Benjamin Rush Science Fair
Instruction Packet
For 4th Grade Students

Goal: To have fun creating a controlled experiment demonstrating your understanding of the Investigative Format.

Working individually or in teams of two, you will design, document, and conduct a controlled experiment using the *Investigative Format*. On the successful completion and documentation of your experiment, you will create a display board for the Science Fair. Your display may also include models of your experiment, the equipment, or pictures and video.

Recommended Approach and Key Dates

1. **IDEA DEADLINE**: You and your partner, if you have one, will have selected, built, and PLAYED with your demonstration/apparatus of science. For example, you decide to and then build a potato battery. You must complete the attached Science Fair Proposal and return it to your teacher for **extra credit**. Date: right after the 1st work party.

2. Your work will be done at home but we can confer on your project at school.

3. **Kick-off work party**: Thursday, March 12th from 3:15 – 4:15 in the 4th grade pod. (pizza and snacks)

4. **All 4/5th science work party**: Thursday, March 26 from 3:15 – 4:15 in the 4th and 5th grade pods. (pizza and snacks). Purpose of this work party is to COMPLETE and put together your display board.

5. **COMPLETE EXPERIMENT by Wednesday, March 25: (recommended)**: Present results of the experiment in the *Investigative Format*. Then put this document on a display board for the Science Fair.

6. **Thursday, April 2, 7:00-8:30 PM is the Science Fair**: Have fun and share your experiment with people. I will come around to view and ask questions about your project.

Project Requirements

1. Projects must follow the *Investigative Format*.
2. Experiments and demonstrations must answer a scientific question and prediction.
3. You may work independently or in teams of two.
4. Your project may not use fire or dangerous chemicals.
5. Your display board must contain the following sections:

	Title & Name		
Question	Materials List	Data Table	Conclusion
Prediction	Procedures	Graphs	Science Explanation

- Your teachers will provide example display boards and provide formatting ideas so your information can be clearly read by Science Fair attendees.

- The PTA is generously providing display boards for students.

Science Fair Resources[1]

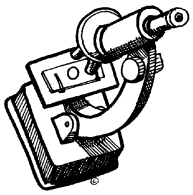
http://www.kcls.org/homework_help/scienceexperiments.cfm

http://www.stevespanglerscience.com/experiments

http://www.factmonster.com/spot/sciproject2.html

http://science-project.com/

http://school.discoveryeducation.com/sciencefaircentral/?pID=fair



Investigative Format Documents

Check your science journal or look below:

INVESTIGATIVE FORMAT FOR A CONTROLLED EXPERIMENT

1. QUESTION – a testable question based on experience.

2. PREDICTION – a testable IF/THEN prediction that includes the changed and measured variables.

IF _____, THEN _____

3. MATERIALS LIST – a list of supplies needed to complete the experiment. Don't forget to include how many of each item you need and measuring tools.

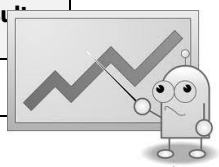
-
-
-

4. PROCEDURE – the steps describing how to do the experiment. The steps must include the three types of variables: a **changed** variable, a **measured** variable, and the most important **controlled** variables. The steps must be clear, tell how to measure data, and repeat the test 3 times.

1.
2.
3.

5. DATA – a data table and graph showing the **measured** variable.

Changed (manipulated) Variable	**Measured (responding) Variable (units used to measure the variable)**			
	Trial 1	**Trial 2**	**Trial 3**	**Average Resu**
1st value				
2nd value				
3rd value				



6. CONCLUSION – a four-sentence conclusion.

1. State whether the experiment 'supports' or 'falsifies' the prediction.

2. State the lowest average of the measured variable.

The experiment **supports** that darker colored containers, retain more heat. The light colored containers **averaged** 34° C. The dark colored containers **averaged** 38° C. Dark colored containers were 4° C **hotter** than light colored containers

