Science Project Guidelines and Resources Packet

1. Science Project Primer: The Scientific Method

- Your final project should have all the major headings in the Scientific Method.
  A. Problem/Purpose/Question
  B. Hypothesis
  C. Materials
  D Procedure/Method
  E. Observations/Data
  F. Results/Analysis (explain your results)
  G. Conclusions (include what you'd try next)

2. General Notes:

- Plan BEFORE you try to do your experiment.
- Come up with a snazzy title, have fun with it!
- Design your experiment around your hypothesis, not your hypothesis around your experiment.
- REPEAT, REPLICATE, REPEAT, REPLICATE....all experiments must be **repeated** exactly as you did the first time (mostly 3, 4 or 5 times) to show that your result is REAL and not just CHANCE! Show all your work, if you don't show your repeated results, the judge won't know you repeated the experiment!
- Start with testing one thing at a time, then add in other factors.
- Don't delete negative results from your report, you often learn more when things don't work as planned.
- Make it interesting, if you don't find it interesting, someone else won't likely either.
- Research why things happen the way that they do when you get results. Its more interesting when you put fun facts and explain why you got the results that you did.
- Don't assume, find out!
- Put down all the steps in your method or procedure, even the little itty bitty ones. The purpose of your procedure is so that anyone can repeat your experiment **exactly** as you did, and hopefully get the same results.
- Give yourself plenty of time to design and re-design your experiment, sometimes you just need to mess with it! Just remember, once you are

happy with your design, **then** you start actually collecting your final data.

- Record all your data and observations in one place (a notebook is good), and turn that in with your project. You will have to have a notebook if you are going to participate in the Berrien County Art and Science Expo.
- **If you really like your final project, you can always enter it into the Berrien County Art Science Expo (4th grade and up). Please contact Tonya Snyder at the address below or visit http://www.remc11.k12.mi.us/expo/ for entry forms.Keep a notebook to hand in with your project as well.**
- **Tonya Snyder at (269)471-7725 ext. 360 or tsnyder@remc11.k12.mi.us**

3. Project Requirements

1st-3rd Grade:

- Science Project Form
- Collection (see examples at end of packet)

  Or

  Demonstration/Scientific Method Experiment (on Poster Board or Tri-fold, see examples at end of packet)
- Name plate **MUST** be in the upper right hand corner of your project or clearly visible on your collection (See cutout form on page 3).

4th-5th Grade

- Scientific Method Experiment (on Poster Board or Tri-fold, see examples at end of packet), fully labeled with all sections of the Scientific Method.
- Science Project Form is optional, but should be used to plan and display project. **Note, if you are entering the Expo, you must have a form and keep a notebook while doing your project which must also be entered with your project. Older students should do a report as well (5th graders).** See Expo website for current details.
- Name plate **MUST** be in the upper right hand corner of your project (Use cutout form on page 3).

Take Chances, Make Mistakes, Get Messy!

Forms:

- Name Plate- **Must be in upper right-hand corner of display.**
- Science Project Form: Scientific Method
- Science Project Form: Collection/Demonstration
- Judging Sheet: 1st-3rd Grade
- Judging Sheet: 4th=5th Grade

Name:_____

Teacher:_____

Room:_____

Grade: **1** **2** **3** **4** **5**

Science Project Form - Scientific Method

(Form required for 1st-3rd grades, guideline for 4th-5th grades)

Name:_____

Teacher and Grade:_____

Title of Experiment: _____

_____

Problem/Purpose/Question: What do I want to find out?

_____

_____

_____

_____

Hypothesis: What do I think I will find out? Be specific.

_____

_____

Materials: List ALL of your materials, including brands. A numbered list works best.

_____

_____

_____

_____

_____

Method/Procedure: How will I find out? (List ALL your steps, including how many times you repeat the experiment).

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Data: What actually happened?

Results/Analysis: Summarize and explain your data.

Conclusion: Did I prove my Hypothesis? What would I try next?

Science Project Form - Science Collection or Demonstration

(Form required for 1st-3rd grades)

Name:_____

Teacher and Grade:_____

Title of Collection or Demonstration:

_____

_____

Problem/Purpose/Question: What do I want to find out, collect or demonstrate?

_____

_____

_____

_____

Materials: List ALL of your materials or collection items, including brands. A numbered list works best.

_____

_____

_____

_____

_____

_____

_____

Method/Procedure: How will I find out about my question or collect my materials? (List ALL your steps, including how many times you repeat the experiment).

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Results/Analysis: Summarize and explain what happened. Was it what you expected?

Conclusion: What did I learn? What would I try next?

Brown School Science Fair Judging Sheet – Grades 1-3

Student Name:_____

Teacher Name:_____

Project Type: Collection/Demonstration Scientific Method Experiment

Criteria The criteria below stress student understanding of science and age appropriate science projects (generally collections and simple experiments). The projects will also be judged on how well the project has been displayed.	Not applicable	Missing	Needs Improvement	Done Well	Outstanding
Project					
Question or Collection					
Question stated clearly if an experiment					
Collection has a common science theme					
Student can explain how they put together their collection					
Hypothesis (experimental only)					
Hypothesis stated clearly if an experiment					
Methods/Procedure (more complete in an experiment)					
Complete list of materials present					
Procedure clearly stated and complete					
Procedure appropriate to the question					
Procedure includes replicates (experiment only, very hard concept for young students)					
Data and Results (more complete in an experiment)					
Data are complete					
Data are consistent with the procedure used					
Results are clearly stated					
Results are consistent with the data collected					
Conclusions (more complete in an experiment)					
Conclusions clearly stated					
Question or problem has been answered (Demonstration/Experiment)					
What was learned					
Student can explain what they liked best about their project					
Student can explain what they'd like to try next, either another collection or another experiment					
Display and Project Approach					
Difficulty level of the project was grade appropriate					
Overall inventiveness and creativity was demonstrated					
Project indicates a thorough understanding of the question/conclusions					
Display tells a complete story, collection well organized					
Display is neat, orderly and shows careful work (equal weight given to handwritten, typed or computer generated)					
Comments:					

