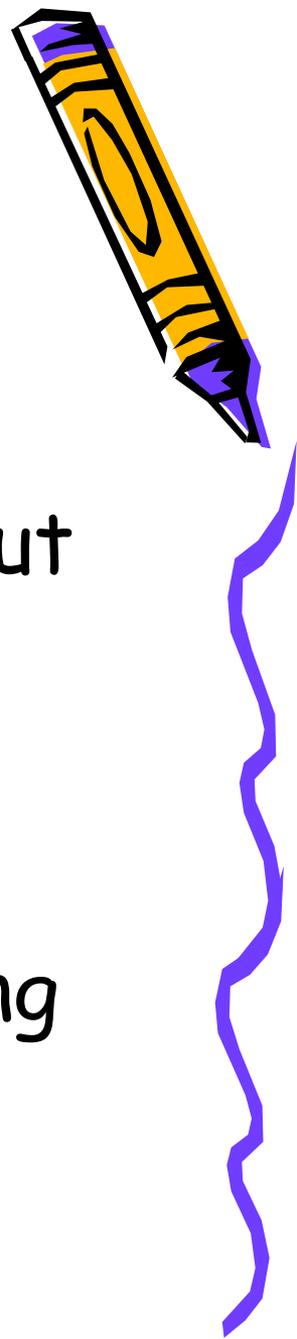
A demonstration only shows how something works, but doesn't test something effecting something else. In this case, the carnations are demonstrating capillary action in their stems.

How many drops of water fit on a penny?

In this case, we are only demonstrating that water drops have the ability to stick together instead of

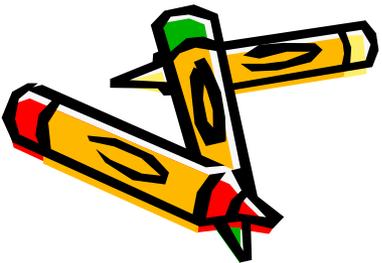
falling flat. Is this testing anything in particular? No.



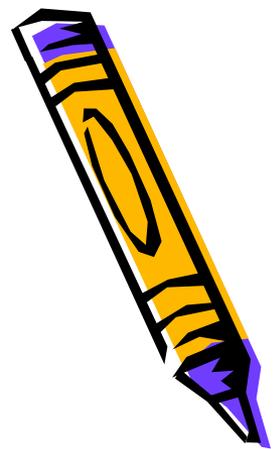


Be Careful!

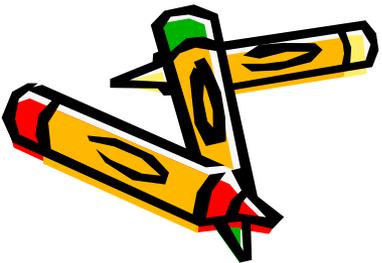
- Many websites and books say that their activity is an "Experiment" but in actuality they are only models, displays or demonstrations
- At Science Fairs, judges are looking for students that **test a question!**

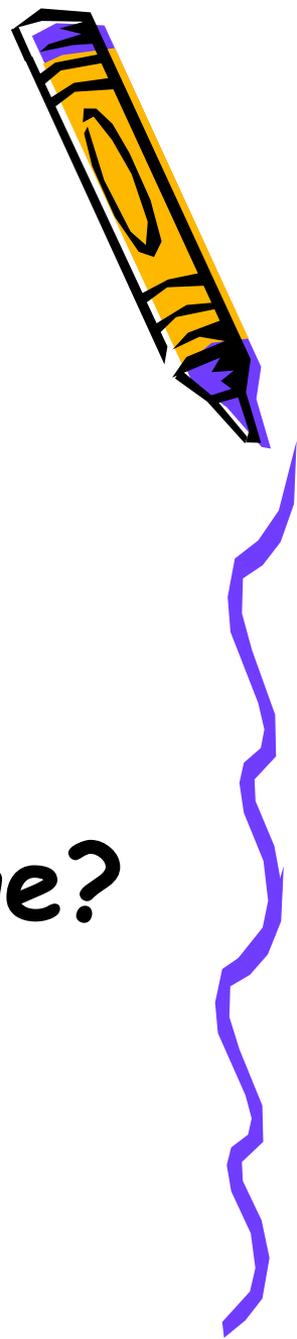


This is not to say that your Science Teacher doesn't want you to make or try these things...



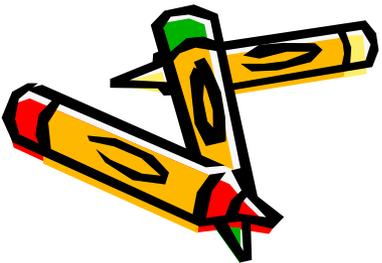
We WANT you to study bugs, volcanoes, water tension and plants... In fact, if you can bring those kinds of studies to demonstrate in class, that would be **TOTALLY AWESOME!!**

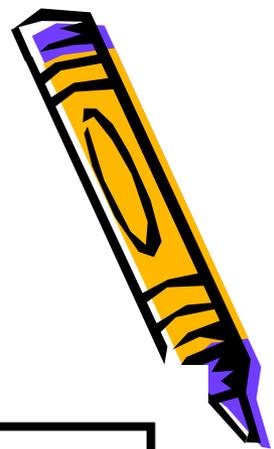




But Science Fair is a
different kind of project!

Are you up for the challenge?





The Science Fair Experiment!

COOL!!!! DO THIS 

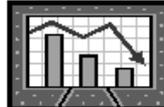
An Experiment:

Lots of information is given, **but it also has a project that shows testing being done and the gathering of data.**

Examples of experiments can be: "The Effects of Detergent on the Growth of Plants", "Which Paper Towel is more Absorbant" or "What Structure can Withstand the Most Amount of Weight"

You can tell you have an experiment if you are testing something several times and changing a variable to see what will happens. We'll talk about variables later....

Which laundry detergent works best?

