



2024 HILLDALE SCHOOL SCIENCE FAIR KICK-OFF

August, 2024

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 5th - 8th Grades:

- A Written Report (see the rubric and this letter for details)
- A Display Board (see the Display Board Guidelines) AND
- A 3-minute, rehearsed Oral Presentation.

Fourth Grade will need to do a display board and a 3-min 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:

- **Fourth-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 (increasingly so as the students get older). Fourth Graders, for example, will do all the work except the actual experiment at school.

A few important notes:

- Seeds are not allowed to be used. Only seedlings may be used. Seedlings must be purchased early in the process - prior to the regular supply due date. The experiment will need to be started sooner as well.
- Bacteria growth requires a significant amount of work and time in measuring/determining actual growth.
- Experiments and studies with human subjects can only be conducted in Grade 8 by no more than five students maximum who are approved by both Mrs. Bacolod and Ms. Clayton.
- Feel free to use the report template!

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. Parents - it's incredibly helpful if you can walk your child through the questions below to help them check their work.

***Students in Grades 4-5 must choose from a pre-approved list of topics which coordinate with the curriculum and their prior knowledge and are at their grade level of difficulty. This will help focus and clarify the process for the children. It will also improve the process for the parents because children will be able to tackle this process independently to a much greater degree.*

4th Grade

1. How do vitamins affect seedling growth?
2. How does aspirin affect the lifespan of cut flowers?
3. How does the amount of yeast affect the rise of bread dough?
4. How does the amount of vinegar affect egg shells?
5. How does chlorine affect human hair color?
6. Which stain remover removes stains the most?
7. How does the amount of light on plants affect their growth?
8. Which liquid (soda, milk, or lemon juice) produces the most gas when combined with baking soda?
9. Which dishwashing liquid is the most effective at removing food stains from dishes?
10. Which color of plastic bag will heat water from the sun the most?



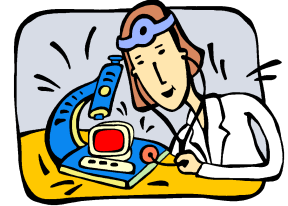
5th Grade

1. Is water absorbed at the same rate in different kinds of soil?
2. What are the effects of water on different types of wood?
3. How does acidic water affect the dissolution of limestone?
4. Does mulching or turning the topsoil allow for the most moisture retention in soil?
5. Which type of food compost produces the most biogas?
6. How does acidic water affect seed germination?
7. How does acidic water affect seedling growth?
8. How does terracing affect erosion?
9. How does the salinity of water affect buoyancy?
10. How does topical antifungal medicine affect fungi?

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 to which you want an answer.
- 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 for 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 A, then it will grow twice as high in centimeters as the plant given fertilizer B.”*
- b. Put this in a single sentence using “If...Then” format.
- c. Think of the hypothesis as: “If “this” changes, then, “this” will be measured. Or think of the hypothesis as: “If (manipulated variable) ,then (responding variable).”
- d. DO NOT compare the control group in your hypothesis. It just helps you understand the baseline (where you’re starting from).
- e. 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 so that anyone else could do your project after you just by reading them. 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 in paragraph form in your report).
 - a. 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. 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.
 - vii. What could you do next time to improve your experiment?
- b. 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.
- c. Record under “Conclusion and Discussion” on your board.

Parents of students in Fourth through Eighth Grades should minorly assist their children while ensuring the *students* 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, October 18. Specific times are listed below. 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. Singh 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,
Ms. Clayton & Mr. Singh

**Science Fair will be held at the Teglia Campus on Oct 18, 2024.
Teglia - 285 Abbot Ave.**

Kindergarten - Second Grades

- Each class will record their presentation, and we will live stream it to you on the day of the fair.
- Live performances will resume in 2025.

Third - Fifth Grades

4:00 - 4:45 PM

- Third - Fifth Grade projects will be on display and families are encouraged to walk around and ask questions.
- Awards will be announced at 4:50 PM.
- Families are encouraged to leave after the award ceremony to free up parking for other families.
- Families should take home presentation boards at the end of the fair.

Sixth - Eighth Grades

5:15 - 6:00 PM

- Middle School projects will be on display and families are encouraged to walk around and ask questions.
- Awards will be announced at 5:45 PM.
- Families should take home presentation boards at the end of the fair.

