Grayhawk Elementary School's Science Fair
March 31, 2020

In order to foster fun with the exploration of science and engineering , this year's Science Fair will be held at our Night in our Museum on March 31, 2020. Student are encouraged to perform age-appropriate science projects.

- All students who enter a display will be recognized as an exhibitor with a special name tag and ribbon they will wear during the *Night in our Museum* event.
- Projects completed by students in grades 4-6 will be judged with prize ribbons presented for 1st, 2nd and 3rd place for each grade level.
- Students in grades 4-6 who work in teams will be judged and awarded prizes in the team category rather than grade category.

Projects are due Thursday, March 26.

Only displays will be presented at the Night in our Museum, students do not need to be present.

Students may submit projects that have been completed by individuals, teams or classrooms. Teams should be comprised of students in approximately the same grade.

Age-Appropriate Experiments
Pre-K through Grade 2
Appropriate projects for this group are collections, models, reports, inventions or simple experiments. Science experiments may be reproductions of ideas from books or websites that demonstrate a known scientific principle, like the famous egg in the bottle trick that demonstrates air pressure.

Examples

1. Model – solar system
2. Report – how a plant grows from a seed
3. Collection – leaves, coins, stamps
4. Inventions – place springs on shoes to make bouncy shoes
5. Experiment - objects that sink or float

All projects must reflect critical thinking, see examples in table below.

Project should include:

	Question	Example
Purpose	What do I want to learn? What do I know?	I want to learn about the different kinds of coins and the monetary value they represent.
Experiment	What did I do?	I collected as many coins as I could, I grouped them according to monetary value.
Analysis/Conclusion	What did I learn?	Coins represent a value. 100 pennies equal $1, 20 nickels equal $1, 10 dimes equal $1, 4 quarters equal $1, 2 half dollars equal $1 and $1 coin equals $1.

Grade 3-4

Students are more capable of understanding and following scientific methodology formats at this age but experiments should be kept small and manageable. The focus should be on *discovering* an unknown, rather than reproducing an experiment that demonstrates an accepted concept.

Inventions are also appropriate for this age group and should follow the engineering process.

Science Experiment should include:

	Question	Example
Purpose	What do I want to know?	What is the effect of feeding plants soda?
Hypothesis	What do I think will happen?	Plants get nutrients from water, soda contains some water but a lot of other stuff too. If plants are fed soda, the plant will not grow as big as if it was fed water.
Experiment	What did I do?	Plant seeds and monitor for growth every 3 days for 15 days. Plant group 1 will be fed 30 ml of water every day. Plant group 2 will be fed 30 ml of soda every day.
Analysis/Conclusion	What did I learn?	Plants fed soda did not grow as tall as plants that were fed water.

Invention should include:

Process	Question	Example
Ask	What problem does this address?	Some children are afraid of the dark and would be more confident with a robot that lights up a dark room.
Imagine & Plan	What will my invention include?	My robot is made of recycled materials, a battery, copper wires, LED lights and a switch.
Create & Improve	How did I design and build my invention? What improvements were necessary?	First… Next… Then… Finally...
Communicate	What did I learn?	Simple circuits require conductive materials and complete, closed circuits.

Grade 5-6

Students are capable of applying scientific methodology to experiments. Designing and building inventions are also appropriate for this age group. In addition to following the engineering process, students in grade 5-6 are expected to research and test their inventions.

Science Experiment should include:

	Description	Example
Purpose	Expressed as an open-ended question	How does light wavelength affect growth of bean plants?
Research	Gather information (be sure to cite your sources on your display) This helps form your hypothesis.	How does sunlight affect growth of plants? What are the different wavelengths of visible light spectrum? How do I separate wavelengths of light so only a certain wavelength is allowed on the plant?
Hypothesis	Expressed as a statement, this is what you think will happen.	Bean plants need light to grow. If only certain wavelengths of light are allowed to reach the plant, the plant will not grow as big as if all of the wavelengths of light are allowed to reach the plant.
Experiment	This is what you did and should include experimental design. Specify Variables (see below)	Seeds planted and growth measured in centimeters at 3-day intervals for a total of 15 days.

