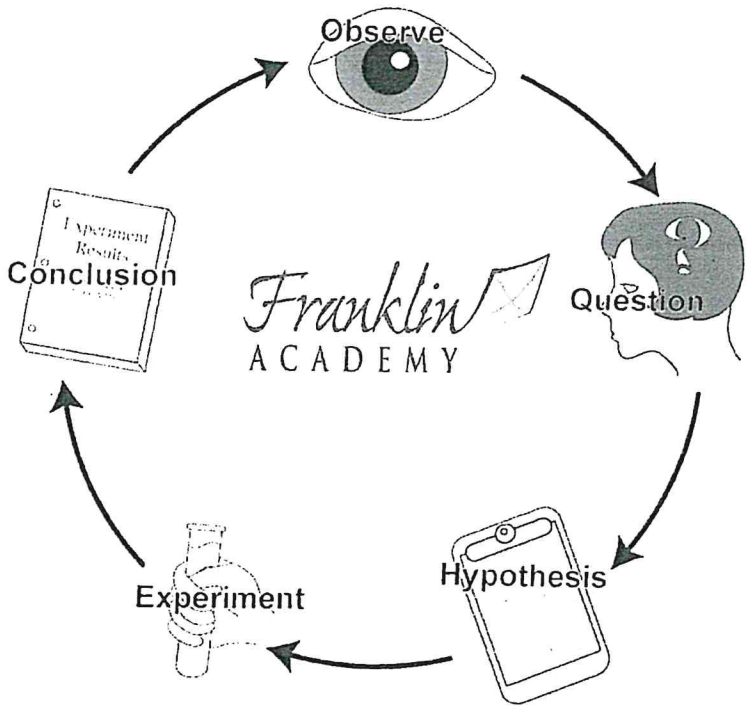
Franklin Academy Charter School Boynton Beach

2020 District Elementary Mathematics, Science, and STEM Fair



STUDENT – PARENT GUIDE

Student Timeline and Assignments For Completing School Math, Science, STEM Fair

Dear Parent or Guardian,

We will be holding our school science and math fair on April 16, 2020 Participating in a science, math and STEM fair is an enjoyable way for students to learn how to conduct experiments to solve problems. Students will make displays that show how they went about conducting their experiments.

This science fair is not quite like the science fairs you may have experienced. While models and modeling are important to science, we are not encouraging students to display models of such things as volcanoes and the solar system. Instead, we are encouraging them to ask questions and then to set up experiments to answer those questions. In this way, they learn to approach science as scientists do.

There are three (3) assignments, to help your child begin planning their investigation, "*My Purpose/ Project, Testable Question* and *My Hypothesis*." Your child's teacher will explain them to your child and will need your support in having them complete each assignment. A calendar of due dates is included to keep them on track.

1) *Help your child select a math or science topic that they are interested in learning more about.*
2) *Work together with them to formulate a testable question, which they can answer (test) by doing an experiment.*
3) *Take them to the library or help them search online for more information about their question. Then read more about it to learn what is already known about the topic.*
4) *Next, help your child plan an experiment that will test their question. Identify what they should look for, observe, and record, as they are conducting their experiment. Help them gather and list, in quantity, all the materials they will need to do their experiment. Write a list of the procedural steps, in the order they will follow them, to do their experiment.*
5) *Once their procedure is approved, help them observe and ask questions as they carry out their experiment, but be careful not to do the experiment for them. Have them repeat their experimental test three (3) times. Guide the process and mentor their progress, do not do the work for them.*
6) *Last, help them gather the supplies they will need to make a display of their projects results. Allow them to put the display together themselves - only offer encouragement not assistance.*

Obviously, the project investigation and display should be your child's own work. This is a good time for you to mentor, encourage, and assist them in completing these assignments. Attached please find a guide to completing a successful project, a timeline of due dates, and the assignments your child needs to complete. If you have any questions, contact me anytime.