Brown School Science Fair Judging Sheet – Grades 4-5

Student Name:_____

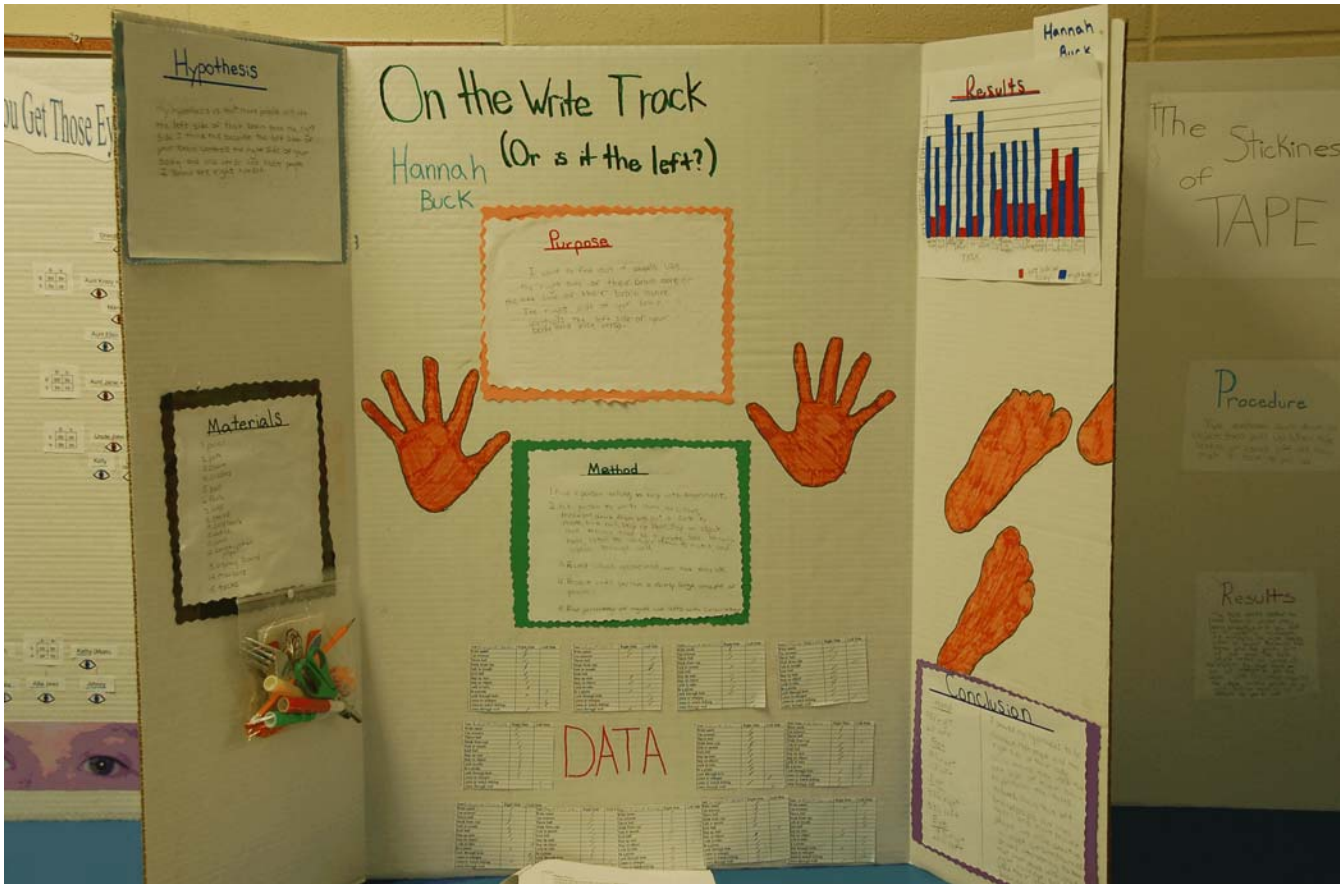
Teacher Name:_____

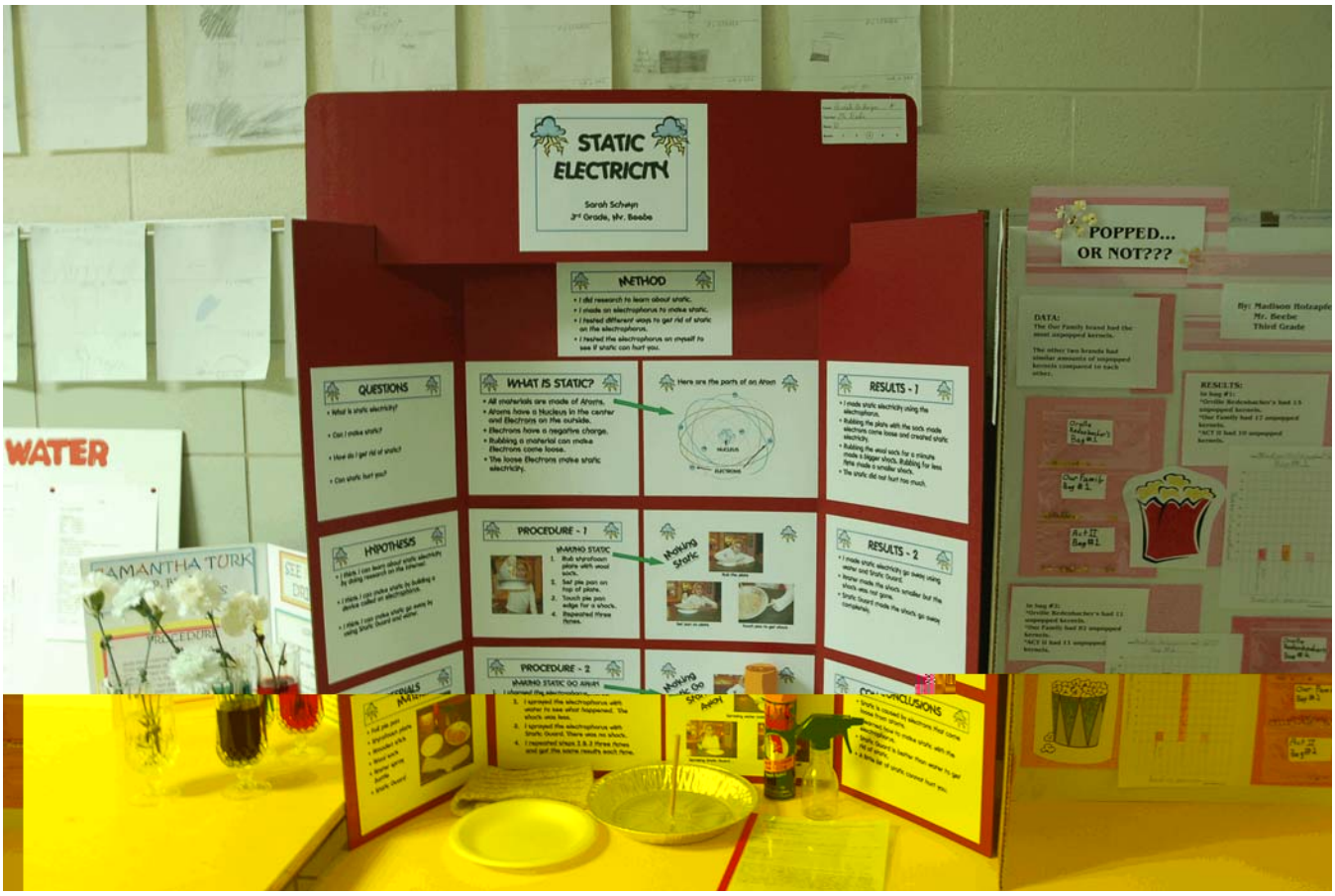
Criteria	Not applicable	Missing	Needs Improvement	Done Well	Outstanding
Scientific Method					
Question or Problem					
Question or Problem stated clearly					
Question or Problem well defined					
Hypothesis					
Hypothesis stated clearly					
Hypothesis experimentally testable					
Procedure					
Complete list of materials present					
Procedure clearly stated and complete					
Procedure appropriate to the question					
Procedure includes replicates					
Procedure includes control where appropriate					
Data and Results					
Data are complete					
Data are consistent with the procedure used					