<p>Question Which laundry detergent will get my whites whiter?</p>	<p>Materials: Brand X Brand Y Brand z</p>	<p>Results</p> 
<p>Hypothesis I think that brand x laundry detergent will get my whites whiter because it has...</p>	<p>Procedure:</p> <ol style="list-style-type: none">1.2.3.	<p>Conclusion I found out that brand x detergent was actually....</p>

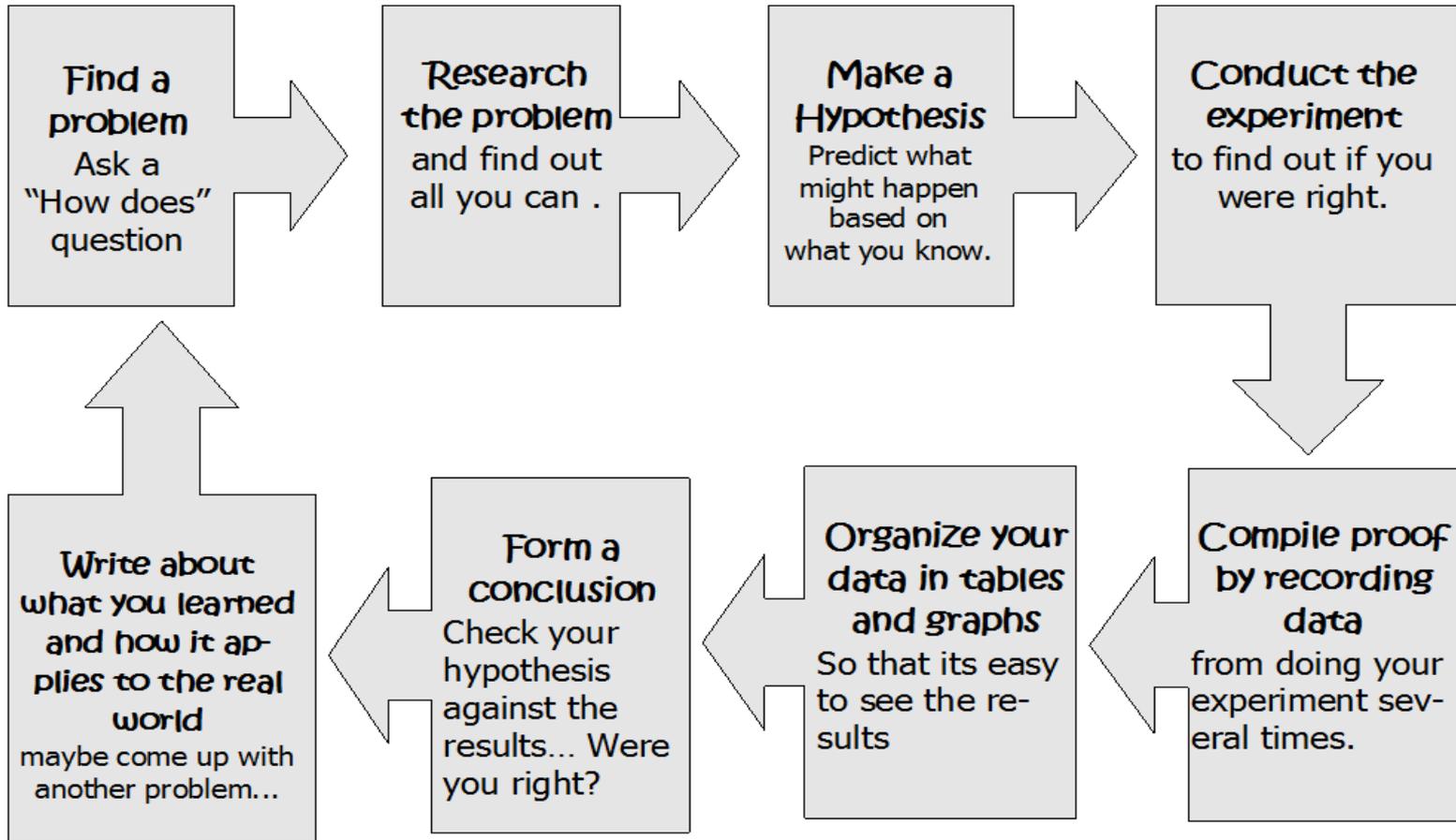
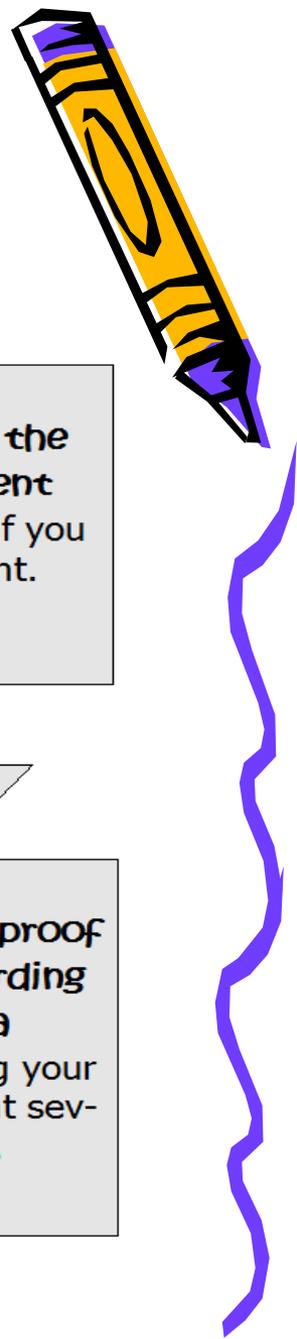
Experiment

Great Choice for the science fair!



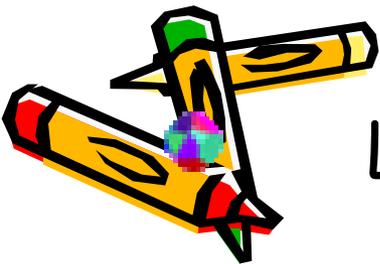
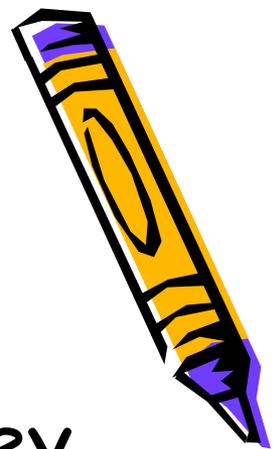


What is the Scientific Method?



So how do you come up with a question?

Some people find something that they are really interested in and then generate questions that they would like to know about that topic. Once they have written down as many questions as they can, then they try to find a question that is actually testable...