Respectfully,

Beth Melnick
Franklin Academy Science Fair Coordinator

INADMISSIBLE AT THE ELEMENTARY DISTRICT FAIR

The following are NOT ALLOWED at the Elementary District Fair competition and could result in a project NOT being certified for display and judged.

- Mold, bacteria, and virus projects, or any active harmful cultures
- Chemical use without adult supervision, including grocery store chemicals
- Living animal projects without an **Animal Subject Approval Form, pg. 20** (Investigations involving invertebrate or vertebrate cannot injure, harm, or kill the animal. An **Animal Subject Approval Form** MUST be completed, signed, and turned in to the classroom teacher before experimentation begins.)
- Projects involving human subjects without a **Human Subject Approval Form, pg. 21** (Investigations involving humans as test subjects MUST have a **Human Subject Approval Form** completed, signed, and turned in to the classroom teacher before experimentation begins.)
- Students participating as subject without an **Informed Consent/Assent Form, pg. 22** (All students participating in an experiment need written parental permission and each participant also needs to agree in writing to participate. An **Informed Consent/Assent Form** must be signed and submitted to the classroom teacher before experimentation begins.)
- Preserved specimens, body parts, taxidermy, dissections, or autopsy photos displayed on the project board
- Dirt, soil, minerals, rocks, radioactive substances, or compost samples on the project board
- Solids, liquids, gases, chemicals, or compound samples (including water) on the project board
- Any food (pet or human - including candy, snacks, or treats) on the project board
- Medicines, poisons (including plants), drugs, or radioactive materials of any kind
- Dry ice or other inappropriate substances on the project board
- Flammable substances, candles, lamps, burners, or other heating devices display on the project board
- Weapon or firearm investigations
- Batteries, wet or dry cells displayed on the project board
- Real money, coins, or currency of any nation displayed on the project board
- Plastic, wood, foam, or ANY material that keeps the project board from closing flat
- Awards, ribbons, medals, or certificates from other competitions
- Photographs showing student faces (investigator or subjects must be blacked out)
- Student and/or school names (can only be displayed on the back of the center panel display)
- Project board over 36 inches high or 48 inches wide (minimum 27 inches x 39 inches)
- Headers or anything sticking out of the sides or bottom of the project board
- Papers, separate log books, pictures, or objects not attached to the project board
- Loose objects in front of the board at the District Fair
- Staples, clips, push pins, brads, nails, tacks, or sharp objects of any kind attached to the project board
- Knowingly entering a project falsely in any way

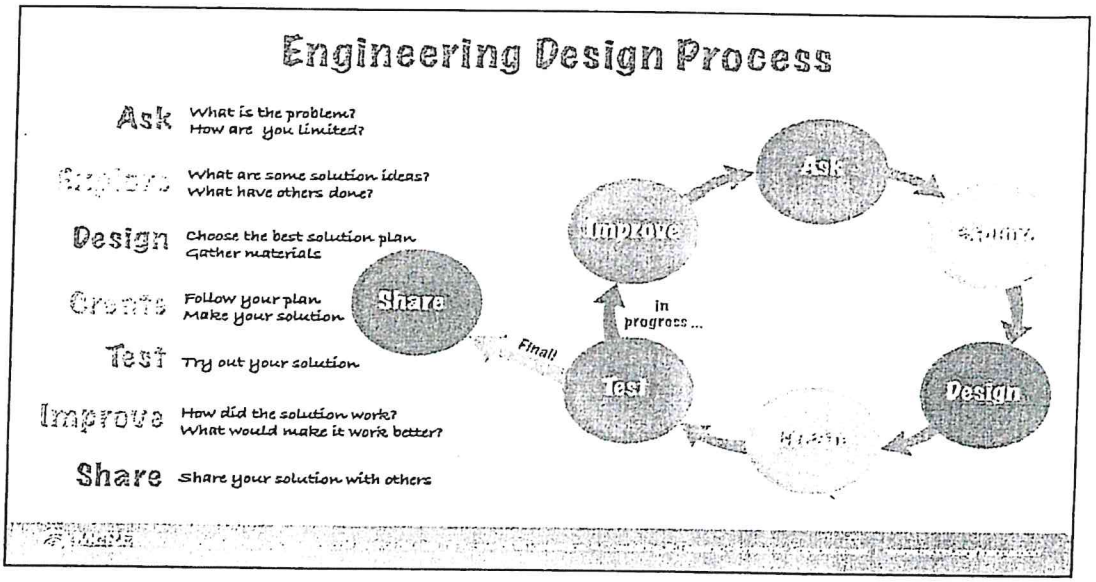
The School District Fair Committee reserves the right to disqualify any project from judging that is considered unsafe or inappropriate, and remove it from public display. Students, parents, and teachers are responsible for checking their display boards before registering them in the District Fair competition to make sure they comply with the above rules and have all the appropriate forms needed for certification.