Data tables and/or graphs are properly labeled					
Results are clearly stated					
Results are displayed in charts and graphs					
Results are consistent with the data collected					
Conclusions					
Conclusions clearly stated					
Data and results have been properly interpreted					
Question or problem has been answered					
Suggestions for other questions or the next step have been given					
Display and Project Approach					
Overall inventiveness and creativity was demonstrated					
Project indicates a thorough understanding of the question/conclusions					
Display tells a complete story					
Display is neat, orderly and shows careful work (equal weight given to handwritten, typed or computer generated)					

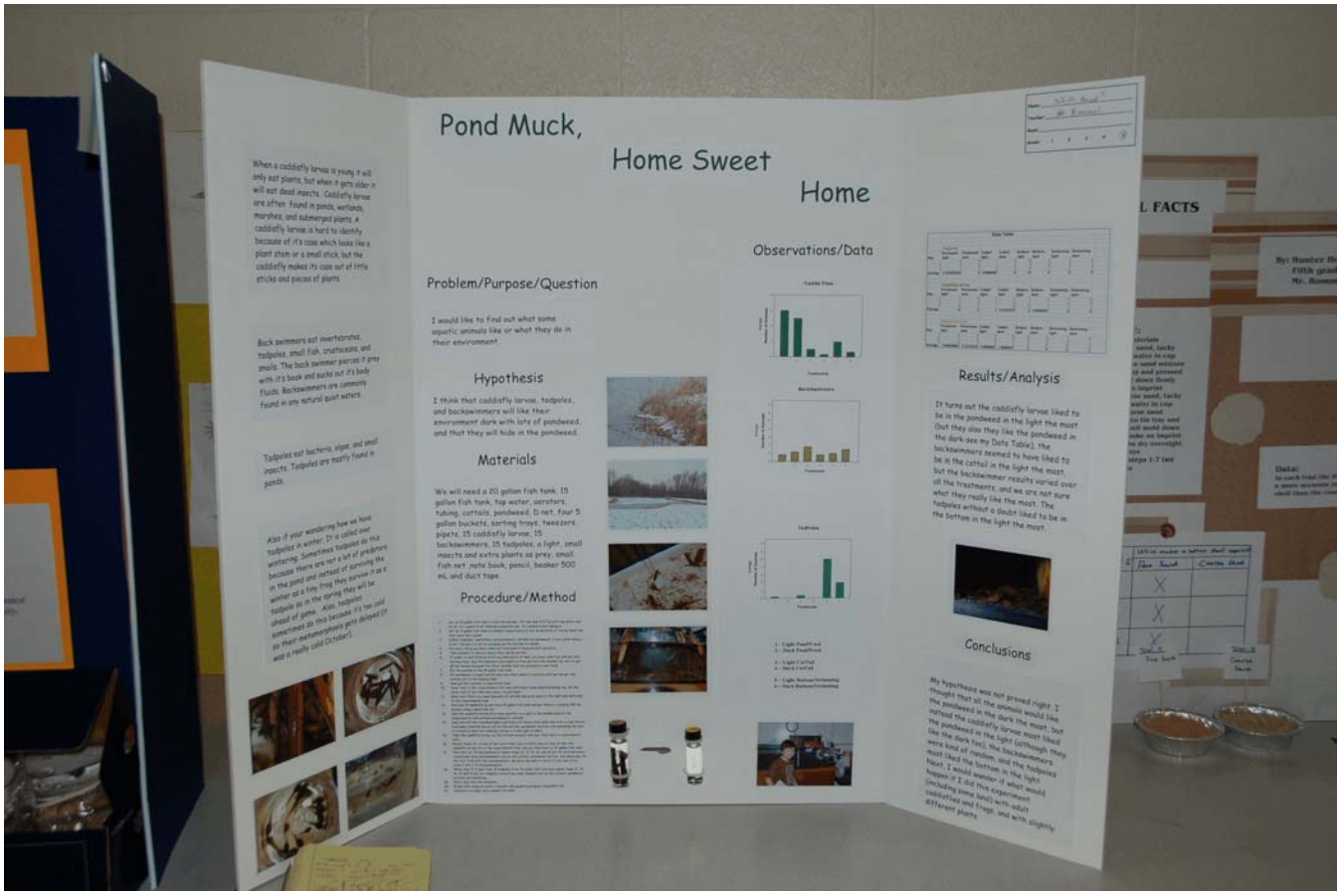
Comments:

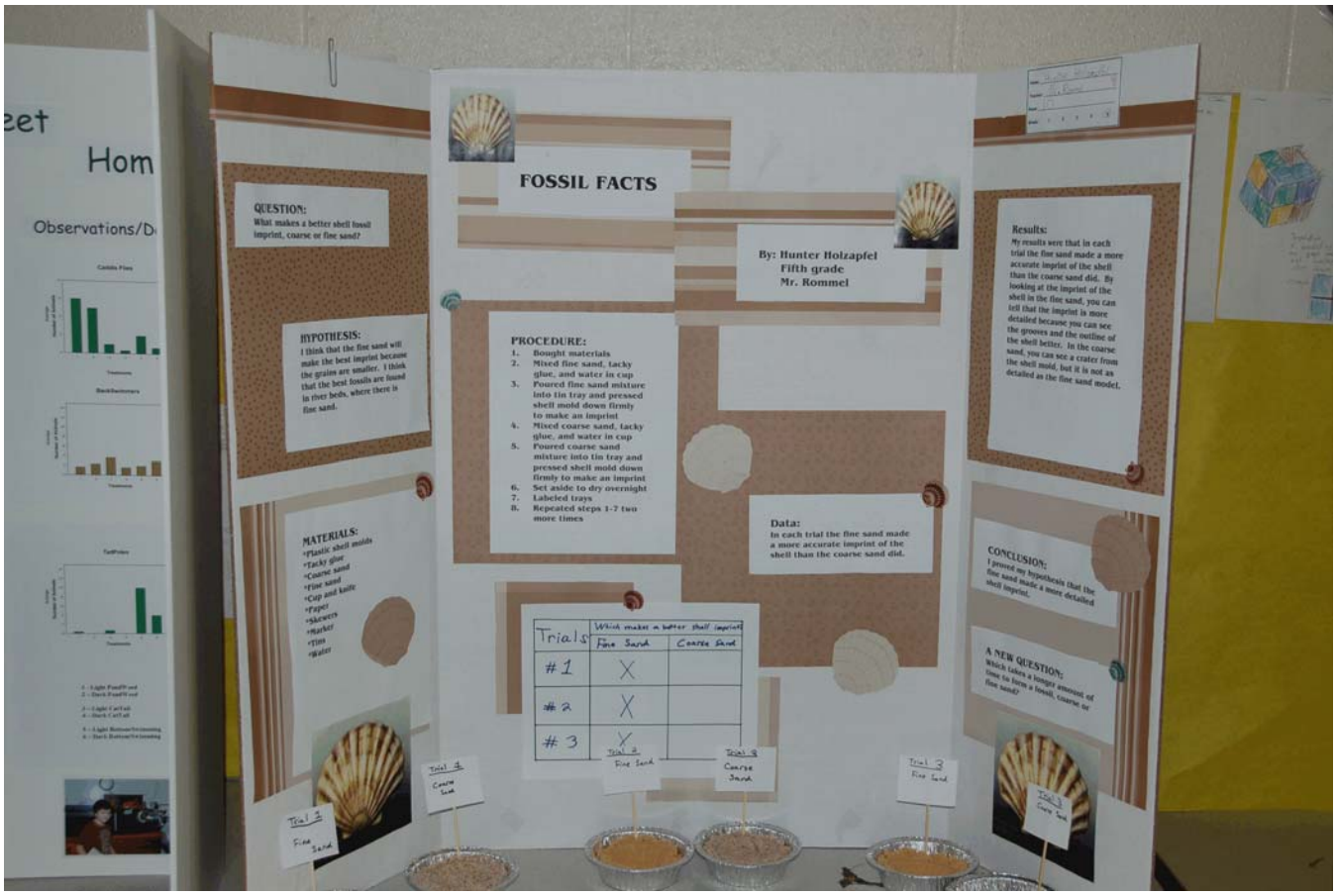
A small list of example projects and experiments. Remember, 4th and 5th graders must do something experimental following the Scientific Method Enjoy!