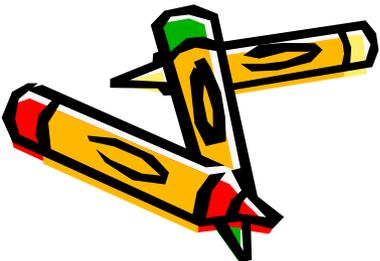
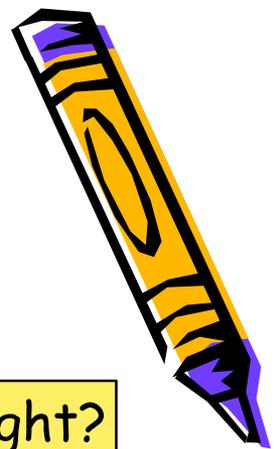
Let's look at an example of doing that...

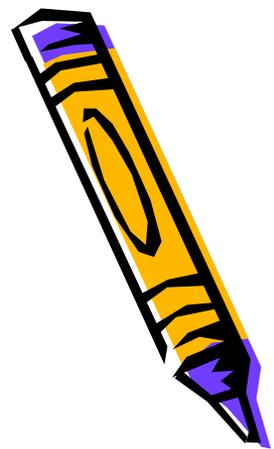
Topic: Roly Polies

- Do they have metamorphosis?
- How many legs do they have?
- Do they breathe air?
- Are they insects
- What do they eat?
- How many babies do they have?

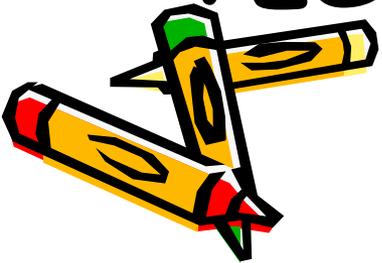
- Do they like dark or light?
- Where do they live?
- Who are their predators?
- Where are they on the food chain?
- Do they have metamorphosis?
- Why are some light gray and some dark gray.

A couple of these questions can actually be tested or turned into a test to find out something.

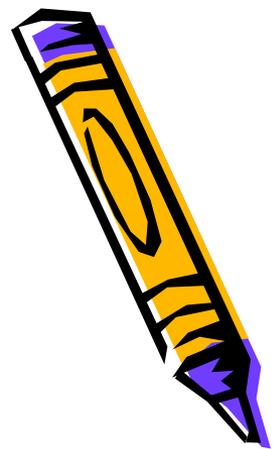




**HOW CAN WE CREATE A
TESTABLE QUESTION?**



The **EFFECT** Question



What is the effect of _____ on _____?

sunlight

eye color

brands of soda

temperature

oil

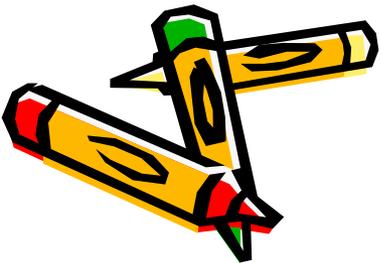
growth of plants

pupil dialation

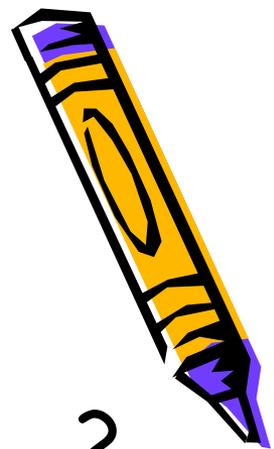
piece of meat

size of a balloon

ramp



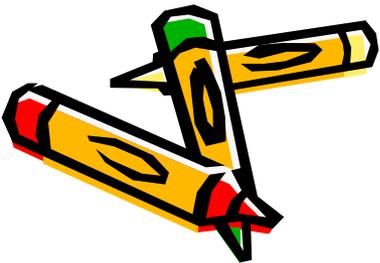
The How Does **AFFECT** Question

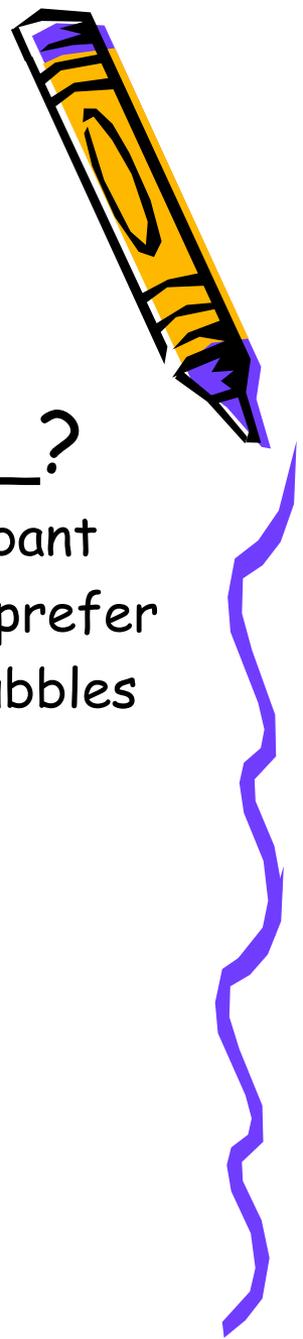


How does the _____ affect _____?