Analysis	Keep records of your data including detailed day-to-day notes on the progress of the experiment including observations and measurements. This data can be transferred to a graph or chart for display.	Graph all measurements of each plant. Label the graph clearly and explain what it shows.
Conclusion	Summarize your results. State if your results support or do not support your hypothesis. If results are different from your hypothesis, give a possible reason for the difference. Suggest further investigations.	

Variable	Definition	Example
Controlled	Factors that stay the same for all of your tests	Plants watered with 15 mL of filtered water every other day and exposed to light source for 12 hours every day.
Independent	Those variables that you control	The wavelength of light that reaches the plant (red filter, blue filter, green filter, no filter).
Dependent	The factor being observed	Growth of the plant.

Invention should include:

Process	Question	Example
Ask	What problem does this address?	How can we produce clean energy with minimal impact on the environment?
Research	What information is already available? What have others done to address this problem?	Current studies and educational websites promote the use of solar and wind power for the following reasons….
Imagine	What are the possibilities? What will my invention include?	A combination of solar panels working as a wind turbine to produce twice the energy.

Plan	What materials are needed, available, affordable? Sketch a blueprint or a diagram of a prototype.	This is a diagram of my prototype labeled with all of the components and materials needed to engineer it.
Create	How did I design and build my invention? What steps did I take?	First… Next… Then… Finally...
Test	How well does it function? Does it meet the goal? What corrections are necessary?	The first prototype turbine blades were too heavy with the solar panels.
Improve	What improvements were necessary?	I had to reduce the size of the solar panels on later prototypes.
Communicate	What did I learn? What next steps could I take to further this project?	Solar and wind are cleaner ways to produce energy, but do not work well together in this format. The next phase would be to add solar panels at the base and not on the blades.

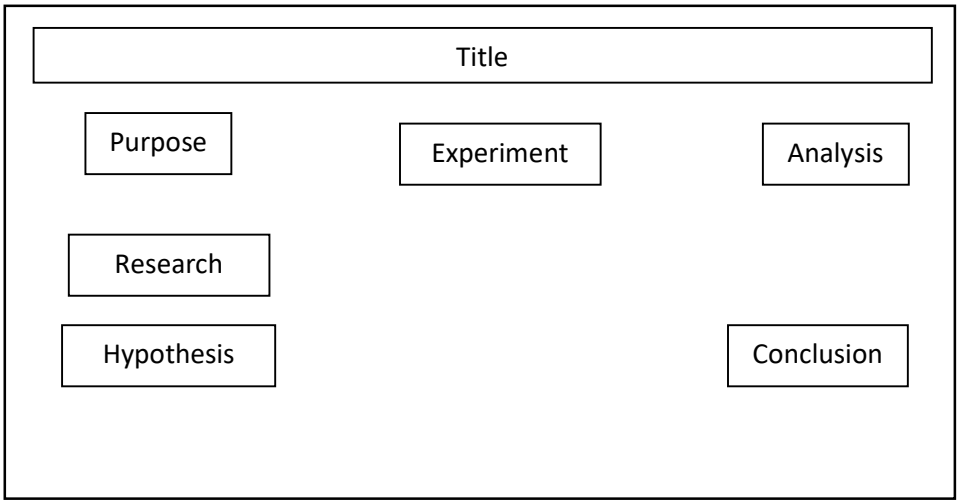
Display

The display should show everything that the student did during their investigation. Remember, students are not presenting during the event so the display must convey all important information. Displays are limited to one trifold board, approximate size 36” x 48”. All materials (including trifold board) must fit onto display table 48” wide x 18” deept. Valuable items should not be displayed as displays will not be attended.

Displays should include:

1. Title
2. Steps of Scientific Method or Engineering Process
3. Graphs and Charts
4. Photos or illustrations
5. Name, Grade, Teacher should be written on the back upper right-hand corner.

Scientific Method Display



Engineering Process Display