PALM BEACH COUNTY SCHOOL DISTRICT

2016 DISTRICT ELEMENTARY MATHEMATICS AND SCIENCE FAIR

Student & Parent Guide
PROMOTING EXCELLENCE IN S.T.E.M.
TYPES OF PROJECTS

MATH PROJECTS
A math project consists of all the activities used to solve a problem, explore an idea, and apply a mathematical skill or principle. It must include a purpose, procedure, investigation or survey, procedure, data, relationship to mathematics, and a conclusion. It should apply a mathematical skill, concept, or principle and clearly explain all the mathematics used to obtain the results.

SCIENCE PROJECTS
A science project consists of all the activities used to investigate a problem, explore an idea, and apply science skills and concepts. It must include a purpose, hypothesis, materials list, experimental procedure, data, graph, and a conclusion. It should show all the recorded data (evidence) collected in the experiments in tables or charts, and compare or contrast the data visually. A written conclusion with claims supported by evidence (the recorded data) should clearly support or reject the hypothesis. Metric units and measurements should be used if possible and the experiment should be repeated a minimum of three (3) times for validity or include a minimum of three (3) separate experimental samples.

ENGINEERING PROJECTS - USING THE ENGINEERING DESIGN PROCESS
An engineering project consists of all the activities used to design and engineer a solution to a problem and should follow the ENGINEERING DESIGN PROCESS.
1) ASK / PURPOSE - “What is my problem?”
2) IMAGINE / HYPOTHESIS - “What is a possible solution?”
3) MATERIALS - a list of all the things you will need to make it.
4) PLAN - drawings of the technical designs, complete with a title, labeled parts, and measurements with units, of the design that are accurate and precise enough so that it could be recreated by others.
5) CREATE / PROCEDURE - a step-by-step description of how you built it and plan to test it.
6) DATA / IMPROVE – Fine-tune each experimental test (of 3 separate trials), along with a written record of what you improve, how it works in each trial until it works perfectly time after time.
7) CONCLUSION, explain what you’ve learned in writing. Write about what you observed through the design and engineering process and describe how your design applies in real-life situations.

ALL MATH AND SCIENCE PROJECT BOARDS should include all the following steps:
1. PURPOSE - a statement explaining what you are trying to investigate. It can also be written as a question. You can also use all or part of your purpose statement/question as the Title of your project.
   Collect as much information as you can about your investigation. Spend some time in the library or on the internet learning more about it. Your research will help you understand the question a little better and help you write a testable question or “hypothesis” that can be tested by collecting experimental data.
2. HYPOTHESIS - a prediction that can be tested by conducting an experiment. A hypothesis is an informed (researched) question. It uses the information you collect about your purpose (statement/question) to explain the observations made before, during, and after doing your experimental test trials.
3. MATERIALS - a list of all the equipment and materials you use in your investigation. List each item by quantity, in a column. Use metric tools, measures with units when possible (customary English measuring tools, and measures with units will also be accepted).
4. PROCEDURE - a list of all the steps in your experimental trials, in the exact order you perform them. Be clear, but keep it simple. Other scientists should be able to replicate your experimental results by following the same procedures.
   In every experiment there must be “controlled variables” which do not change and one “tested variable” which does change. You will use the data from the control group to validate the final results of the experimental group. List the variables you will control, so they will not change, and identify the tested variable, you hope will change, in your experimental trials.
   Any factor in your investigation that can change as you test your hypothesis is your “tested variables.” It helps to only pick one variable to test and to control all the other variables keeping them exactly the same in each trial. After writing your procedure, show it to your teacher. Once your teacher has approved your procedure (for safety and/or the humane treatment of the test subjects), you may begin your experiment.
5. **DATA** - a written record of all the observations (changes) and measurements made in your experimental trials. It is important to record everything that takes place. Record both qualitative and quantitative descriptions and measurements. Your data may be kept in a logbook. Take photographs that show the changes you observe, but **do not** photograph any human faces (of the investigator or subjects). Once you have finished your first experimental trial, run two more trials following the same procedure exactly (for a minimum of 3 trials). If you are testing samples, you must test each sample a minimum of 3 times as well.

If you are engineering a design use a **DATA-Improve** label on your project board. With each trial in your design process, make improvements to your design. “**Tweaking it** to improve how it works.” Then test it again. Record descriptions of how you improved it before and after each test trial and explain what happened.

Compare and contrast your observations (qualitative and quantitative) in data tables. If possible graph two data factors (observations) to compare how they interact. With each graph you make, explain any patterns or trends you observe in the graph. Make sure to record units with all of your measurements. Be precise in your measuring and accurate with any computations. Bar, line, circle, and leaf-plot graphs are all excellent ways to compare and contrast your data.

