“The important thing is not to stop questioning. Curiosity has its own reason for existing.”

– Albert Einstein

The HBW 5-8 Science Fair

2014-2015

Dear Parent(s):

Your child has the opportunity to take part in an exciting school event, the HBW Science Fair. This learning experience will enable your child the option to do research and offer them an experience to explore topics beyond what they learn in the classroom. Investigating a specifically-selected science topic of interest in detail can open up a new appreciation for questioning and learning about the world around them.

We would like to invite you to work along with your child as he or she selects, investigates, and reports on an appropriate area of science or topic of scientific interest. With your support and encouragement, your child can develop the skills and attitudes he or she needs to make this project a valuable experience. We encourage you to guide your child whenever and wherever you can, but the final project should reflect your child’s individual effort and design.

All of the provided documents will help your child prepare for the science fair. The sheets have been designed to allow your child to work independently, but with guidance, as they move through the research process, thus helping him or her generate a successful project.

Participation in this learning experience is **optional and completely voluntary** for our grade 5-8 students, so it will not be reflected in their science grade at any time in the school year. However, your child will have the opportunity to be recognized at a school fair event scheduled later on in the school year. And we hope the true reward will be his/her engagement in an experience that is similar to the work that scientists and engineers do to learn about and improve the world we live in.

After reviewing the components of this activity, if your son or daughter chooses to participate in the science fair, please return the contract with child and parent signatures to Mrs. Pietrucha by **December 19th.** Hopefully we can look forward to your child’s participation in this wonderful scientific event.

Sincerely,

HBW Science Staff

What is a Science Fair Project?

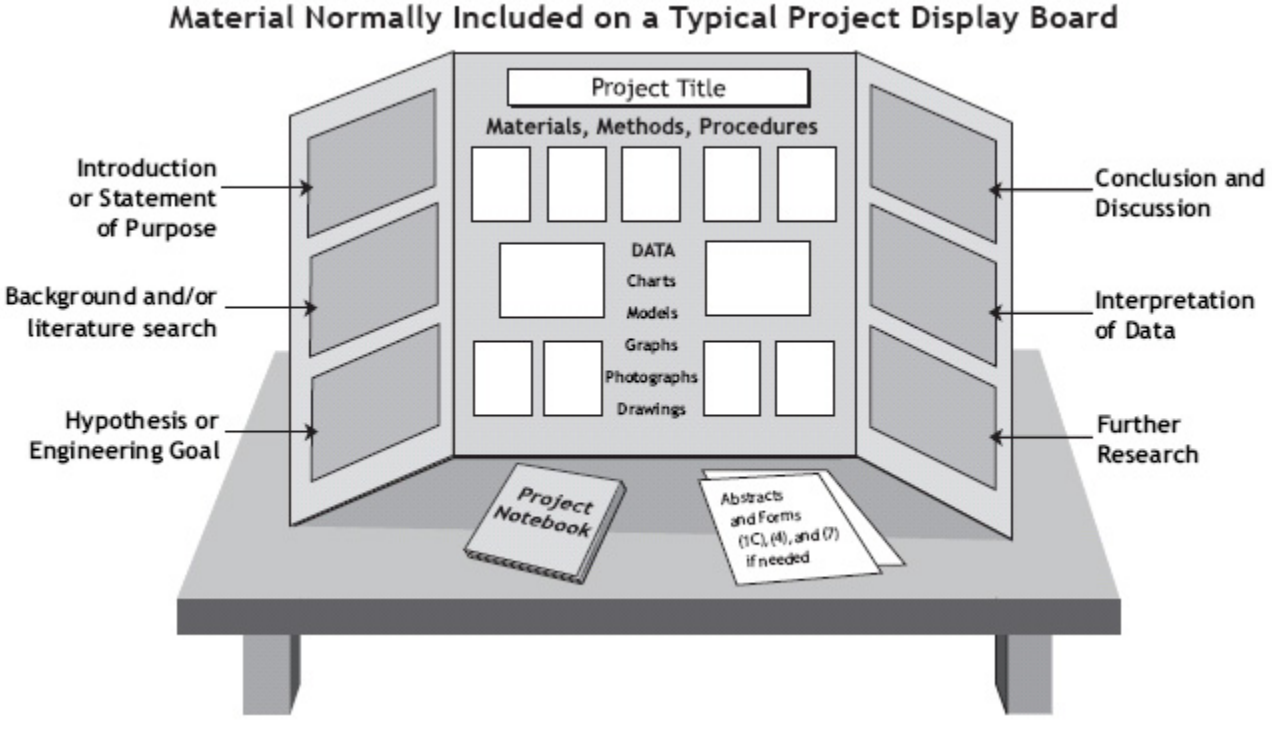
A science fair project is an independent, educational activity that incorporates critical thinking, creativity, and a variety of other skills to produce a display of scientific inquiry and findings. Over several weeks, you will conduct research, complete an experiment, and design a presentation, in preparation for a science fair event in which you will showcase and present this work.