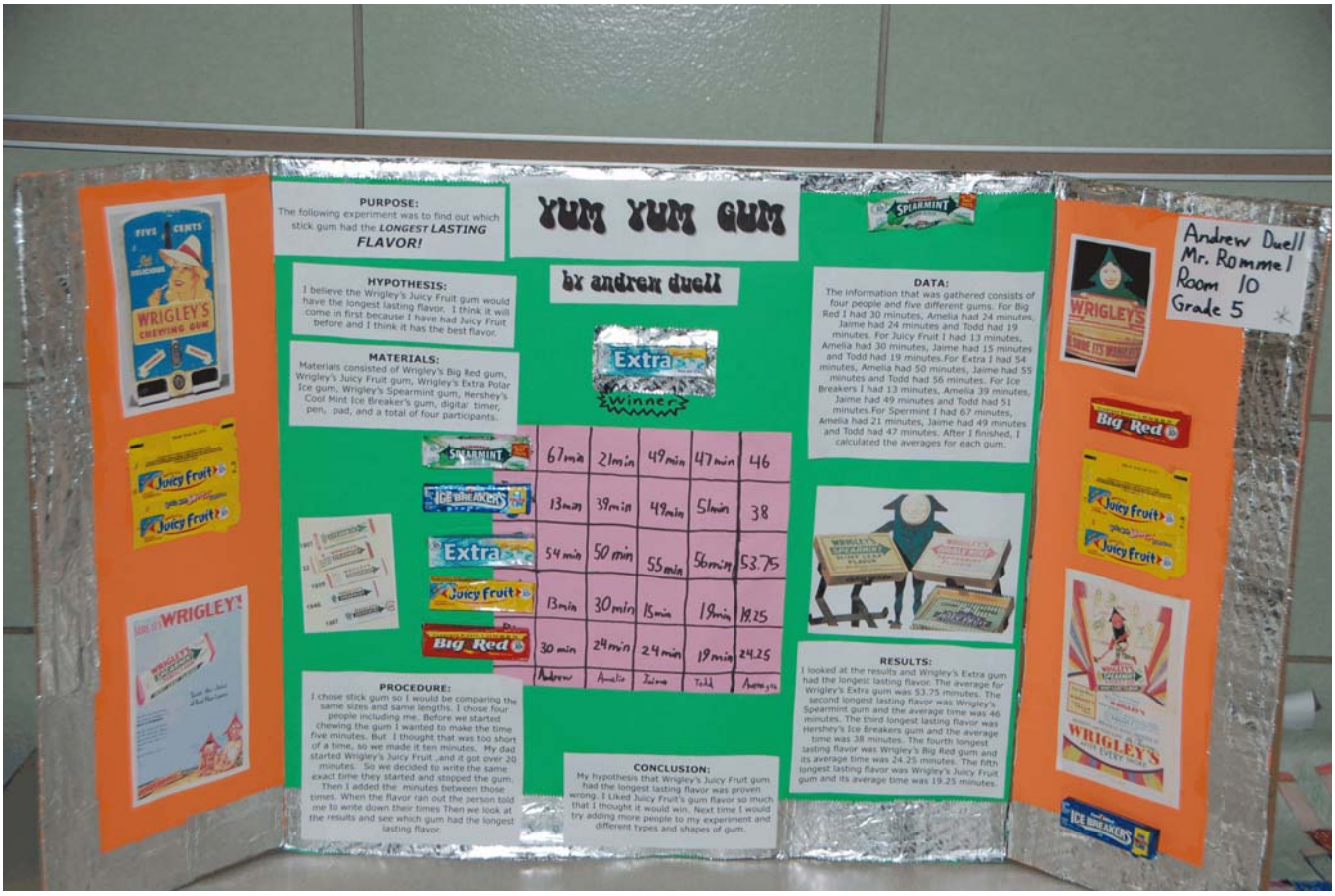
How can plants be used to measure the level of air pollution?
Are ants picky over their food? Do they have any preference?
Are your dreams in color?
How do different types of liquids affect fruit-fly growth?
What use is a stem for a flower?
Can you tell where sound comes from when you are blindfolded?
Can things be identified by just their smell?
Soil types in my area
What weight can a spider's web hold?
Which tile cleaner removes soap scum the best?
Find out how much hot air you have
Does the temperature of water affect the time it takes for the water to freeze?
Do different brands of popcorn leave different amounts of unpopped kernels?
Can we create light by chewing?
Demonstrate the strength of a suspension bridge using egg shells
Does the particle size of sand used to make bricks matter?
How do differences in surfaces affect the adhesion of tape?
How do temperature changes affect ants?
Show how animals hide themselves from their enemies and predators
How do oil spills affect marine life?
How much space does trash occupy?
How to make a baking soda volcano
Show how many colors of food dyes or inks are found in a smartie or m&m?
Is snow warmer on top or underneath?
How does the iris of your eye work?
Is our heartbeat affected by music?
Can quarters and feathers fall at the same speed?
Do plants grow at different rates when given different plant foods?
Does a pineapple grow best in sand, soil or water?
How does temperature affect the rate of growth of algae?
How do you grow your own mold?

