

Lyles Middle School
Science Fair 2019-2020
Feb. 20-21, 2020

Mandatory for all Honor Science Students

(Major Project Grade)

Optional for all Regular Science Students

(Extra Credit Project Grade)

Science Fair Project Outline...



Science Fair Project Outline...

Science Fair Description Via Garland ISD Steamposium website

Students are asked to develop an investigation and report results on a self-supporting display board. Students may participate as individuals or in teams of no more more than 3 students.

Students may enter the regional competition, STEAMposium or both. Unlike the regional fair, students will have the opportunity to present and share their project with the community.

Top 3 Projects from School Science Fair will Continue onto the Steamposium Event

Steamposium Date: Saturday, April 18, 2020

STEAM
POSIUM

SAVE THE DATE
SATURDAY
APRIL 18, 2020
CURTIS CULWELL CENTER
NEW CHALLENGES NEW SHOWCASES

#gisdSTEAM

A photograph of two young girls, likely the project creators, standing at a booth during a science fair. They are wearing blue shirts and lanyards, and are holding informational materials. The background shows other fair booths and people.

ADJUSTABLE DOG HOUSE

ESSENTIAL QUESTIONS What if a dog house could be fitted for a breed with small puppies and large full-grown?

PROJECT
Design an expandable dog house and build a functioning prototype.

CONCLUSION:
This product's purpose was intended for owners of large dog breeds. The consumer will be satisfied in knowing all the benefits that my product will bring. The house is good for the dog's health as living in an appropriate size is crucial to any animal. I designed and create an expandable dog house that is useful and affordable.

WHILE MEASUREMENTS WERE APPLIED BOTH SIDES WERE USED

Two separate panels were used on the front (door opening)

- The house was built in two halves
- The top half was slightly larger than the bottom half
- This allows the top half to slide up and down allowing modified growth of the structure

PROBLEMS

- As the dog grows, the structure expands with it
- The simple structure is easy to work with
- The height can reach up to 3 times the original size

ADVANTAGES

- The materials are lightweight
- It is practical for large dog breeds
- It is overall cheap and durable

A photograph of a cardboard dog house prototype. It is a simple, rectangular structure with a small entrance on the front. The entrance is decorated with a yellow and black Batman logo. The house is placed on a wooden surface.

Information via Garland ISD STEAMPOSIUM Website

Science Fair (Steamposium)

40 projects will be accepted on a first come, first served basis. Please use the form below to submit teams of up to 3 students. All students who contributed to the project are considered a team member even if they are not able attend the STEAMposium event.

Lyles will send the top 3 projects from each grade level.

Teacher must register the top 3 teams by Feb. 24th, 2020 for them to be able to compete on April 18, 2020.

Projects Rules will be based off of the link below.

<https://drive.google.com/file/d/1CIHguG-6Fng9QLBFjgPzuvqcqfE9sFwcD/view>

<https://www.smu.edu/Lyle/Institutes/CaruthInstitute/K-12Programs/DRSEF/Students>

Great Resource with step by step directions on how to do a science fair project below...

<https://www.sciencebuddies.org/science-fair-projects/science-fair>

Student Science Fair Timeline and Checklist

- Students are responsible for getting teachers initials on each checkpoint date.
- This form will be turned in / kept in the project composition book, 1 page per student.
- Students are responsible to complete this activity at home and/or during teacher tutoring hours, NOT during the class.
- Coach Pease's Tutoring: Tues. 8am to 8:45am / Weds. 5pm to 6pm
- Student is responsible for ALL supplies / cost on own.
- Student(s) groups can be up to 3 people, may work with student in another class period
- This sheet must be initialed EACH time an assignment is due. If a student, loses this sheet, it will be replaced, but the student will lose 10% of his/her total overall points.

Student Name: _____ Class Period: ____

Student Science Fair Timeline and Checklist

<u>Description</u>	<u>Date Due</u>	<u>Points Possible</u>	<u>Early Bird (+5 points)</u>	<u>On Time</u>	<u>Late (-5)</u>	<u>Teacher Initials</u>
Topic Title	2/3/2020	20				
Group Members Info (Names, class period.)	2/3/2020	20				
Background Research Info: Composition Book (data)	2/3/2020	60				
Total Points, check/grade 1		100				