color of the light
humidity
color of material

growth of plants
growth of fungi
the absorption
of heat

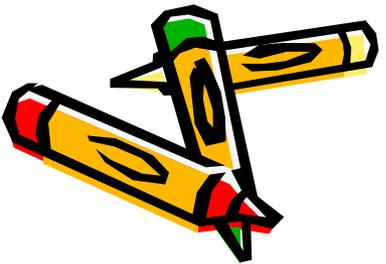




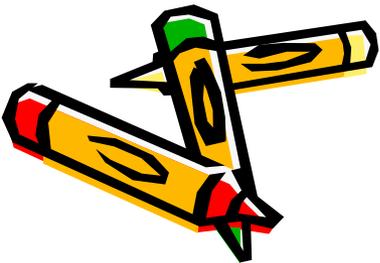
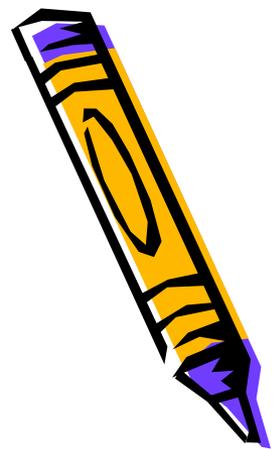
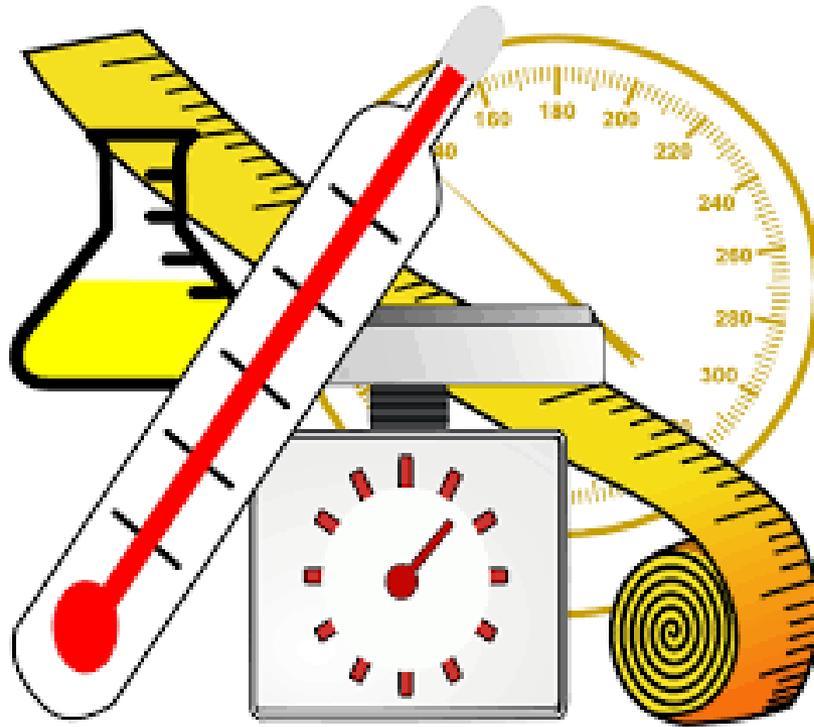
The **Which/What** and **Verb** Question

Which/What _____ (verb) _____?

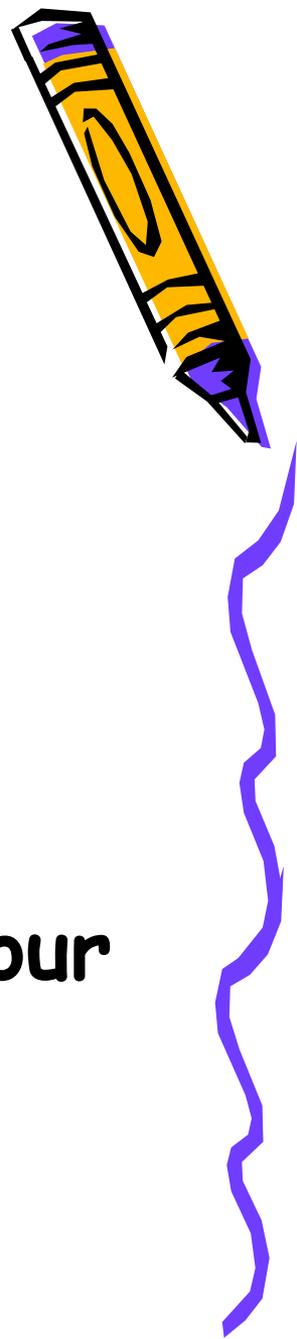
paper towel	is	more absorbant
foods	do	mealworms prefer
detergent	makes	the most bubbles



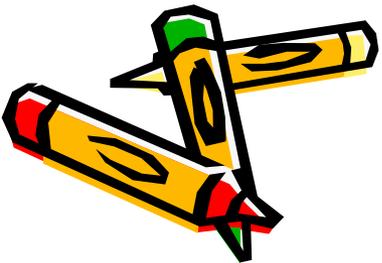
Next see if your question
can be measured...

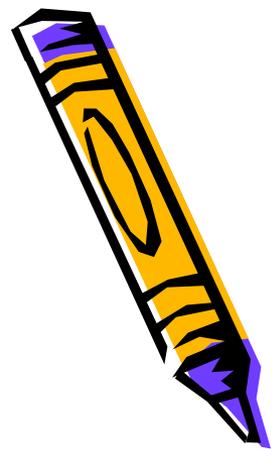


In science we use METRIC Measuring tools!



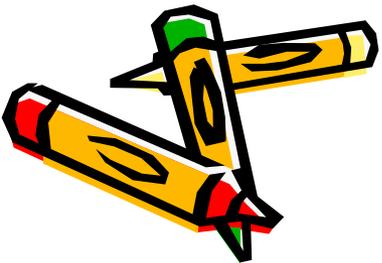
Don't be afraid to come up with your own testable question





ONCE YOU HAVE A
QUESTION YOU CAN START
THE SCIENTIFIC METHOD

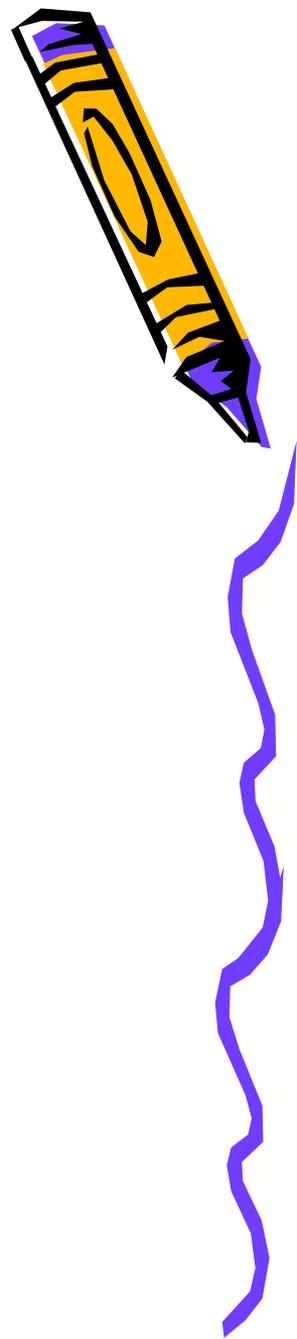
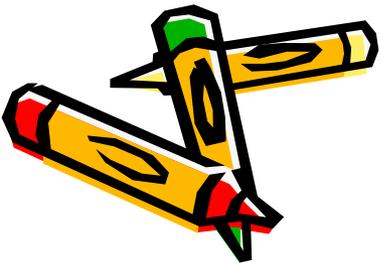
LET'S TRY IT...