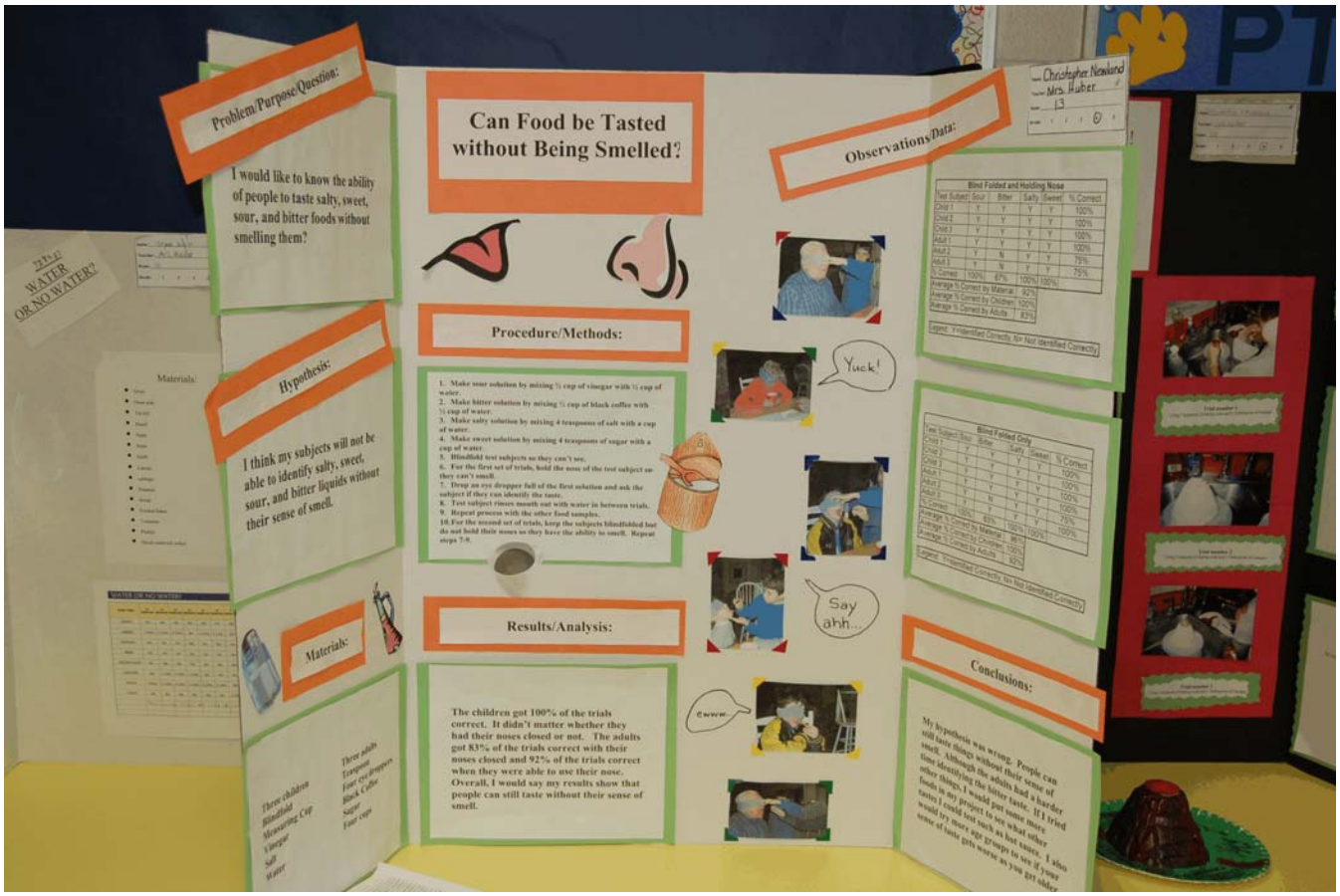

Hypothesis
On the Write Track
Hannah Buck
(Or is it the left?)
Purpose
Results
Hannah Buck
The Stickines of TAPE
Procedure
Materials
Method
Results
DATA
Conclusion

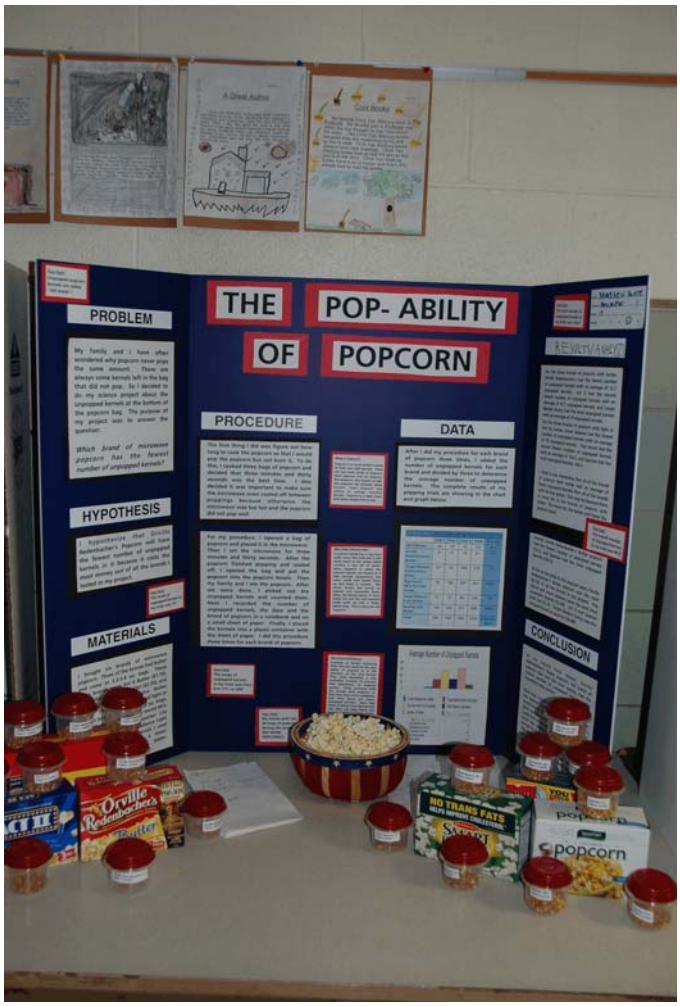

STATIC ELECTRICITY
Sarah Schwyn
3rd Grade, Mr. Beebe
METHOD
QUESTIONS
WHAT IS STATIC?
RESULTS - 1
HYPOTHESIS
PROCEDURE - 1
RESULTS - 2
PROCEDURE - 2
CONCLUSIONS
POPPED... OR NOT???
WATER
SAMANTHA TURK