<u>Description</u>	<u>Date Due</u>	<u>Points Possible</u>	<u>Early Bird (+5 points)</u>	<u>On Time</u>	<u>Late (-5)</u>	<u>Teacher Initials</u>
Detailed Material & Procedures List	2/5/2020	50				
Hypothesis	2-5-2020	20				
Analysis & Conclusions	2/10/2020	50				
Total Points, Check/Grade 2		120				

<u>Description</u>	<u>Date Due</u>	<u>Points Possible</u>	<u>Early Bird (+5 points)</u>	<u>On Time</u>	<u>Late (-5)</u>	<u>Teacher Initials</u>
Display Board Proposal (blueprint layout)	2/10/2020	25				
Written Report	2/14/2020	100				
Composition Book	2/14/2020	75				
Display Board Completed	2/14/2020	100				
Total Points, Check/Grade 3		300				

<u>Description</u>	<u>Date Due</u>	<u>Points Possible</u>	<u>Early Bird (+5 points)</u>	<u>On Time</u>	<u>Late (-5)</u>	<u>Teacher Initials</u>
Final Project Overall Presentation (In Class)	2/17-20/ 2020	100				
Total Points, Check/Grade 4		100				
Top 15 Projects from Honors and Regular Science Optional Projects Final Judging (In Rm. TBA)	2/20-21/2020 Must be set up / on display by 8:45am on 2/20/2020	Top 3 Projects proceed to Garland ISD Steamposium				

Steps to the Scientific Method Resources

- <https://www.sciencebuddies.org/science-fair-projects/science-fair/steps-of-the-scientific-method>
- Video: <https://www.youtube.com/watch?v=yi0hwFDQTSQ>
- <https://www.thoughtco.com/steps-of-the-scientific-method-p2-606045>
- <https://sciencebob.com/what-are-the-steps-to-the-scientific-method/> Awesome Site for Science Fairs

Scientific Method Overview

- **Seven** steps:

1. Choose problem
2. Research problem
3. Develop hypothesis
4. Write procedures
5. Test hypothesis
6. Organize data
7. State conclusions



Composition Book Layout:

Page 1: Title Page

Page 2: Table of Contents

Page 3: State the Question

Page 4-10: Collect Data /
Background Research

Page 11: Hypothesis

Page 12: Materials

Page 13-20: Test / Procedure

Page 21-30: Record Data
Collected from Procedure/Test

Page 31-35: Conclusion

Page 36-38: Student Timeline /
Checklist

Remember to make this book your own. This is where you not only keep your information, but it is also another place you can show organization skills, knowledge of topic and creativity.

Steps of the Scientific Method Explained

<https://www.sciencebuddies.org/science-fair-projects/science-fair/steps-of-the-scientific-method>

Step 1. Ask a Question (Due 2-3-2020)

The scientific method starts when you ask a question about something that you observe: How, What, When, Who, Which, Why, or Where?

For a science fair project some teachers require that the question be something you can measure, preferably with a number.

For detailed help with this step, use these resources:

- [Your Question](#)
- [Laboratory Notebook](#)

Step 1 : Form / As a Question

Finding an Idea for Your Science Fair Project

One of the most important considerations in picking a topic for your science fair project is to find a subject that you consider interesting. You will be spending a lot of time on it, so you do not want your science fair project to be about something that is boring.

We know that finding a topic is the hardest part of a science fair project, and sometimes you just need a little help focusing on what sorts of topics would be of interest to you. To help you find a science fair project idea that can hold your interest, Science Buddies has developed the [Topic Selection Wizard](#). By answering a series of questions about everyday interests and activities, you will help us identify an area of science that is best for you. If your teacher has assigned a specific area of science (like "biology" or "earth science") for your science fair, you can also browse our whole [library of projects by subject](#).

If you are coming up with your own topic, or have a topic idea from somewhere else, be sure to look at our list of [Science Fair Topics to Avoid](#). Steering clear of these will ensure you have a high-quality science fair project that is easier to complete!

Teacher Tool Box

Assign these with Google Classroom:

- [Scientific Questions Quiz](#)
- [My Science Project Question](#) (Student Worksheet)

Links for Project Ideas...

http://www.projects.juliantrubin.com/science_fair_project/award_winning_projects.html

<https://www.pinterest.com/pin/263671753164470441/?lp=true>

<https://www.sciencebuddies.org/science-fair-projects/science-projects>

<https://www.education.com/science-fair/middle-school/>

<https://www.thoughtco.com/6th-grade-science-fair-projects-609028>

<https://www.theedadvocate.org/43-of-the-best-7th-grade-science-projects-and-experiments/>

These are just a few..google search “science fair projects for middle schoolers” for even more ideas!