TYPES OF PROJECTS

Math Projects investigate a problem and gather data which the learner analyzes mathematically. The focus is on the math skills and processes used to explain the investigations results. Consumer-product surveys are good examples of math fair projects. Consumers are polled about their likes and dislikes. The data gathered is analyzed mathematically by the learner and the results of the survey are explained. Winning math projects should reflect the learner's grade-level, math skills, and abilities. The labels and descriptions required on a math project board and a scoring rubric can be found on pages 8-10.

Science Projects involve designing an experiment to test a hypothesis. The focus is on the scientific processes and skills needed to explain the data collected in the experiment. The data is organized into a table, examined for trends, and used to support any conclusions made about the results of the experiment. The project should reflect the science standards learned and rigor expected at each grade-level. The labels and descriptions required on a science project board and a scoring rubric can be found on pages 11-14.

STEM Projects involve the integration of science, technology, engineering, and mathematical concepts applied to solve a real-world problem. Students will design an investigation to solve a real-world problem using the engineering design process. The labels and descriptions required on a STEM project board and a scoring rubric can be found on pages 15-18.



THEME PROJECTS

Theme Projects are INDIVIDUAL Math, Science, or STEM projects (from grades 3, 4, and 5) which meet the criteria of the 4 themes described below. The "Best 2" School Fair projects per theme may be entered from each grade into the District Fair competition. These projects are judged by grade level in a School's Fair.

At the District Fair grades 3, 4, and 5 are judge together in each theme. Ribbons are awarded for first, second, third place, and honorable mention in each theme.

1. AVIATION theme projects must investigate a flying object or flight safety.
2. GREEN theme projects must investigate the basic needs of a plant or how plants respond to stimuli.
3. PHYSICAL SCIENCE theme projects must investigate a hand-made design which is planned (engineered), built, tested, and improved in an investigation.
4. ENERGY theme projects must investigate a form of energy or energy conservation.

Participating in School Science, Math STEM Fair

A Guide to Successfully Completing a Project

Projects and Divisions

Students may choose to do *science, math, S.T.E.M., or theme projects*. For grades 3 through 5 there are three project Divisions; *Class, Team,* and *Individual*. In grades K, 1, and 2, students will participate in teacher directed *Class Projects*. *Class* projects include all the students in one classroom, predicting, experimenting, recording data, drawing conclusions about one project. In grades 2, 3, 4, and 5 students can participate in *Team* projects in which 2 to 4 students collaborate to complete one project. Or students in grades 3, 4, and 5 can choose to do an *Individual* project, done by one student with support from their teacher and parents.

Grade Level Categories

Classes or students enter their projects one of four different grade-level Categories: *Regular, Dual Language Learners*, or *Gifted Learners*. First each category is judged separately to determine a first and second place winner in a **School Fair** competition. Then the first and second place winners advance to the **District Fair**, the final level of competition for K-5 students.