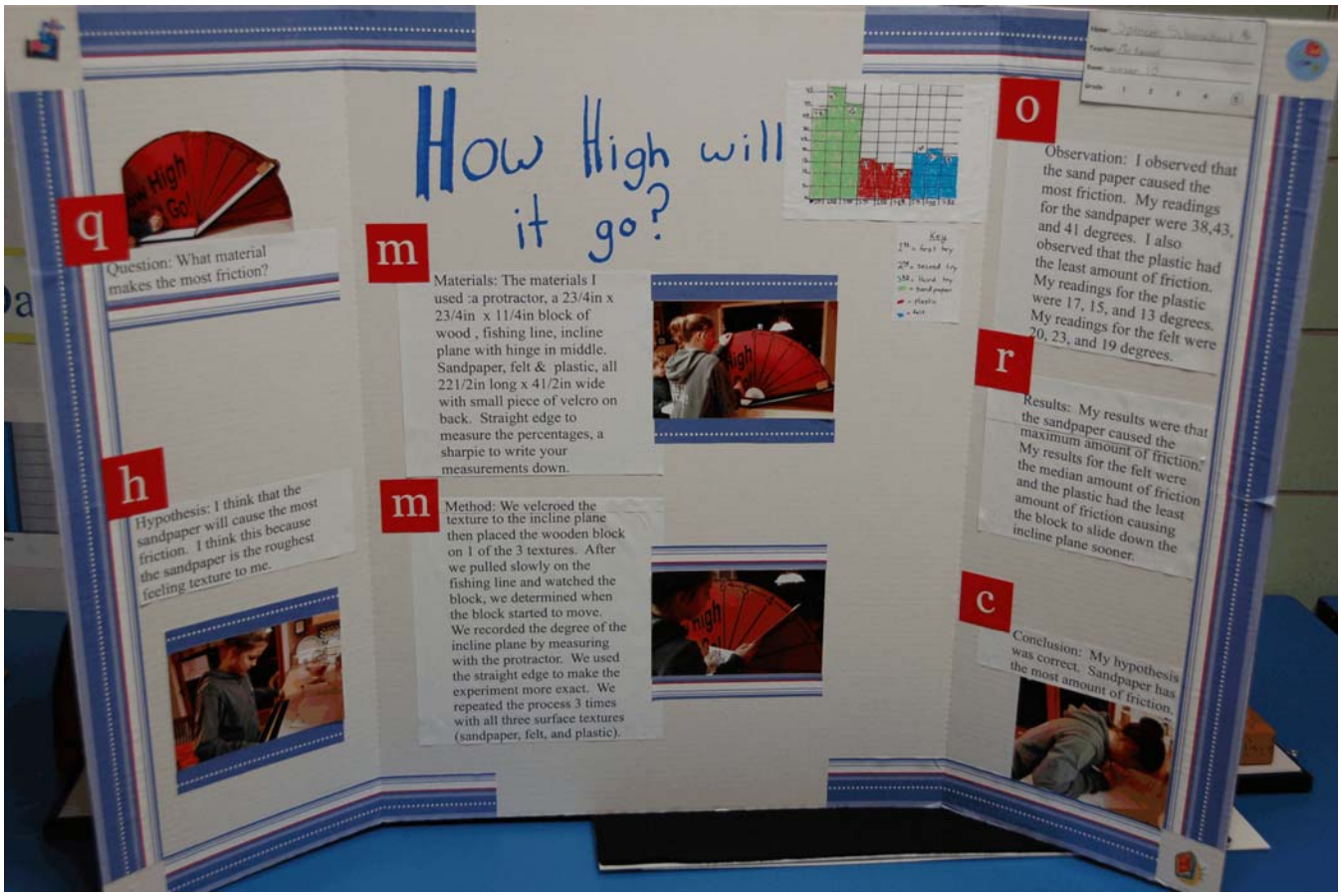

Pond Muck,
Home Sweet
Home
Problem/Purpose/Question
I would like to find out what some aquatic animals like or what they do in their environment.
Hypothesis
I think that caddisfly larvae, tadpoles, and backswimmers will like their environment dark with lots of pondweed, and that they will hide in the pondweed.
Materials
We will need a 20 gallon fish tank, 15 gallon fish tank, tap water, aerators, tubing, cattails, pondweed, D net, four 5 gallon buckets, sorting trays, tweezers, pipets, 15 caddisfly larvae, 15 backswimmers, 15 tadpoles, a light, small insects and extra plants as prey, small fish net, note book, pencil, beaker 500 ml, and duct tape.
Procedure/Method
Observations/Data
Results/Analysis
Conclusions
L FACTS


FOSSIL FACTS
QUESTION:
What makes a better shell fossil imprint, coarse or fine sand?
HYPOTHESIS:
I think that the fine sand will make the best imprint because the grains are smaller. I think that the best fossils are found in river beds, where there is fine sand.
By: Hunter Holzapfel
Fifth grade
Mr. Rommel
PROCEDURE:
1. Bought materials
2. Mixed fine sand, tacky glue, and water in cup
3. Poured fine sand mixture into tin tray and pressed shell mold down firmly to make an imprint
4. Mixed coarse sand, tacky glue, and water in cup
5. Poured coarse sand mixture into tin tray and pressed shell mold down firmly to make an imprint
6. Set aside to dry overnight
7. Labeled trays
8. Repeated steps 1-7 two more times
MATERIALS:
•Plastic shell molds
•Tacky glue
•Coarse sand
•Fine sand
•Cup and knife
•Paper
•Skewers
•Marker
•Tins
•Water
Data:
In each trial the fine sand made a more accurate imprint of the shell than the coarse sand did.
Results:
My results were that in each trial the fine sand made a more accurate imprint of the shell than the coarse sand did. By looking at the imprint of the shell in the fine sand, you can tell that the imprint is more detailed because you can see the grooves and the outline of the shell better. In the coarse sand, you can see a crater from the shell mold, but it is not as detailed as the fine sand model.
CONCLUSION:
I proved my hypothesis that the fine sand made a more detailed shell imprint.
A NEW QUESTION:
Which takes a longer amount of time to form a fossil, coarse or fine sand?
Trials
Which makes a better shell imprint
Fine Sand
Coarse Sand
#1
#2
#3
Trial 1 Fine Sand
Trial 1 Coarse Sand
Trial 2 Fine Sand
Trial 2 Coarse Sand
Trial 3 Fine Sand
Trial 3 Coarse Sand