Step 1 Continued...

Your Science Fair Project Question

Once you have chosen a topic of interest, you will need to create a related scientific question. Without a good question, your whole science fair project will be much harder, if not impossible! It is important to select a question that is going to be interesting to work on for at least a few weeks and that is specific enough to allow you to find the answer with a simple experiment. A scientific question usually starts with: How, What, When, Who, Which, Why, or Where. Here are some characteristics of a good science fair project question:

- The question should be interesting enough to read about, then work on for the next few weeks.
- There should be at least three sources of written information on the subject. You want to be able to build on the experience of others!
- The question should contain one factor (variable) that you can change in your experiment and at least one factor (variable) that you can measure.

Now, for something like a science fair project, it is important to think ahead. This will save you a lot of stress and unhappiness later. Visualize the experiment you might perform to answer your question. How does that possible experiment stack up against the following issues?

- The experiment should measure changes to the important factors (variables) using a number that represents a quantity such as a count, percentage, length, width, weight, voltage, velocity, energy, time, etcetera. Or, just as good might be an experiment that measures a factor (variable) that is simply present or not present. For example, lights *on* in one trial, then lights *off* in another trial, or *use* fertilizer in one trial, then *do not use* fertilizer in another trial. If you cannot observe or measure the results of your experiment, you are not doing science!

Step 1 Continued...

- You must be able to control other factors that might influence your experiment, so that you can do a fair test. A "fair test" occurs when you change only one factor (variable) and keep all other conditions the same.
- Is your experiment safe to perform?
- Do you have all the materials and equipment you need for your science fair project, or will you be able to obtain them in a reasonable amount of time at a cost that is okay for your family?
- Do you have enough time to do your experiment before the science fair? For example, most plants take weeks to grow. If you want to do a project on plants, you need to start very early! For most experiments you will want to allow enough time to do a practice run in order to work out any problems in your procedures.
- Does your science fair project meet all the rules and requirements for your science fair?
- Have you avoided the bad science fair projects listed in the [Science Fair Topics to Avoid](#) table in this project guide?

If you do not have good answers for these issues, then you probably should look for a better science fair project question to answer.

Keep in mind that science fair projects that involve human subjects, vertebrate animals (animals with a backbone) or animal tissue, pathogenic agents, DNA, or controlled or hazardous substances, often need approval from your science fair's Scientific Review Committee **beforehand**. Check with your teacher or the science fair coordinator for rules specific to your science fair. You can also read more about common science fair rules on our [Scientific Review Committee](#) page.

State the Question Proposal form: <https://www.sciencebuddies.org/science-fair-projects/science-fair/project-proposal-form.pdf>

Step 1: State the Question Checklist

What Makes a Good Science Fair Project Question?

For a Good Science Fair Project Question, You Should Answer "Yes" to Every Question

Is the topic interesting enough to read about, then work on for at least the next few weeks?

Yes / No

Can you find at least three sources of written information on the subject?

Yes / No

Can you measure changes to the important factors (variables) using a number that represents a quantity such as a count, percentage, length, width, weight, voltage, velocity, energy, time, etcetera?

Yes / No

Or, just as good, are you measuring a factor (variable) that is simply present or not present? For example,

- Lights **ON** in one trial, then lights **OFF** in another trial,
- **USE** fertilizer in one trial, then **DO NOT USE** fertilizer in another trial.

Can you design a "fair test" to answer your question? In other words, can you change only one factor (variable) at a time, and control other factors that might influence your experiment, so that they do not interfere?

Yes / No

Is your experiment safe to perform?

Yes / No

Do you have all the materials and equipment you need for your science fair project, or will you be able to obtain them quickly and at a low cost?

Yes / No

Step 2.: Collect Data/ Do Background Research

(DUE 2-3-2020)

Rather than starting from scratch in putting together a plan for answering your question, you want to be a savvy scientist using library and Internet research to help you find the best way to do things and ensure that you don't repeat mistakes from the past.

For detailed help with this step, use these resources:

- [Background Research Plan](#)
- [Finding Information](#)
- [Bibliography](#)
- [Research Paper](#)

What is Background Research???