Rules/Guidelines of Science Fair Project

1. All aspects of the project must be displayed on a Tri-Fold presentation board. You should also bring any interesting components of your project (samples, equipment, models, etc.) to set up in front of your display board during the Science Fair.) Presentation boards do not need to be purchased. They will be supplied to you on Friday January 9th.
2. All extra materials for the project should not exceed $15.00.
3. The project is to be created/completed by the student and the Scientific Method must be followed.
4. The participant must be present on Thursday February 26th from approximately 3:00pm-6:00pm with completed presentation board and components necessary to explain project and findings. (Snow Date – Friday February 27th)
5. This is an independent, extra -curricular activity that does not take place in the classroom and is not graded.

Science Fair Presentation Display Board Guide

Use the board diagram below to guide you when designing your display board. All parts displayed here do not need to be included. Necessary parts would be the 6 steps of the scientific method and any graphics/pictures/model/examples/etc. that support the experiment/project findings.



Sample Topics for Science

- How does water rise in different kinds of plant stems?
- What are some behaviors of earthworms?
- What are good and poor conductors and why?
- How does light effect the growth of plants?
- How do different types of fertilizers effect plant growth and why?
- How sound is transmitted through different materials?
- Will a rubber band stretch the same distance every time that the same amount of weight is attached to it?
- Does a baseball go farther when hit by a wood or metal bat?
- How do materials affect insulation? How does the thickness of these materials affect insulation?
- Does music effect on animal behavior?
- Does the color of food or drinks affect whether or not we like them?
- Does music have an effect on plant growth?
- Which paper towel brand is the strongest?
- What is the best way to keep an ice cube from melting?
- Can the food we eat affect our heart rate?
- How effective are child-proof containers and locks?
- Can background noise levels affect how well we concentrate?
- Does the color of light used on plants affect how well they grow?
- What brand of battery lasts the longest?
- What type of food allow mold to grow the fastest?
- Does having worms in soil help plants grow faster?
- Can plants grow in pots if they are sideways or upside down?
- Does the color of hair affect how much static electricity it can carry? (test with balloons)
- Which soda decays fallen out teeth the most?
- What light brightness makes plants grow the best?
- Does the color of birdseed affect how much birds will eat it?
- Do natural or chemical fertilizers work best?
- Can mice learn? (you can pick any animal)
- Can people tell artificial smells from real ones?
- What brands of bubble gum produce the biggest bubbles?
- Does age affect human reaction times?
- What is the effect of salt on the boiling temperature of water?
- Does shoe design really affect an athlete's jumping height?
- What type of grass seed grows the fastest?
- Do all brands of diapers absorb the same amount of liquid? Does it matter what the liquid is (water as opposed to juice or... um.. urine)?
- Do all dishwashing detergents produce the same amount of bubbles? Clean the same number of dishes?