If you are designing an engineering project make accurate and precise drawings. Include technical information by labeling all the parts by name, measuring the critical pieces and recording their measures with units. Make sure each drawing has a title. Include all drawings on your project board. (*Note: Drawings, tables/charts, and graphs can be layered on top of each other when taped on the project board*).

6. **RELATIONSHIP-TO-MATHEMATICS, is required on all math projects** - explain any math skills, computations, or processes that were used in your investigation and/or design and engineering process.

7. **CONCLUSIONS** – true statements explaining the results/outcome of your investigation. What evidence did you discover in your experimental trials that supports each statement? Do they support or reject your hypothesis? What problems happened during your experimental trials that may have affected your results, if any? All findings must be explained. Any claims (assertions) you make must be supported by the data recorded in your tables/charts. When applicable, at the end of your conclusions explain why your project is important or what applications it may have to real-life.

All project boards must show the entire investigation process. The students are **not** present during judging, so only the information written and displayed on their project board will communicate what they’ve learned in their investigation to the judges.

Layout the information for the steps above, **in order from 1 through 7** so that they read from the left-side panel across the middle panel and finally down the right-side panel on the board display.
MATH FAIR PROJECT IDEAS

A good math project should solve a problem or answer a question using math skills or principles. Here are some interesting ideas you might want to investigate.

Do numbers and symbols really help people communicate?
What are magic squares?
What are Napier rods?
Is probability affected by the number of sides on a die?
What are triangular and square numbers?
How does temperature affect the state of matter?
Roman Numerals vs. Arabic Numbers, What’s on Your Watch?
Can practicing math facts improve test scores?
Where’s the math in computer languages?
Where is the math in Music?
What are Tangrams?
Stock Market Math
What are “Big Numbers?”
How are fractions used in advertising?
What’s symmetry in nature?
End of Days, When does your calendars end?
Is 666 really a part of every barcode number?
Are there ordered pairs in art?
What is a number’s divisibility?
Switch-on, Switch-off, Binary Number computing
Unplugged calculations, how does an Abacus work?
What are Catalan numbers?
Why have Time Zones?
What are Fibonacci numbers?
That’s the least of your Number Coin problems
Can an Almanac accurately predict the weather?
What is the Golden Mean?
Could there be a North American Euro?
Is your Bank ATM’s, FREE or FEE?
Are some Unit Prices more attractive than others?
Does daylight savings time work for you?
How can you measure a planet?
What in Your Wallet? Cash, Debit, or Credit

What do you want to know? Be different and creative!
SCIENCE FAIR PROJECT IDEAS

PLANTS
How does light affect plant growth?
How does color affect the growth rate of plants?
How does temperature affect seed germination?
Is spacing important when growing radish seeds?
How does magnetism affect the height of bean seeds?
How does acid rain affect the growth of rye grass?
Do different types of soil effect how well a plant grows?
Does how deep you plant a seed effect its rate of germination?
Does salinity affect a plant’s growth?
Does acid rain affect a plants leaves?
What effect do detergents have on growing bean seeds?
Does gravity effect the roots of a plant?
Does temperature effect the ripening time of a banana?

ANIMALS
How does temperature affect the activity of meal worms?
Does the amount of food affect mealworm population growth?
How do different color lights affect an earthworm’s behavior?
How do bright lights affect cricket behavior?
Do background colors affect a chameleon?
What effect does temperature have on goldfish?
How do different levels of salinity affect brine shrimp population?
How do snails respond to different pH liquids?
Do vibrations affect the behavior of ants?
Does the height of a bird feeder change how many birds use it?

HUMAN BODY
Who has bigger hands/feet, boys or girls?
Who is taller, boys or girls?
Who has more lung capacity, boys or girls?
How does vision effect your taste?
How does age effect your reaction time?
How does age effect hearing?
How does age effect smell?
How does exercise change your pulse rate/or blood pressure?
What is the effect of walking/skipping/running on your heart rate?
How does left/right handedness change your reaction time?
How does the amount of light change your vision?
Does color affect how food/beverages taste?
Does listening to different music affect mental performance tasks?
Does watching T.V. affect how fast you complete a puzzle?

EARTH & SPACE
Does the sun rise at the same time/in the same location every day?
Are the hours of daylight and night the same year round?
Does the moon rise at the same time/in the same location every night?
Does freezing change rocks?
Do different soils drain the same amount of water?
How do different types of ground cover effect soil erosion?
What is the effect of the wind on bare soil?
Does temperature effect crystal growth?
Does air temperature effect the evaporation of water?
Does air pollution have an effect on precipitation?
MORE SCIENCE FAIR IDEAS

EARTH & SPACE (continued)
Does the length of a wing change the flight of a paper airplane?
Does soil color effect how it heats-up?
How does the change in season effect the temperature of water?
How does humidity effect evaporation?
Can acid rain effect statues made of stone?
How do shadows change over time?
Does the angle of sunlight effect soil/water temperatures?
Do different surfaces absorb the same amount of energy?

