2015 HILLDALE SCHOOL SCIENCE FAIR KICK-OFF

September 2015

Greetings Hilldale students, parents, and staff,

The Science Fair is coming! It's time to ask questions and make discoveries while practicing the Scientific Method. This year we aim for the best group of projects ever, which of course will demonstrate true comprehension of the scientific method. Below you will see the eight areas which will need to be addressed during the course of preparation for the Science Fair.

Each teacher will present his or her class with a grade specific rubric.

Please note that the final products will include ALL of the following for 4th - 8th Grades:

- A Written Report (see the rubric and this letter for details)
- A Display Board (see the Display Board Guidelines) AND
- An Oral Presentation.

Please note that the final products will include ALL of the following for K-3rd Grades:

- A Display Board (see the Display Board Guidelines) AND
- An Oral Presentation.

There are rubrics for the lower and upper grades with different requirements for the different levels. Please read through carefully.

It is important to note the following grade-level expectations:

- **Kindergarten** students will conduct the entire process in school together as a class under the direction of Mrs. Valladares.
- **First Graders** will conduct two experiments in two groups during school under the direction of Ms. Kemp.
- **Second Graders** will conduct experiments in small groups. Most of the work will be done at school, but some will be conducted at home.
- **Third-Eighth Graders** will conduct individual experiments. There will be check-in dates and some class time devoted to Science Fair preparation, but the majority of the work will be done outside of school.

Students are expected to complete their work **INDEPENDENTLY** with parental supervision. **PARENTS SHOULD NOT DO THE WORK FOR THEIR CHILDREN**. All work should be conducted at the **GRADE LEVEL** of the child.

Please see the following seven areas which need to be addressed in the report (if applicable), on the display board, *and* in the oral presentation.

1) PURPOSE
    a. Ask the Scientific Question you want an answer to.
    b. What are you trying to find out?
    c. Record under "Purpose" on your board (see handout).
    d. Write in the form of a question.
2) BACKGROUND / RESEARCH
    a. Research the topic. (Find out any basic information that is important for your topic).
    b. Define your terms. (Write the definitions of all important words).
    c. Define the manipulated variable, the responding variable, the control group, and all constants. (See the abstract for examples).
    d. Record any preliminary (or initial) observations. (What made you ask the question in your purpose?)
    e. Complete this section in paragraph form for the report (Fourth – Eighth Graders) and in bulleted or outlined format for the display board.
    f. Record under "Background/ Research" on your board.
3) HYPOTHESIS
    a. State a possible explanation for the preliminary (initial) observations, or state the answer to a scientific question. (This is a bigger statement than just stating what you think will happen as a result of conducting your experiment). For example, *"If a plant is given fertilizer, then it will grow twice as high in centimeters as the same plant without fertilizer."*
    b. Put this in a single sentence using "If…Then" format.
    c. Record under "Hypothesis" on your board.
4) MATERIALS and PROCEDURES
    a. Include how you are designing and performing your experiment.
    b. Include the Materials you will use.
    c. State the specific measurements, using the metric system.
    d. State the step-by-step Procedures you will take. List these with numbers.
    e. Include any safety precautions you will need to take.
    f. Make sketches or take photos of the experimental set up if helpful.
    g. Be sure to conduct at least 3 trials of your experiment for students in 4-8th Grades.
    h. Record under "Materials and Procedures" on your board.
5) DATA
    a. Conduct your experiment.
    b. Record anything that is measured or counted.
    c. Record any observations.
    d. Make data tables to record your data.
    e. Show data from all trials you conducted.
    f. Calculate an average of the trials and record this in your data.
    g. Do not include graphs in this section.
    h. Include a lab book of your observations (if you wish).
    i. Take photos as appropriate.
    j. Record under "Data" on your board.