Successful Projects

The key to success is deciding what to investigate and carefully planning and designing an experiment. The resulting science or math project should display all the steps used to answer/solve a problem, describing the purpose, writing a hypothesis (testable question) and experimental procedure, recorded the data, analyzing the results and explain your conclusions in writing.

Step 1: Selecting a Testable Question

Students begin by selecting a question that can be tested by doing an experiment. The observations of the experiments results should include both qualitative (descriptive) and quantitative (measurement) data. *Descriptions should include what is observed through all five senses, seeing, hearing, tasting, smelling, and touching*. Measuring tools should be used to record the precise amounts of changes that take place as accurately as possible. Therefore, selecting a "testable question" is very important. Questions that ask for an opinion or belief are <u>not</u> testable questions. Opinion questions survey how someone feels or what someone thinks. Testable questions are different in that they are answered by evidence. Evidence that is observed, measured and can be validated. Validity is demonstrated by following the same exact steps, and getting the same results. To prove their results are valid, students should repeat their experiment a minimum of three (3) times or trials. The data from all three trial should be recorded and the evidence included with your project. Teachers, parents, should mentor students by suggesting ideas and providing access to background resources, like library books or Internet sites.

- ✓ The testable question should be recorded under the ***Purpose*** label on the display board.

Step 2: Writing a Hypothesis

A hypothesis is a statement that predicts what you think the outcome of your experiment will be. The premise of a hypothesis is cause and effect. Likewise the hypothesis statement is usually written in an "If …, then" format. For example: ***If*** a magnet attracts a material, ***then*** that material will be a metal. This statement is a hypothesis because a magnet can be used to test each material and attraction to metal can be observed. Students will be asked to write and submit a testable question and hypothesis for their project to their teacher for approval before doing any experimenting. They should write their own hypothesis, in their own words, with minimal help from parents.

- ✓ The hypothesis should be recorded under the ***Hypothesis*** label on the display board.

Step 3: Planning a Safe Experiment

Planning the experimental procedure that will be followed to test your hypothesis is important for several reasons. First and foremost is the safety of the subjects and the investigator. The safety of everyone involved. For this reason, each student will be asked to write and submit a list of the materials they are using to and the steps of their experimental procedure. Students should the amount of each material, any tools, and the step by step procedure plan they will follow as the experiment. Parents can help, but should restrict their support to assistance only. Then the procedures will be reviewed and approved by their teacher. Once approved, experimenting can begin. Any changes or substitutions must also approved by the teacher.

- ✓ List all ***Material*** by quantity and record the experimental steps under ***Procedure*** on the display board.

Step 4: Observing and Recording Data

Once your experimental procedure is approved, you can begin your experimental trials. Every effort should be made to provide adequate time to complete their experiments. A ***Data Table*** should be used to record all observations and measurements collected during each trial. Procedures should be **repeated exactly the same way all three times** (or three separate, identical samples should be tested). Any analysis of the data including calculations, comparing and contrasting, or graphing should also be recorded.

- ✓ All the data and any analysis (graphs) should be recorded under the ***Data*** label on the display board.

Real World Connections

Real Life Connections explain how your project relates to the real world and how it pertains to everyday life. Does it help plants, animals, people, or the earth? Could it create new jobs or work? Could it become a new product or technology? How does it benefit or apply to our everyday experiences?

- ✓ Real World Connections should be recorded under the ***Real World Connections*** label on the display board.

Step 5: Drawing Conclusions

The Conclusions are an explanation of the results of your investigation. Any claims you make need to be supported by evidence gathered and recorded in your Data Tables. Each claim must be matched to an observation, measurement, calculation, or trend in your recorded data. Conclusions must not be limited to whether or not the hypothesis is accepted or rejected, but should explain what, how, and why the data supports any claims you make. Students should make their own conclusions sighting the evidence that supports their claims in writing.

- ✓ Conclusions should be recorded under the ***Conclusion*** label on the display board.