PHYSICAL
What is the effect differently shaped prisms on the production of a color spectrum?
What effect does lens shape have on the refraction of light?
How do color light filters affect perception of color of objects?
How does length, tension, or mass of a guitar string affect the pitch of sound?
How do different solids affect the transmission of sound?
How does the length of a vibrating body affect the sound?
How well do different solids (wood, plastic, metal) conduct heat?
What is the effect of temperature on the volume of air?
What is the effect of heat on different liquids?
Do different insulating materials affect heat loss/gain of water?
How does the color of an object change the amount of heat it will absorb?
Can red cabbage juice measure the pH of household liquids?
How does the strength of a magnet change through different materials (glass, cardboard, paper)?
What is the best shape for a kite?
How is the distance a skateboard rolls affected by the mass of the skateboard?
Does wattage affect the heat from an incandescent light bulb?
Can different fabrics change heat loss/gain?
Does temperature change the height a ball will bounce?
Do the way mini-lamps are connected in a circuit affect the brightness of their bulbs?
Do the number of batteries and the how they are connected affect the strength of an electromagnet?
Do the number of wire wraps around the nail of an electromagnet change its strength?
Does the size of the iron nail of an electromagnet change its strength?
How does the mass of an object affect its buoyancy?

ENVIRONMENTAL (Green)
Does recycling change the amount of wastes that goes to the landfill?
What materials that are thrown away at home could be reused at school for learning projects?
How do oil spills affect feathered animals, furry animals, fish, sand, or shellfish?
Which plant and food wastes breakdown best in a compost bin?
Which native plants attract hummingbirds, butterflies, or more birds into an environment?
Which native plants need less irrigation water and provide more color to a landscape?
What natural remedies are effective at controlling harmful insect that attack garden plants?
What native plants can be introduced into irrigation ponds to promote aquatic habitats?
What steps can be taken at home or school to reduce the trash sent to the landfill?
What can you do to reduce electrical energy consumption in your home or school?
What can be done to stop wasting water at home or school?
ENGINEERING DESIGN PROJECT IDEAS

FLIGHT ENGINEERING

Design, test, and improve -
- ways weight (ballast) can be used to balance longer wing length to achieve the longest flight of a model airplane
- the wing span of a fixed propeller model airplane to increase its flight air time
- different launch guide systems, vertical, 45 degree, and horizontal, to get the maximum flight distance out of a balloon rocket
- different propulsion gases, like air and helium, to see which produces a longer balloon rocket flight
- alternative egress (escape) methods out of an aircraft
- an air powered model hover craft
- safety restraint designs for infants traveling on aircrafts
- sound separation systems to separate adult air passengers from crying babies
- comfortable seating for longer flights

WASTE RECYCLING ENGINEERING

Design, test, and improve -
- a system to insure all paper, plastic and/or aluminum cans are being recycled properly
- a trash can that maximizes the volume (space) that recyclables such as paper, plastic, aluminum take up
- a trash can that motivates kids to sort recyclables properly
- new ways to reuse commonly wasted materials so they don’t take up space in our landfill
- a system to reuse or recycle school supplies so they aren’t wasted
- a way to keep people from disposing of harmful liquids and solids down the sink drain
- a way to reuse old school uniforms
- inexpensive and safe ways to compost vegetation and/or food scraps back into soil

MECHANICAL ENGINEERING

Design, test, and improve -
- your favorite furniture
- your favorite sports equipment
- ways to crush balky plastic recycling to save trash container space
- easy, safe ways to mount you favorite music player to your bike
- a soap container that quickly cleans garden tools
- a wind powered device that moves water up hill
- a rubber band powered cart or train (connected carts)
- a steam powered model boat or car
- a hand powered coin sorter
- a mechanical arm that throws balls to a hitter
- a prosthetic device that allow a handicap person to participate in a sport
- a Ping-Pong ball throwing catapult

ENERGY CONSERVATION ENGINEERING

Design, test, and improve -
- a portable solar powered chocolate s’more cooker
- an LED clock powered by a fruit or veggie battery
- a mega strong electromagnet
- a rechargeable electricity storage cell (capacitor)
- a hydro-electric powered paper cutter
- a wind powered LED light reading visor
- a solar powered personal fan for a baseball cap
- a hydrogen cell powered speed racer
- a solar powered speed racer
THE CLASSROOM TEACHER’S ROLE
The most important part of the classroom teacher’s role is to model the process and coach their students how to create testable questions. Classroom teachers should provide all the appropriate oversight, guidance, and support the learner’s need to succeed. The checklist below lists the classroom teacher’s responsibilities.