Scientific Method Reference Worksheet – Six Steps

1. State the Question/Problem

The question you are asking must be testable by conducting a controlled experiment. The question should be related to something you do not already know the answer to.

For Example: What effect does the amount of water have on the height of a sunflower plant?

2. Gather Information

Conduct research using the internet, books, magazines, databases, etc. to gather information from creditable sources about the topic that will help you form your hypothesis.

3. Develop a Hypothesis

Create a statement (prediction) that provides a possible answer to your scientific question. The hypothesis must be testable, should be based on the research you have done, and can be stated using an, "If……then,…." statement.

4. Design an Experiment

Determine the variables for your experiment. You must pick an independent variable (manipulated variable), a dependent variable (responding variable), as well as constants (factors you will keep the same). In some situations, a control and an experimental group(s) may be necessary for comparison purposes.

Independent Variable – What will you *change* in the experiment?
Dependent Variable – What will you *measure* in the experiment as a result of the change?
Constants – What will remain the same throughout the experiment? *Remember, this is what will keep your experiment controlled and therefore valid!*

Write a detailed procedure that outlines the steps and what data will be collected in order to conduct your experiment. Remember, another student (scientist) should be able to replicate the experiment exactly based on your written experimental procedure.

LAB SAFETY RULES APPLY! AND PLEASE NO FLAMES/ HAZARDOUS MATERIALS/ OR ANIMALS. THANK YOU!

5. Record and Analyze Information

a) Create data table(s) to collect your data in an organized way. The data you collect may be qualitative or quantitative.

b) Choose and create an appropriate graph or visual representation to display the data.

c) Interpret and analyze the data. Once all data has been collected, begin to think about what the data reveals, and what relationships can be seen. Does this information support your hypothesis?

6. Write a Conclusion

The first line of your conclusion should be a restatement of your hypothesis. Then, state whether or not you accept or reject your hypothesis and support your statement with experiment examples. Use your data to show how you came to this conclusion and what your outcome means for the benefit of society/future/science in general.

Timetable for Science Fair – 2014-2015

Due Dates	Tasks for Science Fair Completion	Check off whendone
Mandatory 1st Meeting- 12/12	• Receive paperwork/ Review guidelines/Choose topics for approval • Get contract and hand in at 2nd meeting on 12/19	
Mandatory 2nd Meeting - 12/19	• **Mandatory Requirement #1** - Hand in contract and get TOPIC approval • For 3rd meeting based on approved topic from Grade level Teacher received back on 12/19, 12/22 or 12/23 - Design experiment with scientific method on Design Template-this will include your hypothesis, variables, procedure, data collection, materials, etc. • Select resources/Plan out experiment parts	
Mandatory 3rd Meeting -1/9	• **Mandatory Requirement #2** – Get DESIGN approval by teacher • Pick up Presentation Boards • Collect materials needed • If possible, start your experiment/collecting data/making observations	
Week Five	• Continue making and recording observations/collecting data	
Week Six	• Continue making and recording observations/collecting data	
Week Seven	• Continue making and recording observations/collecting data • Start to make note of your results and what they mean	
Mandatory 4th Meeting – 2/6	• Check in with teacher and share procedures so far • Review presentation board features for display and explanation process • Finish collecting data • Begin to create charts/graphs/or other visual aids to process	
Week Nine	• Plan the layout of board • Type up information needed for display on the board • Prepare titles/Labels/additional presentation materials	
Week Ten	• Proofread all work and mount • Decide on other materials for in front of the display • Prepare for fair presentation	
Week Eleven	• Set-Up Display at Home and check for any flaws • Practice answering questions about project with friend/family member	
Science Fair	Thursday February 26 – 3 PM Set – Up Display Science Fair 3:30 – 5:30 PM (Snow Date – 27th)	

***All meetings will be held in room 212 with Mrs. Pietrucha at 3:00 PM. ***

HBW Science Fair Contract/Registration Form – 2014-2015

To have your project entered in the HBW Science Fair, please review and complete the following statements, sign and return by Friday December 19th, 2014.