HILLDALE SCHOOL SCIENCE FAIR CALENDAR



Due Dates for 4th -8th Grades:

Monday	8/26	Kick Off Science Fair
Tuesday	9/3	Proposal Due to teacher for Topic Approval (Complete Form)
Friday	9/6	Teachers return Proposal Form
Friday	9/13	Preliminary Abstract (Steps 1-3) Due to teacher (Complete Form)
Monday	9/16	Teachers return Preliminary Abstract; Students begin Materials and Procedures and continue research
Monday	9/23	Procedures and Materials Due
Friday	9/27	Teachers return Procedures and Materials
Friday	9/27	Seedlings (if being used) must be purchased and experiment begun
Monday	9/30	All Supplies and Materials must be purchased or borrowed <i>*Teachers check in with students who are growing plants sooner*</i>
Tues - Fri	10/1 – 10/4	Classwork and Individual Check-Ins -Bring any hard copies or resources needed to school -Opportunity to type up Purpose, Hypothesis, and Research for Lab Report -Opportunity to make Display Board for Purpose, Hypothesis, Research, Title
Sat –Sun	10/5 – 10/6	Conduct Experiments (unless earlier start date needed)
Tuesday	10/7	Data Due for In-Class Check-In
Tues-Thurs	10/08 – 10/10	Class Time for Graphing, Lab Report, and Display Boards
Friday	10/11	Boards due for In-Class Check-In Presentation practice at home.
Monday	10/14	Final Projects Due at 8:30 AM.
Mon-Wed	10/14 – 10/16	Oral Presentations in Class
Wednesday	10/16	Finalists are chosen
Thursday	10/17	Finalists are Judged
Friday	10/18	Science Fair from 4-6 PM

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 8th grade may conduct experiments or scientific studies which include people or animals as the subjects and in which all the variables cannot be controlled. All others must conduct experiments without people.
- 3) Third through Fifth Grades must choose a topic from the pre-approved Science Fair topics for their grade. If, as a Fifth Grader, 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) Fourth Graders do not need to write a report, but they must do all of the work and show it on the display board.
- 5) Focus your problem on an easily measurable 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.
- 6) Gather relevant (important) information that may affect your experiment such as type of habitat, time of day, and previous behavior of substances or individuals.
- 7) Remember a hypothesis is an educated guess. Be sure your hypothesis matches your purpose with a clear number related to the variable being studied. **Do not state why** you think your hypothesis will work in the hypothesis, as that is best saved for the conclusion. For example, *“If a plant is given Fertilizer A, B, or C, then the plant given Fertilizer A will grow higher in centimeters than the plants given Fertilizer B or C.”*
- 8) Do not include your control group in your hypothesis. In the hypothesis about fertilizer, the control plant would not have any fertilizer, and I did not mention it in my hypothesis.
- 9) Clearly describe what steps you will take to test your hypothesis so that anyone else could follow them without asking for your help.
- 10) Be sure to include a control group and conduct **at least three trials** whenever possible. In my fertilizer experiment, I would have 12 identical plants to start. Three would have no fertilizer, three would have Fertilizer A, three would have Fertilizer B, and three would have Fertilizer C.
- 11) Refer to the vocabulary on the next page if you are confused about definitions (or ask your teacher).
- 12) In the results section, **display your data in the clearest way**, such as in a bar graph or 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 write clearly.
- 13) Photographs of the process can be included in the data section; however, they should not include a picture of any people.
- 14) 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 not unexpected that you do not hypothesize the wrong answer when conducting an experiment to which you don't already know the answer.

- 15) In the conclusion, discuss ways you could improve your test or write about other problems that came up after you looked at your results.
- 16) 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.
- 17) THINK SIMPLE, CLEAR, DIRECT. It's better to conduct a simple experiment well than to get lost in too many ideas and be unclear.

Vocabulary

Trends: Patterns

Manipulated Variable: The independent variable that you are controlling or changing
Example - how much fertilizer you gave the plant or which fertilizer you gave to the plant (in example)

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 - the plant that did not receive any fertilizer grew 5 centimeters. The plant given Fertilizer A grew 9 centimeters and the plant given Fertilizer B grew 13 centimeters. The plant with Fertilizer C grew 6 centimeters. However, they would have grown 5 centimeters if I had done nothing at all. I know this because my control plant (without any fertilizer) grew 5 centimeters. Therefore, my Fertilizer A plant grew 4 more centimeters because of the fertilizer, my Fertilizer B plant grew 8 more centimeters because of the fertilizer that I used, and my Fertilizer C plant grew 1 centimeter because of the fertilizer that I used. This is something that I can discuss in the Conclusion/Discussion section.

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

Example – the plant given fertilizer A will grow taller in centimeters than...

Example – Plane B will stay in the air for longer than Planes A and C in seconds...

Example – the bread kept in the bag will have more than twice as many mold spots than...