School Fair Project Time Line

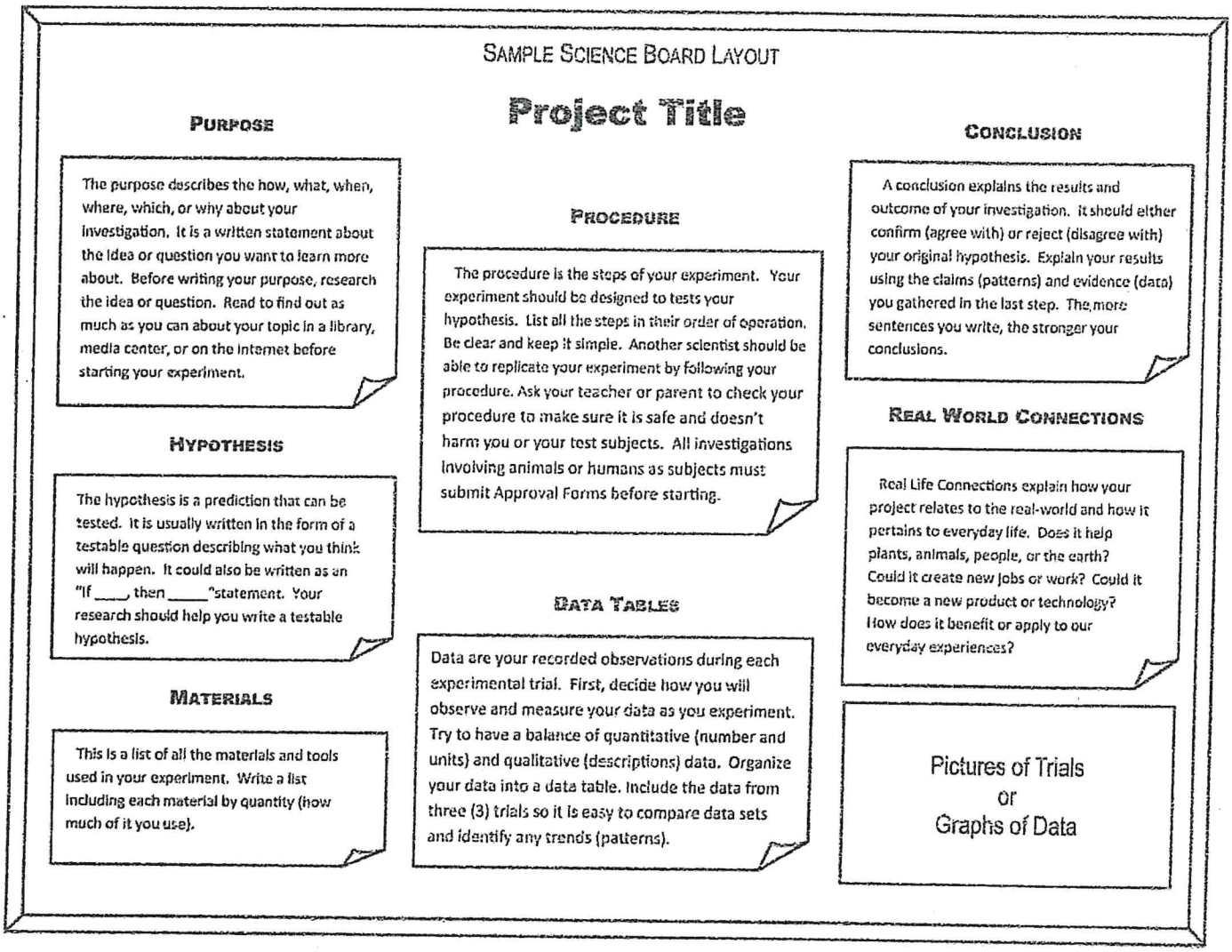
Date of the School Math, Science, STEM Fair April 16, 2020