Step #2: Collect Data about Question

Key Info

Background research is necessary so that you know how to design and understand your experiment. To make a **background research plan** — a roadmap of the research questions you need to answer — follow these steps:

1. Identify the keywords in the question for your science fair project. Brainstorm additional keywords and concepts.
2. Use a table with the "question words" (why, how, who, what, when, where) to generate research questions from your keywords. For example:
What is the difference between a series and parallel circuit?
When does a plant grow the most, during the day or night?
Where is the focal point of a lens?
How does a java applet work?
Does a truss make a bridge stronger?
Why are moths attracted to light?
Which cleaning products kill the most bacteria?
Throw out irrelevant questions.
3. Add to your background research plan a list of mathematical formulas or equations (if any) that you will need to describe the results of your experiment.
4. You should also plan to do background research on the history of similar experiments or inventions.
5. Network with other people with more experience than yourself: your mentors, parents, and teachers. Ask them: "What science concepts should I study to better understand my science fair project?" and "What area of science covers my project?" Better yet, ask even more specific questions.

Step 2: Collect Data

Sample Background Research Plan

Background research plan for the science fair project question: Does drinking milk help decrease spiciness better than water or Pepsi?

Keywords —

- Milk
- Spiciness
- Pepsi
- Water

Research questions —

- Why do spicy foods taste hot?
- How does the tongue detect spiciness?
- How does one measure spiciness?
- What causes spiciness to increase (or decrease)?
- What are the properties and characteristics of spicy substances?
- Where in the body does spiciness occur?
- What is the composition of milk, Pepsi, and water?
- What are the properties and characteristics of milk, Pepsi, and water?

Science concepts and/or areas of science —

- Taste buds

Background Research / Step 2: Collect Data Worksheet / Step by Step Guide to assist

<https://www.sciencebuddies.org/teacher-resources/science-fair/project-background-research-worksheet.pdf>

Click on the above link / print out to help set up project for Step 2: Collect Data

Background Research / Step 2 Collect Data Check List

Background Research Plan Checklist

What Makes a Good Background Research Plan?	For a Good Background Research Plan, You Should Answer "Yes" to Every Question
Have you identified all the keywords in your science fair project question?	Yes / No
Have you used the question word table to generate research questions?	Yes / No
Have you thrown out irrelevant questions?	Yes / No
Will the answers to your research questions give you the information you need to design an experiment and predict the outcome?	Yes / No
Do one or more of your research questions specifically ask about any equipment or techniques you will need to perform an experiment? (if applicable)	Yes / No
If you are doing an engineering or programming project, have you included questions from Engineering & Programming Project Tips?	Yes / No

Step 3: Hypothesis (DUE 2-5-2020)

(Educated guess to answer the question stated for the project)

3. Construct a Hypothesis

A hypothesis is an educated guess about how things work. It is an attempt to answer your question with an explanation that can be tested. A good hypothesis allows you to then make a prediction:

"If _____*[I do this]* _____, then _____*[this]*_____ will happen."

State both your hypothesis and the resulting prediction you will be testing.

Predictions must be easy to measure.

For detailed help with this step, use these resources:

- [Variables](#)
- [Variables for Beginners](#)
- [Hypothesis](#)

Step 4: Test / Experiment (Due 2-5-2020) (*materials & procedure*)

4. Test Your Hypothesis by Doing an Experiment

Your experiment tests whether your prediction is accurate and thus your hypothesis is supported or not. It is important for your experiment to be a fair test. You conduct a fair test by making sure that you change only one factor at a time while keeping all other conditions the same.

You should also repeat your experiments several times to make sure that the first results weren't just an accident.

For detailed help with this step, use these resources:

- [Experimental Procedure](#)
- [Materials List](#)
- [Conducting an Experiment](#)

Step 5: Analyse Data / Collect Data (Due 2-10-2020)

(data collected from lab procedure)

5. Analyze Your Data and Draw a Conclusion

Once your experiment is complete, you collect your measurements and analyze them to see if they support your hypothesis or not.

Scientists often find that their predictions were not accurate and their hypothesis was not supported, and in such cases they will communicate the results of their experiment and then go back and construct a new hypothesis and prediction based on the information they learned during their experiment. This starts much of the process of the scientific method over again. Even if they find that their hypothesis was supported, they may want to test it again in a new way.

For detailed help with this step, use these resources:

- [Data Analysis & Graphs](#)
- [Conclusions](#)

Step 6: Draw your Conclusion (Due 2-10-2020)

6. Communicate Your Results

To complete your science fair project you will communicate your results to others in a final report and/or a display board. Professional scientists do almost exactly the same thing by publishing their final report in a scientific journal or by presenting their results on a poster or during a talk at a scientific meeting. In a science fair, judges are interested in your findings regardless of whether or not they support your original hypothesis.