A. The project I plan to enter in the HBW Science Fair is **my own work** and has been completed by me following the rules/guidelines reviewed in the 1st meeting and science fair paperwork.
B. I will not begin the experiment until this contract has been signed, the TOPIC and DESIGN has been approved, and all **lab safety** procedures are in place for the experiment to proceed.
C. I agree to set up my project and be present **on February 26th, 2015 from 3 PM to 5:30PM**. (Snow Date = Friday 27th) I will bring in my presentation board completed and any additional materials needed for in front of my board. I will also bring my project and materials home after the fair with the understanding that it may go past the 5:30 PM time for clean-up.

_____ _____
Signature of Student Date

My son/daughter, _____ who has signed for the above statements has my permission to participate in the HBW Science Fair and is in accordance with the rules and regulations. I agree to support the statements above as well.

_____ _____
Signature of Parent Date

Science Fair Topic:

1) **What question do you want to answer for your science fair topic**? (Remember that this will enable you to do an experiment and collect data)

_____

2) What is a "Back-Up" question you would answer if your topic is already taken?

_____

Mandatory Requirement #1 – Teacher Approval - _____

Science Fair Design Template – 2014 - 2015

Use this template to design your experiment and refer to as you complete your experiment. Each box represents a step in the scientific method. Complete the first **FOUR** steps and bring in for approval on **Thursday January 9th.** The Analysis and Conclusion parts will be completed during and at the end of the experiment.

1.□State the Question/Problem – What do you want to find out?

_____

_____

2.□Gather Information

Conduct research using the internet, books, magazines, databases, etc. to gather information from creditable sources about the topic that will help you form your hypothesis.

Try for three different resources:

_____

_____

3. □Develop a Hypothesis

What do you think will happen and why?
Use an If….then….statement format and create a complete sentence.

_____

_____

_____

4.□Design an Experiment

Materials – What do you need to answer your question?

_____

_____

Determine the variables:

Independent Variable – What will you *change* in the experiment?

_____

Dependent Variable – What will you *measure* in the experiment as a result of the change?

_____

Constants – What will remain the same throughout the experiment? *Remember, this is what will keep your experiment controlled and therefore valid!*

_____

_____

LAB SAFETY RULES APPLY! AND PLEASE NO FLAMES/ HAZARDOUS MATERIALS/ OR ANIMALS. THANK YOU!
What safety rules will be followed in your experiment?

_____

_____

_____

Write a detailed procedure that outlines the steps and what data will be collected in order to conduct your experiment. Remember, another student (scientist) should be able to replicate the experiment exactly based on your written experimental procedure.

What are the steps you plan to follow to prove your hypothesis true or false?
Be Specific and number your steps so someone else would be able to repeat what you have done. Attach extra paper if needed to continue steps.

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5.□Record and Analyze Information

Display your data in an organized manner with the use of charts/graphs/diagrams/photographs/etc. Include all titles and labels and it should support or disprove your hypothesis.

6.□Write a Conclusion

This should summarize what you did, how you did it, and your result. Restate your hypothesis and include any relevant data that supported or disproved your hypothesis. Include what you have learned from the experience and what you might plan for the future.

Mandatory Requirement #2 – Teacher Approval - _____

After meeting with my grade level teacher, my approved question/topic is …

_____

_____

_____

_____

- You are now ready to work on your design for your experiment and presentation board.
- Use the provided "Design Template" to plan out what you are going to do using the scientific method.
- Copy your approved question onto the form to complete step number one.
- Then, fill in steps 2, 3 and all of 4 thinking about and explaining what you plan to do and why.
- These steps need to be handed in to your grade level teacher **BEFORE or by Friday January 9th**.
- Once your design has been approved by your grade level teacher, come see Mrs. Pietrucha for the presentation boards in room 212.