Date	Completed	Things I Need To Do
Begin Now		Choose the type of project you would like to do: Math, Science, STEM. Choose a theme: Aviation, Green, Physical science or Energy. Then research your topic and purpose using books, the Internet and other resources. **NO ANIMAL and/or HUMAN SUBJECT PROJECTS.**
Nov 7 *50pt towards QUIZ grade*		Write the Topic and PURPOSE, TESTABLE QUESTION, Identify the Data, (page 9) **SUBMIT TO TEACHER for APPROVAL.**
Nov 14 *50pt towards QUIZ grade*		Once approved, HYPOTHESIS, (if.. then..because..), variable, and control. (page 10)
ONCE TOPIC HAS BEEN APPROVED, **NO CHANGES ARE PERMITTED WITHOUT TEACHER APPROVAL**		
On going		Design experiment to test your hypothesis. Write a MATERIALS List and the PROCEDURE Steps you will follow.
On going		Conduct your experiment **3 times** and record your observations in DATA tables in a log or your science notebook.
On going		Take pictures throughout experiment. *Faces are not allowed in pictures.*
On going		Organize your data into charts or tables. Make one or more GRAPHS that compare or contrast the data.
Dec 13		Write your CONCLUSION. Make sure you justify each claim you make with the evidence you recorded in your data tables. Describe the REAL WORLD CONNECTIONS to your project.
On going		Make your project on display paper supplied by the school. Carefully check the Inadmissible at the Elementary Fair guidelines. **NO SCIENCE BOARDS ALLOWED. USE DISPLAY PAPER ONLY.**
Jan 13 *200 pt TEST grade*		**Science Display project submitted to your Science Teacher.**
Jan 14 – 24		Present your project to the class. Be ready to talk about your experiment and what you learned in your investigation.
Jan 27		Teacher submits top 2 projects for each category: Math, STEM, and Physical Science. Themes: Aviation, Green, Physical science or Energy.
March 16-18, 2019		P.B.C. SCHOOL DISTRICT ELEMENTARY MATHEMATICS, SCIENCE AND STEM FAIR at the South Florida Fairgrounds.
March 17, 2019	2:00 – 7:00 P.M.	The SCHOOL DISTRICT ELEMENTARY FAIR is Open to the Public
Grades		Late Assignments- 1st day late -10pts, 2nd days late -20pts, 3rd day late – 40 pts. 4th day late -60 pts, 5th day late- 0%

Science Display Layout

This is the order of your labels to set up your display.
The placement of 3/ 2/ 3 labels does not have to be explicitly followed. *If you have a larger material list and cannot fit it on the left side, then place it at the top middle section. The order has remained the same but the location has changed.*

Reminder:
Your titles vary depending on the type of project: math, science or STEM. See below



MATHEMATICS

Problem/ Question
Hypothesis/ Conjecture
Materials
Procedures
Data Tables
Conclusion and Proof
Real World Connections

SCIENCE

Purpose
Hypothesis
Materials
Procedures
Data Tables
Conclusion
Real World Connections

STEM

Problem/ Question
Explore/ Hypothesis
Design/ Plan
Materials
Create/ Procedures
Improve/ Test
Data
Share/ Conclusion
Real World Connections

Name _____ Date _____

Due November 7, 2019

My Topic, Purpose and Testable Question

My Hypothesis, If-Then Statement

The Topic and PURPOSE of my project is about *(What are you trying to prove? Your experiment needs to include observable and measureable data that you can record precise amounts of change.)*

My testable question is *(Your purpose written in question form. It can be answered by conducting an experiment. Testable question change one thing, the variable, to see what the effect is on another thing, the constant.)*

The data I will be recording is *(What will you measure and what changes will you be observing?)*

My project HYPOTHESIS is *(A cause and effect prediction and written as an If-Then statement.)*

I will observe these changes *(list the **variables** you will test and the other variable you will **control** to keep from changing in your experiment and the data and measurements you will be collect and record)*

Teacher approval and comments