3. State the highest average of the measured variable.

4. Describe the relationship between the highest and lowest changed variables.

Examples of Good Questions

1. Which type of glue makes the strongest Popsicle Bridge?
2. Does a disco ball pendulum swing faster than a bowling ball pendulum?
3. Do certain types of fabric repel more water better?
4. Will the size of the tire affect the distance a car travels?
5. Will increasing the amount of sugar affect the growth of a plant?
6. Will increasing the sand in soil affect the growth of a garlic plant?
7. Does the liquid a boat is floating in affect how many passengers it will carry?
8. Does the type of paper affect a paper towel's absorbency?
9. Does the type of liquid affect the speed at which paper towel absorbs?
10. Does the amount of water affect how well a plant will grow?
11. Do the ingredients of an ice cube affect how fast it melts?
12. Does the size of a container affect how fast the temperature of the water rises?
13. Does the type of parachute material affect how long a parachute takes to fall?
14. Does the size of a lemon affect the voltage of a lemon battery?
15. Does adding more lemons in sequence create a longer lasting battery?

SCIENCE FAIR PROPOSAL

Instructions: each team must complete a proposal. It is due on .

Team Members: _____ AND _____

Experiment/Display Name: _____

Describe your idea for the science fair and the science concept it demonstrates:

_____

_____

_____

_____

_____

_____

Draw a picture of your display/apparatus and/or attach a picture.

SCIENCE FAIR PROPOSAL

List all the variables involved in your demonstration/apparatus:

What materials did you need to build your demonstration/apparatus?

CONSUMABLE SUPPLIES	REUSABLE EQUIPMENT	MEASUREMENT TOOLS
• ex. 2 paper cups	• ex. glass jar	• ex. thermometer
•	•	•
•	•	•
•	•	•
•	•	•
•	•	•

What are three questions you could use your demonstration/apparatus to answer?

1. _____

_____

2. _____

_____

3. _____

_____

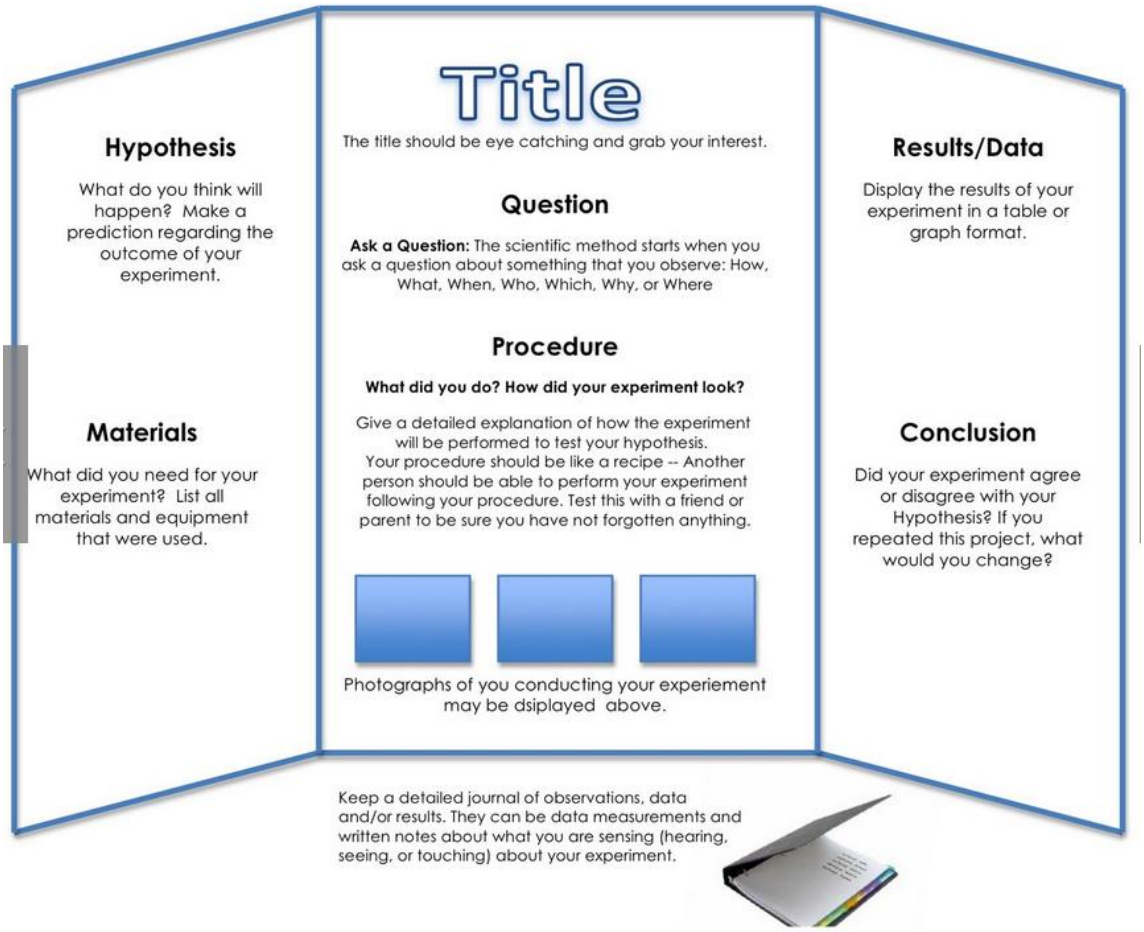
If you have already decided on which question you will use for your Science Fair Display, please circle it above and <u>then</u> write your prediction below:

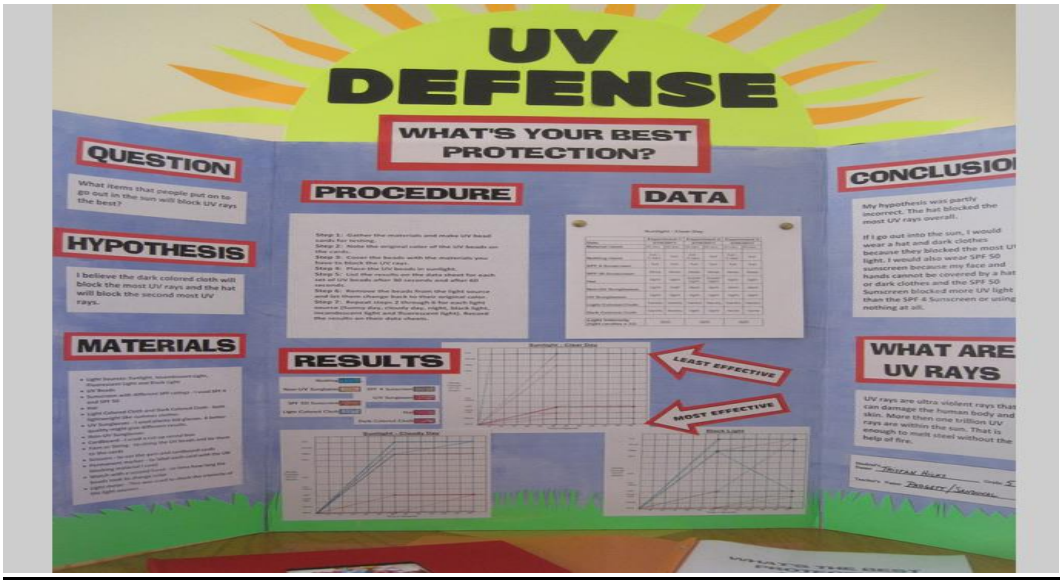
IF _____

THEN _____

SCIENCE FAIR PROPOSAL

<u>Examples of Science Fair boards –</u>





SCIENCE FAIR PROPOSAL

More Examples of Science Fair Boards