Here is a bag of skittles

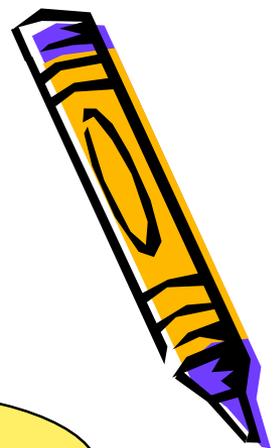
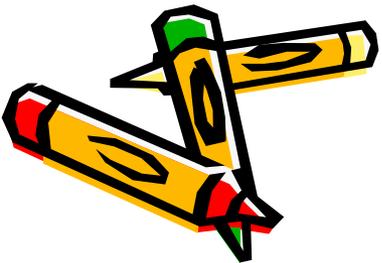


What kind of questions can we create?



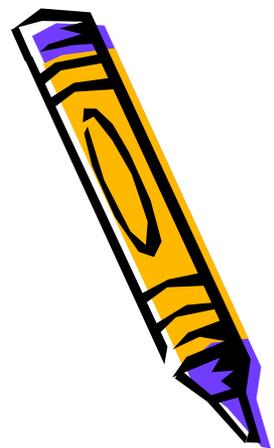
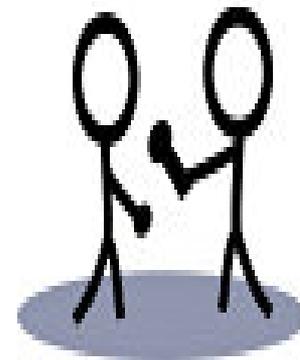
A Sample Problem

What color of Skittle comes
up the most in a bag?

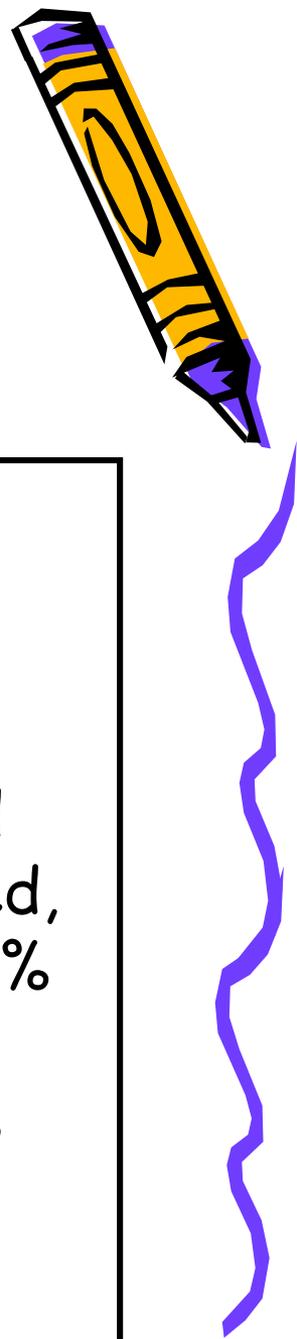


Research the Problem

- Read books
- Magazine Articles
- Internet Websites
- Ask Experts



Write About What You Found Out...

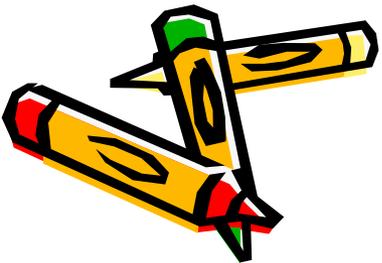


Report

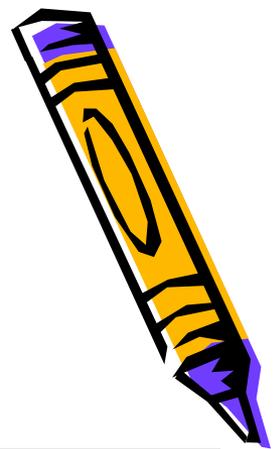
- PK-1 grade 1/2-1 page
- 2nd-3rd Grade: 1-2 pages
- 4-5th grade 2-3 pages
- Middle School and High School 3 pages or more
- High School: APA format

Looks Like:

Report
According to research, each package of Skittles should contain 20% red, 19% orange, 19% yellow, 23% green, and 17% purple



Cite your Sources



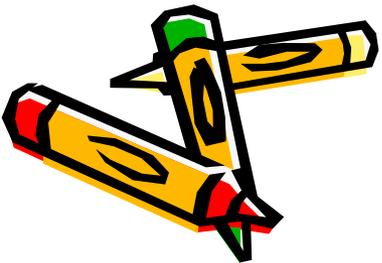
Bibliography (sources)

- **Book or Article:** Title, Author and Year it was published
- **Website:** Name of Website, URL, author and date that it was last updated
- **Expert:** Name of person you interviewed and date of interview
- **Do not list web browsers as sources, ex: Google.com**

Looks Like:

Bibliography

- Wiggly.com
- Skittles vs. M&Ms Report
- Wonka, Willie, How Candy is Manufactured, 1975

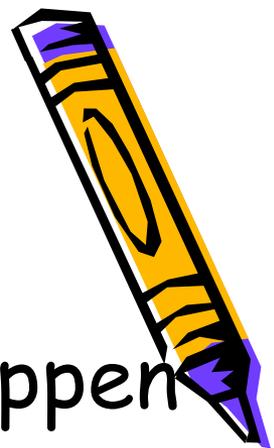
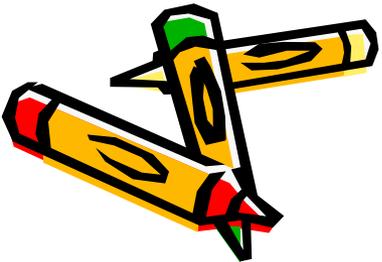


GOOGLE and BING ARE NOT SOURCES! They ARE SEARCH ENGINES!!! (its like saying I found out my information from the library)

Creating a Hypothesis

- Hypothesis is what you think will happen based on what you have researched.
- Hypothesis are more like inferences (it is not a wild guess, its based on evidence)

Example: Based on what you already know, what do you think will happen? Explain



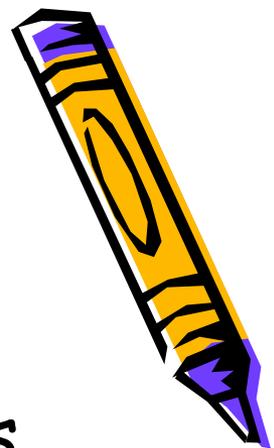
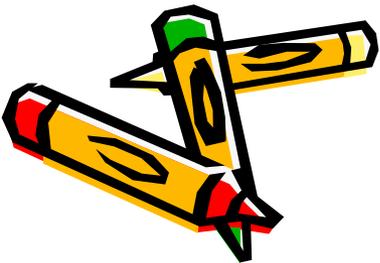
Sample of a Good Hypothesis:

● I think that red will be the color that is the most in bags because of the research I read in Skittles vs. M&M's report

-or-

● I think that yellow will be the color in most bags because these are fun size not regular sized bags

Notice how they say **WHY** they think that.