YUM YUM GUM
by andrew duell
Andrew Duell
Mr. Rommel
Room 10
Grade 5
PURPOSE:
The following experiment was to find out which stick gum had the LONGEST LASTING FLAVOR!
HYPOTHESIS:
I believe the Wrigley's Juicy Fruit gum would have the longest lasting flavor. I think it will come in first because I have had Juicy Fruit before and I think it has the best flavor.
MATERIALS:
Materials consisted of Wrigley's Big Red gum, Wrigley's Juicy Fruit gum, Wrigley's Extra Polar Ice gum, Wrigley's Spearmint gum, Hershey's Cool Mint Ice Breaker's gum, digital timer, pen, pad, and a total of four participants.
PROCEDURE:
I chose stick gum so I would be comparing the same sizes and same lengths. I chose four people including me. Before we started chewing the gum I wanted to make the time five minutes. But I thought that was too short of a time, so we made it ten minutes. My dad started Wrigley's Juicy Fruit ,and it got over 20 minutes. So we decoded to write the same exact time they started and stopped the gum. Then I added the minutes between those times. When the flavor ran out the person told me to write down their times Then we look at the results and see which gum had the longest lasting flavor.
Extra
winner
67min 21min 49min 47min 46
13min 39min 49min 51min 38
54min 50min 55min 56min 53.75
13min 30min 15min 19min 19.25
30min 24min 24min 19min 24.25
Andrew Amelia Jaime Todd Average
CONCLUSION:
My hypothesis that Wrigley's Juicy Fruit gum had the longest lasting flavor was proven wrong. I Liked Juicy Fruit's gum flavor so much that I thought it would win. Next time I would try adding more people to my experiment and different types and shapes of gum.
DATA:
The information that was gathered consists of four people and five different gums. For Big Red I had 30 minutes, Amelia had 24 minutes, Jaime had 24 minutes and Todd had 19 minutes. For Juicy Fruit I had 13 minutes, Amelia had 30 minutes, Jaime had 15 minutes and Todd had 19 minutes.For Extra I had 54 minutes, Amelia had 50 minutes, Jaime had 55 minutes and Todd had 56 minutes. For Ice Breakers I had 13 minutes, Amelia 39 minutes, Jaime had 49 minutes and Todd had 51 minutes.For Spermint I had 67 minutes, Amelia had 21 minutes, Jaime had 49 minutes and Todd had 47 minutes. After I finished, I calculated the averages for each gum.
RESULTS:
I looked at the results and Wrigley's Extra gum had the longest lasting flavor. The average for Wrigley's Extra gum was 53.75 minutes. The second longest lasting flavor was Wrigley's Spearmint gum and the average time was 46 minutes. The third longest lasting flavor was Hershey's Ice Breakers gum and the average time was 38 minutes. The fourth longest lasting flavor was Wrigley's Big Red gum and its average time was 24.25 minutes. The fifth longest lasting flavor was Wrigley's Juicy Fruit gum and its average time was 19.25 minutes.


Problem/Purpose/Question:
I would like to know the ability of people to taste salty, sweet, sour, and bitter foods without smelling them?
Can Food be Tasted without Being Smelled?
Christopher Newland
Mrs. Huber
13
Observations/Data:
Blind Folded and Holding Nose
Blind Folded Only
Hypothesis:
I think my subjects will not be able to identify salty, sweet, sour, and bitter liquids without their sense of smell.
Procedure/Methods:
1. Make sour solution by mixing ½ cup of vinegar with ½ cup of water.
2. Make bitter solution by mixing ½ cup of black coffee with ½ cup of water.
3. Make salty solution by mixing 4 teaspoons of salt with a cup of water.
4. Make sweet solution by mixing 4 teaspoons of sugar with a cup of water.
5. Blindfold test subjects so they can't see.
6. For the first set of trials, hold the nose of the test subject so they can't smell.
7. Drop an eye dropper full of the first solution and ask the subject if they can identify the taste.
8. Test subject rinses mouth out with water in between trials.
9. Repeat process with the other food samples.
10.For the second set of trials, keep the subjects blindfolded but do not hold their noses so they have the ability to smell. Repeat steps 7-9.
Yuck!
Say ahh...
Ewww...
Materials:
Three children
Blindfold
Measuring Cup
Vinegar
Salt
Water
Three adults
Teaspoon
Four eye droppers
Black Coffee
Sugar
Four cups
Results/Analysis:
The children got 100% of the trials correct. It didn't matter whether they had their noses closed or not. The adults got 83% of the trials correct with their noses closed and 92% of the trials correct when they were able to use their nose. Overall, I would say my results show that people can still taste without their sense of smell.
Conclusions:
My hypothesis was wrong. People can still taste things without their sense of smell. Although the adults had a harder time identifying the bitter taste. If I tried other things, I would put some more bitter things in my project to see what other tastes I could test such as hot sauce. I also would try more age groups to see if your sense of taste gets worse as you get older.
WATER OR NO WATER?


THE POP- ABILITY OF POPCORN
PROBLEM
HYPOTHESIS
MATERIALS
PROCEDURE
DATA
CONCLUSION
Orville Redenbacher's
NO TRANS FATS
popcorn


How High will it go?
q
Question: What material makes the most friction?
h
Hypothesis: I think that the sandpaper will cause the most friction. I think this because the sandpaper is the roughest feeling texture to me.
m
Materials: The materials I used :a protractor, a 23/4in x 23/4in x 11/4in block of wood , fishing line, incline plane with hinge in middle. Sandpaper, felt & plastic, all 221/2in long x 41/2in wide with small piece of velcro on back. Straight edge to measure the percentages, a sharpie to write your measurements down.
m
Method: We velcroed the texture to the incline plane then placed the wooden block on 1 of the 3 textures. After we pulled slowly on the fishing line and watched the block, we determined when the block started to move. We recorded the degree of the incline plane by measuring with the protractor. We used the straight edge to make the experiment more exact. We repeated the process 3 times with all three surface textures (sandpaper, felt, and plastic).
o
Observation: I observed that the sand paper caused the most friction. My readings for the sandpaper were 38,43, and 41 degrees. I also observed that the plastic had the least amount of friction. My readings for the plastic were 17, 15, and 13 degrees. My readings for the felt were 20, 23, and 19 degrees.
r
Results: My results were that the sandpaper caused the maximum amount of friction. My results for the felt were the median amount of friction and the plastic had the least amount of friction causing the block to slide down the incline plane sooner.
c
Conclusion: My hypothesis was correct. Sandpaper has the most amount of friction.