For detailed help with this step, use these resources:

- [Final Report](#)
- [Abstract](#)
- [Display Board](#)
- [Science Fair Judging](#)

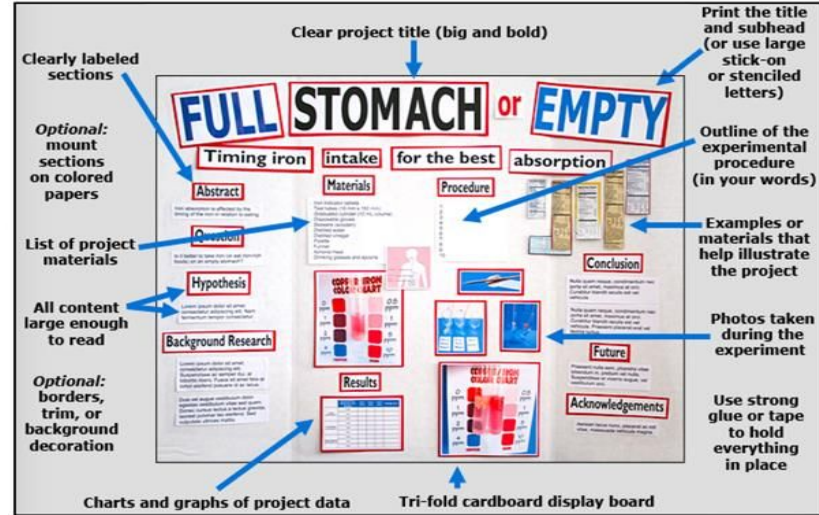
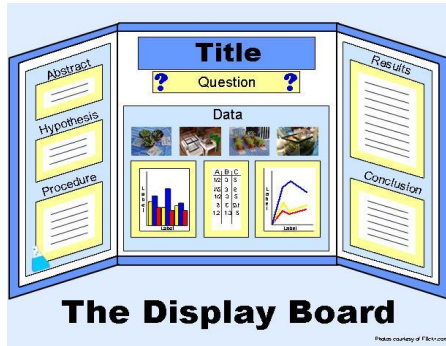
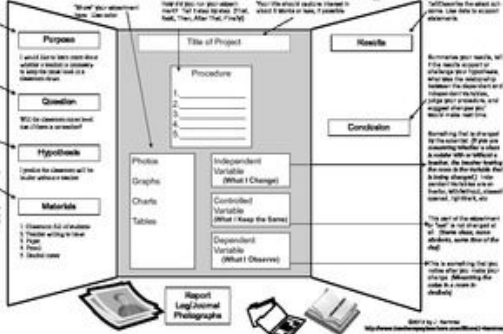
Display Board Proposal (Due 2-10-2020)

Rough Draft of what board will look like.

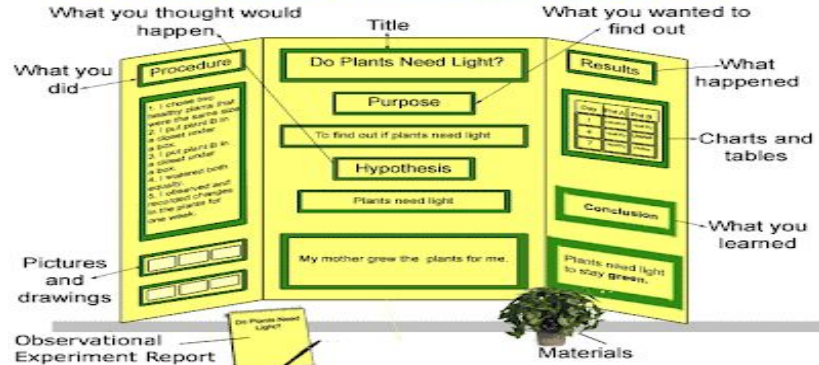
A blueprint / map of how the board will be set up.

Examples of boards for reference

Science Fair Board Sample



Displaying a Science Fair Project



https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.teacherspayteachers.com%2FProduct%2FScience-Fair-Display-Board-Sample-527453&psig=AOvVaw2kUXbxB78Ssmo_nDPUD1AZ&ust=1580913420739000&source=images&cd=vfe&ved=0CA0QjhxqFwoTClC7cmPuOcfQAAAAAdAAAAABAX

More Information to Come...