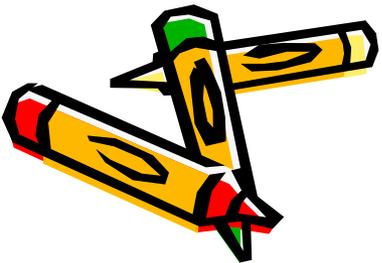
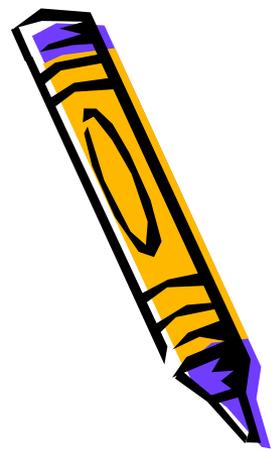


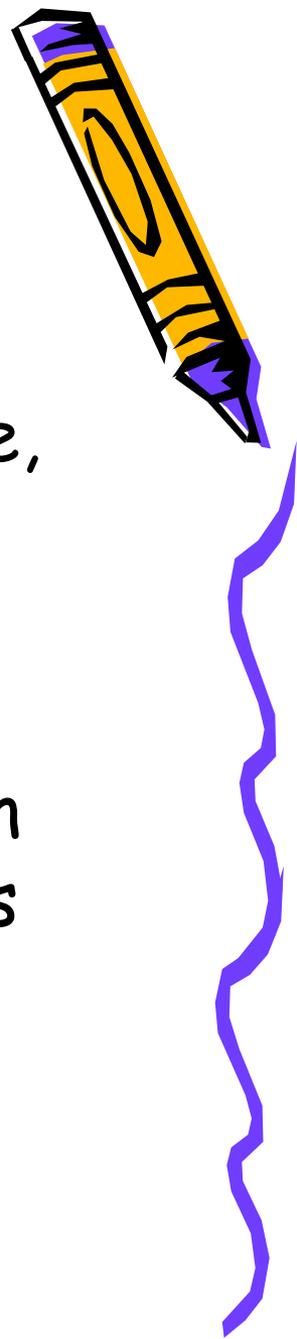
Example of a Bad Hypothesis

● I think the red will win

● I like the yellow one

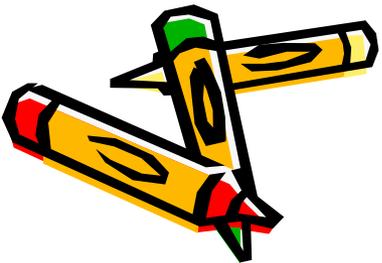
No evidence, no sign of research, no reason why they think that





Designing a FAIR TEST

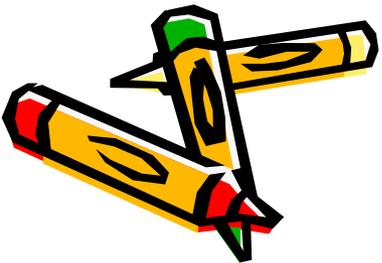
- A fair test only tests one thing at a time, this is called the **INDEPENDENT VARIABLE**
- Everything else in the test has to remain the same in order for it to be fair, this is called the **CONTROLLED VARIABLES**



Designing a RELIABLE Test



- In order to make sure that your results are correct, you should test your experiment **at least 3 times** (or more) for each test you design. (You may want to check with your teacher for the amount of times you should test.)
- Each time you test your experiment it is called a **Trial**
- The more trials, the more reliable the results.



Why do we have to test so much?

Because that is what Scientists do to make sure they are right about something.

Examples of TESTING



Medicine tests

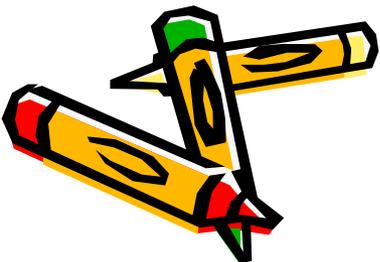
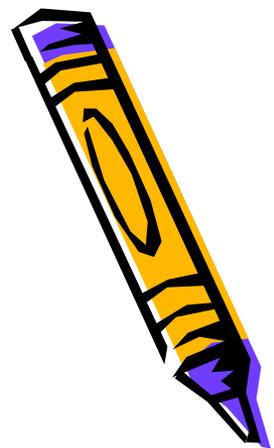


Car safety

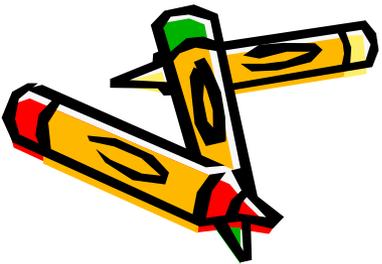
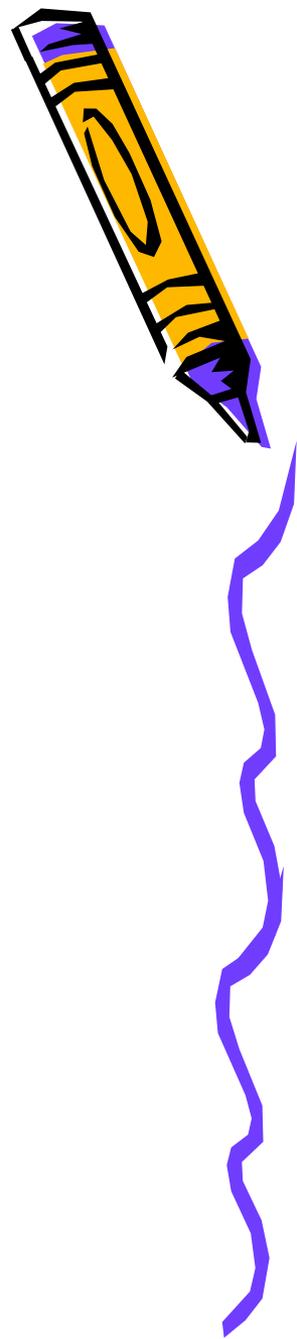


Food safety

You wouldn't want to try medicine or a car that had only been tested once, right?