6) RESULTS
    a. Create at least one graph of the data.
    b. Look for trends or patterns in the data.
    c. Determine whether there is a relationship between the variables (changing elements). If there is, explain or show that relationship.
    d. Explain or interpret your observations from the experiment's data using no more than 2-3 sentences in bullet point format on your board (and paragraph form in your report).
    e. Record under "Results" on your board.
7) CONCLUSION AND DISCUSSION
    a. Answer the following questions:
        i. Was your hypothesis correct or incorrect? Is your hypothesis accepted or rejected?
        ii. Why?
        iii. What did you learn?
        iv. How is this related to everyday life? What does it teach us?
        v. How is this related to the larger world? Why is your experiment important?
        vi. What could you do next time to improve your experiment?
    b. Write about how you would re-do the experiment if you were not correct OR write about where you would go from here if your hypothesis is correct.
    c. Complete this section with bullet points (K-5); Grades 6-8 should complete this section with bullet points on the display board and in paragraph form in the report.
    d. Record under "Conclusion and Discussion" on your board.

Parents of students in Third through Eighth Grades should assist their children while ensuring the s*tudents* show interest in the purpose, do the experiments, and interpret the data. During the oral presentation, students must be able to explain all steps of the scientific method they have taken. Please remind students that they will have more fun testing problems in which they are truly interested.

The Science Fair is Friday, November 13, 2015, from 4:00 - 5:00 p.m. Please plan ahead to attend this wonderful and important event. Due dates are listed on the next page. Winners will be announced at the fair, and all projects will have been graded and awarded during the week leading up to the fair. Grades will be available in the week following the fair. The fair, itself, is a time to celebrate the creativity and hard work of our students.

Your child's teacher and Mr. Yurman-Glaser will be available by email or voicemail to help parents, students, and teachers as we make this the best Science Fair Hilldale School has ever seen! Good luck, Students! Have Fun!

Sincerely,

Mr. Yurman-Glaser, Ms. Yamanoha, Ms. Woolley, Mr. Dyson, Mrs. Bayless, Ms. Kemp, Ms. Valladares, & Ms. Clayton

HILLDALE SCHOOL
SCIENCE FAIR CALENDAR

Kindergarten, First Grade, and Second Grades will work on their projects during class time with their teachers. Second Graders may have some outside elements to complete to be assigned by the teacher.

K-2nd Grades

Dates will be determined by the teachers in class. Parental participation is not required for deadlines in K-2 (unless otherwise noted by the teacher).

Due Dates for 3rd -5th Grades:

Monday	9/21	Kick Off Science Fair
Monday	9/28	**Proposal Due** to teacher for Topic Approval (Complete Form)
Friday	10/2	Teachers return Proposal Form
Thursday	10/8	**Preliminary Abstract (Steps 1-3) Due** to teacher (Complete Form)
Monday	10/12	**Preliminary Abstract Due** to teacher for 4-5th Grades*
Tuesday	10/13	Teachers return Preliminary Abstract
Tues - Fri	10/13 -10/16	Classwork and **Individual Check-Ins** -Bring materials to school -Opportunity to type up Purpose, Hypothesis, and Research for Lab Report -Opportunity to make Display Board for Purpose, Hypothesis, Research, Title
Sat –Wed	10/17 – 10/28	Conduct Experiments (unless earlier start date needed)
Thursday	10/29	**Results Due** for In-Class Check-In
Mon – Tues	11/2 – 11/10	Class Time for Lap Report and Display Boards
Wednesday	11/11	**Projects Due at 8:30 AM.** Presentation practice in class
Thursday	11/12	**Oral Presentations** in Class; Judging; Grading
Friday	11/13	**Science Fair from 4-5 PM**; winners announced

*Due to outdoor education trip for Grades 4-5.