HOW DO WE DESIGN A
TEST?



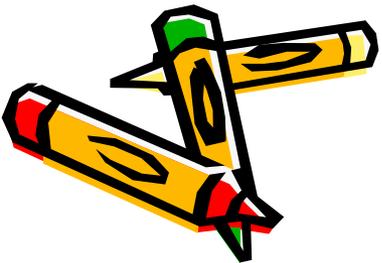
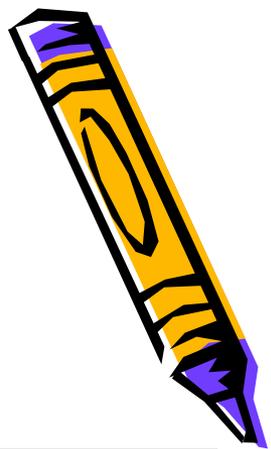
Materials

- A list of the items that you will need for your test...
- **Why?** Scientists list the materials in case someone wants to replicate the test to see if they can get the same results.

What it looks like:

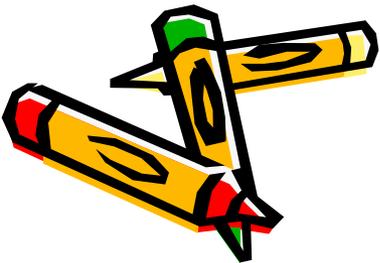
Materials:

- Skittles fun bags
- Paper
- pencil



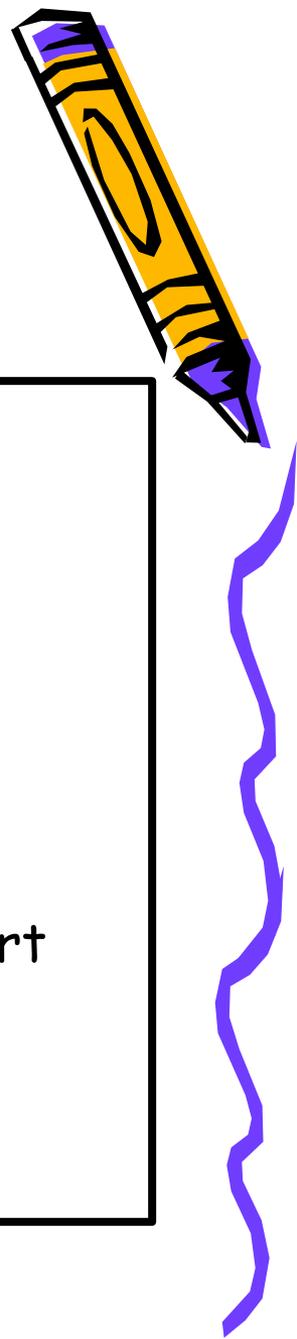
Procedure

- List all of the steps used in completing your experiment.
- Remember to number your steps.
- Add photos of your experiments.
- **Why?** Again, in case people want to try it themselves...

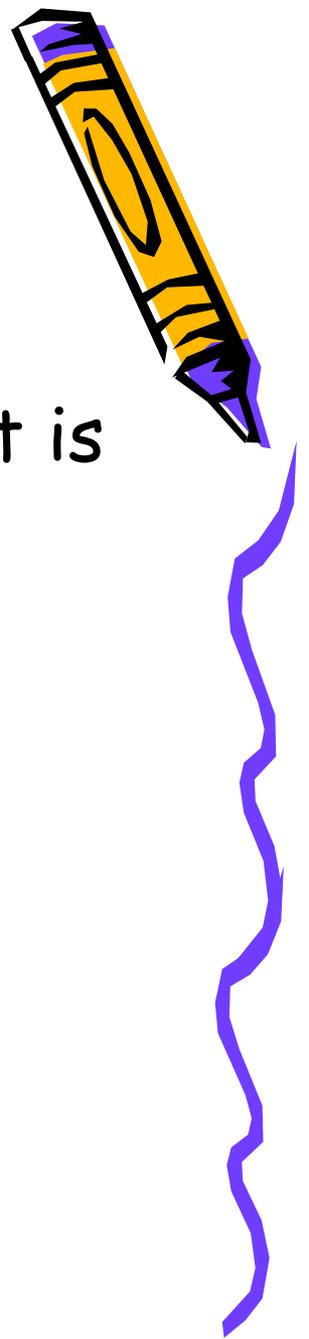


Procedures:

1. Open bag of funsize skittles
2. Number each bag
3. Open each bag and inventory skittles by color
4. Track results on chart
5. Graph results

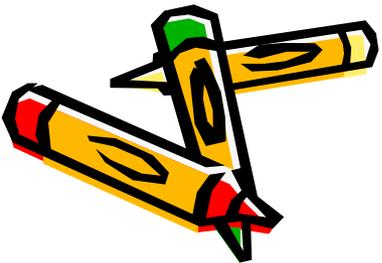


Data/Observations

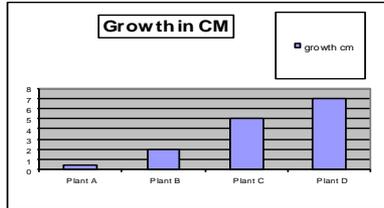
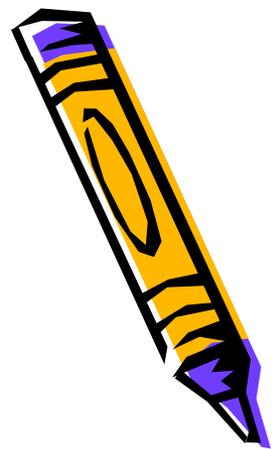


- It is easier to understand the data if it is put into a table or graph.
- Make sure all data is clearly labeled.

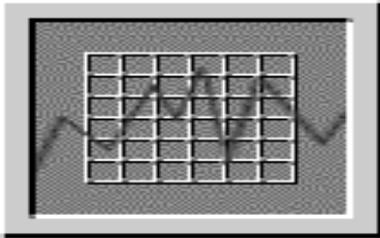
Bag number	yellow	red	purple	green	orange



The Right Graph for the Job



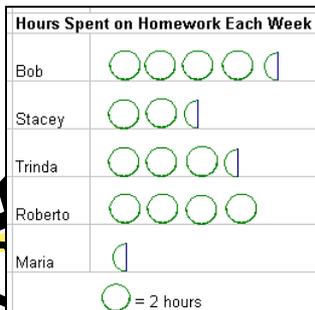
Bar Graph: Measures one thing against others (ex: boys compared to girls)



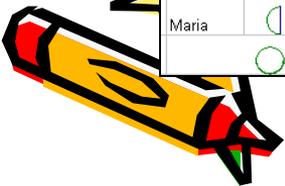
Line Graph: Measures changes over time (ex: Plants grew this much day 1, day 2...)



Pie Graph: Measures parts to the whole (ex: 20% of the people surveyed...)

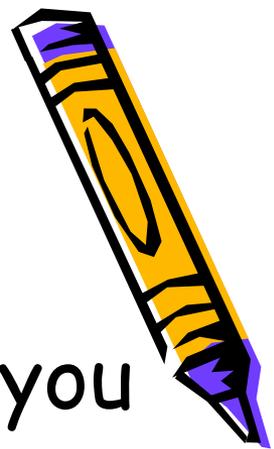


Pictograph: Represents amounts (ex: One Happy face= 5 people)



Conclusion

Type a brief summary here of what you discovered based on the results of your experiments. You need to indicate whether or not the data supports the hypothesis and explain why or why not.



Conclusion

In conclusion, I was correct (incorrect)....

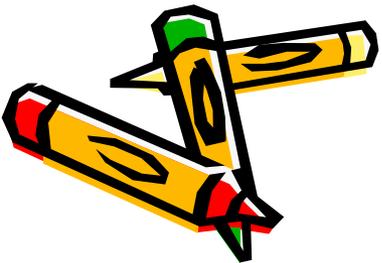
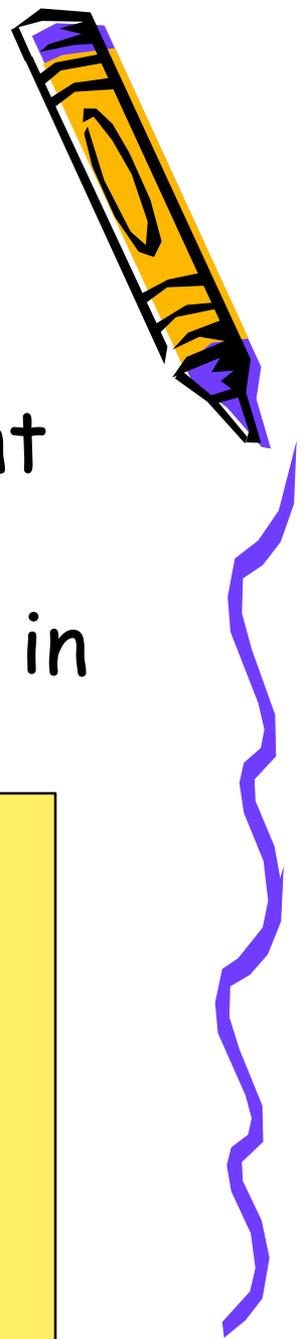


Application:

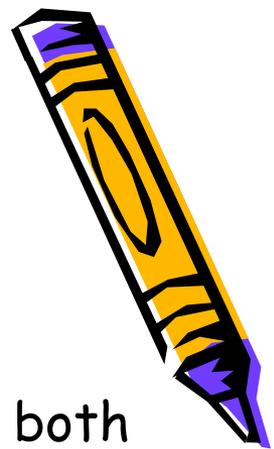
Explain why your project is important to the Real World. How can the information you learned be helpful in Real Life?

Application

Its important to know about the packaging of products because then you can find out if companies are doing what they advertise.



Middle School and High School Extras

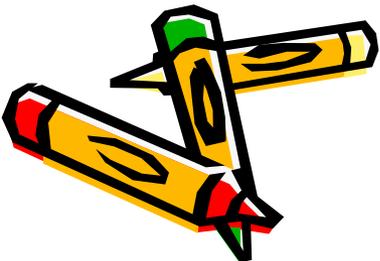


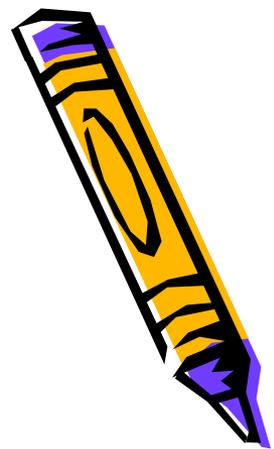
- **Null Hypothesis:** Sometimes your teacher will ask for both a hypothesis and null hypothesis. A Null hypothesis will explain that the test may not effect anything. It shows that you are not biased in your testing.

Ex: *The distribution of skittles is randome*

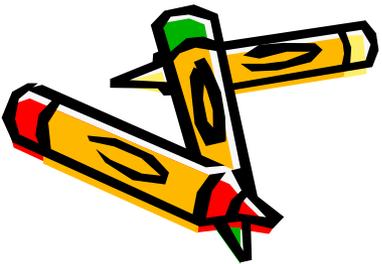
- **Control or Control group:** A group that you will leave alone so that you can compare your results to it. Important in experiments that are looking for effects.

● Ex: *We tested bags from the dollar tree*



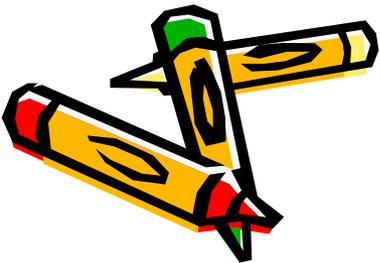


THE NEXT THING YOU NEED
TO DO IS BUILD YOUR BOARD!



For more detailed information like: I want to know more about variables... How many people should I test? What are the safety rules? Where can I look for more ideas? Please go to the El Paso Area Science Teachers K-12 website to download the **Tech2o Science Blast-off Science Fair Guide**:

<http://elpasok-12scienceteachers.weebly.com/science-blast-off-science-fair-guide.html>



Now you have everything you need to start your science fair project. So use your curiosity, creativity and imagination and find out about something new using the Scientific Method!

GOOD LUCK! 😊