Due Dates for 6th – 8th Grades:

Monday	9/21	Kick Off Science Fair
Monday	9/28	**Proposal Due** to teacher for Topic Approval (Complete Form)
Friday	10/2	Teacher returns Proposal Form
Thursday	10/8	**Preliminary Abstract (Steps 1-3) Due** to teacher (Complete Form)
Tuesday	10/13	Teacher returns Preliminary Abstract
Tues – Fri	10/13 – 10/16	Classwork and **Individual Check-Ins**; Bring materials to school.
Sat – Wed	10/17 – 10/28	Conduct Experiments (unless earlier start date needed)
Thursday	10/29	**Results Due** for In-Class Check-In
Tuesday	11/10	**All Projects are Due at 8:30 AM.**
Tues – Wed	11/10 – 11/11	**Oral Presentations** in Class; Judging; Grading
Friday	11/13	**Science Fair from 4-5 PM**; winners announced

Tips on how to do a successful science fair project:

1) Choose a topic to which you do not know the answer. Discovery is the purpose of the science fair!
2) Only students in 6-8th grades may conduct scientific studies which include people or animals as the subjects and in which all the variables cannot be controlled. All others must conduct experiments.
3) Choose a topic from the Science Fair Suggested Project Ideas. If you want to choose a topic that is not on the list, you must get immediate approval from your teacher (prior to the Proposal Form due date).
4) Focus your problem on an easily measureable subject. Avoid compound problems where you are trying to measure multiple things. Use length, number of organisms, time, temperature, and/or other specific metric measurements.
5) Gather relevant (important) information that may affect your experiment such as type of habitat, time of day, and previous behavior of substances or individuals.
6) Remember a hypothesis is an educated guess. Be sure your hypothesis matches your purpose with a clear number related to the variable being studied. Avoid including why you think your hypothesis will work, as that is best saved for the conclusion. For example, *"If a plant is given fertilizer, then it will grow twice as high in centimeters as the same plant without fertilizer."*
7) Clearly describe what steps you will take to test your hypothesis.
8) Be sure to include a control group and conduct **at least three trials** whenever possible.
9) Refer to the vocabulary on the next page if you are confused about definitions (or ask your teacher).
10) In the results section, **display your data in at least two ways (3rd -8th)**, such as in a bar graph and in a pie chart. Describe in words what happened and arrange graphs neatly. **Do not forget to label the axes of your charts**; be neat and legible.
11) Photographs of the process can be included in the data section.
12) Good conclusions discuss why your hypothesis was right or wrong. Do not stop at saying you were right in guessing that your plant would grow taller, but explain *why* you think that occurred and *what factors* contributed to your results actually happening. Mention what you would hypothesize if you were to repeat your test, as most hypotheses will *not* be exactly correct. This is the sign of a true experiment! It is extremely rare that you hypothesize the exact right answer when conducting an experiment to which you don't already know the answer.
13) In the conclusion, discuss ways you could improve your test or write about other problems that came up after you looked at your results.
14) It's important to discuss how your topic or experiment makes sense in the bigger picture. Talk about how it relates to the world and why it is important.
15) THINK SIMPLE, CLEAR, DIRECT. It's better to conduct a simple experiment well than to get lost in too many ideas and be unclear to your audience.

Vocabulary

Manipulated Variable: The independent variable that you are controlling or changing

Example - whether or not you gave a plant fertilizer or how much fertilizer you gave the plant

Responding Variable: The dependent variable that is changing because of what you did

Example - how tall the plant grew

Constants: Those things you kept the same on purpose in the experiment

Example - you used the same soil, the same type of plant, and you gave it the same amount of light and water

Control Group: The sample that you did not do anything to on purpose so that you could see what would have happened without any interference

Example - you had a plant that got 1/3 cup of fertilizer and a plant that got 1 cup of fertilizer and the control group plant did not get any fertilizer. This example would have a slightly different hypothesis than the one from before; it would read: *If one plant is given 1/3 cup of fertilizer, then it will grow half as high in centimeters as the same plant which is given 1 cup of fertilizer.*

Operational Definition: The way you are measuring or comparing something using specific, exact words

Example – the plant given fertilizer will grow twice as high in centimeters than…

Example – Plane B will stay in the air for 30 seconds longer than Plane…

Example – the bread kept in the bag will have 6 more mold spots than the bread…