✔ Model the math and science fair process.
✔ Provide learners with topic ideas and other idea resources.
✔ Assign individual projects.
✔ Make certain each idea is appropriate for the learner’s grade level and skills.
✔ Approve any animal or human subject experiments.
✔ Explain the timeline and chunk any assignments by due date.
✔ Inform the parents of all expectations and keep them in the communication loop.
✔ Provide materials, tools, and an appropriate place to work *(if necessary)*.
✔ Provide ongoing instruction and support with fidelity.
✔ Show learners how to organize and lay-out their project board.
✔ Check the spelling, grammar, skill, accuracy, and content for completeness.
✔ Assess the learner’s performance.
✔ Enter completed projects into your School Fair.

THE PARENT’S ROLE
Parents play an important role in their child’s success in completing a project. The following checklist will assure parents they are not doing too much.

✔ Discuss the learning expectations of the project with your child.
✔ Review the timeline and assignment due dates.
✔ Provide any materials, tools, or resources they need to complete the project.
✔ Set a time and quiet place to do the work.
✔ Encourage your child to do their best and monitor their progress.
✔ Only assist them in completing their assignment, **DO NOT DO THE PROJECT FOR THEM.**
✔ Check their spelling, grammar, skill, accuracy, and content for completeness.
✔ Help them to plan and organize the project board layout before gluing anything down.
✔ Tell them only paper, pictures, and graphs can go on their boards, **no other objects.**
✔ Help them with suggestions, **DO NOT DO THE BOARD FOR THEM.**
✔ Help deliver their projects to school safely by the due date.

REMEMBER!
The project board tells the judges everything that took place in the project investigation process. Students may **not** be present to explain their work at the School Fair competition and will not be present at the District Fair competition. So, it is very important to include everything needed to clearly understand the project. **No research papers, logs, or notebooks are scored at the District competition and should not be display. No models, parts, equipment, or samples are allowed.**
HELPFUL HINTS FOR STUDENTS

Math, Science, and Engineering Fair is a competition. Your project should show what you’ve learned in your investigation. You will learn how to identify a problem, write a hypothesis, and test your hypothesis with an experiment you design and develop. You should observe your variable and your controls, make measurements, and record the data as you repeat your experiment three times. You should organize all your data in tables and analyze the results. Plot and graph the data to compare and contrast your findings if possible. Then write your conclusions explaining what you have learned by doing the project on your display board. Make sure to only make claims that are true, and match them to evidence (data) you’ve observed and recorded in your experimental trials. Write your conclusions in complete sentences.

You can track your progress using the check list below.

STUDENT CHECK LIST

☐ Pick an interesting topic you want to learn more about. Submit your plan for approval to your teacher. Read and follow your teacher’s suggestions and safety precautions carefully.

☐ ALL PROJECTS INVOLVING ANIMALS NEED TO BE APPROVED BEFORE EXPERIMENTING begins.

☐ ALL HUMAN SUBJECT EXPERIMENTS NEED TO BE APPROVED BEFORE EXPERIMENTING begins.

☐ Write your purpose. State what problem (or question) you are going to investigate.

☐ Research your topic. Use your textbook and the internet to read more about your problem. Think about an experiment you could do to learn more about your problem.

☐ Write a hypothesis. Explaining what you are trying to test in your experiments.

☐ List the materials. Make a list of the things you use to do your experiment. Use measuring tools if to make some of your observations and record them in tables in your notebook.

☐ Plan your experiment. Write a step-by-step procedure (recipe). Think of all the things you will “observe that change” in your experiment. These things are called variables (things that change). Pick one that you think supports your hypothesis and develop a procedure to test it.

☐ Next, think about all the “other variables” in your experiment that could change. Develop steps to keep them from changing? Record how you will measure and monitor them. The variables you keep from changing in your experiment become your controls (variables that do not change). An experimental test procedure has one variable that will change and all the other variables are controlled.

☐ Begin your investigation. As you run your experimental test trials, observe all the changes that happen to your test variable. Record everything you observe in a log book. Keep accurate and precise measurements of what happens (quantitative observations). Organize your data in tables.

☐ Describe any other changes you observe using all your senses. What do you see, hear, smell, feel, or taste? (qualitative observations) Record everything you sense and measure.

☐ Repeat your experiment with fresh materials at least 3 times (trials). Record each set of data for each additional experimental trial. Don’t change anything in your procedure.

☐ Organize your data into tables. Add units to all your number data across all 3 trials. Plot and Graph any data you can to visually compare and contrast what has happened. Explain any trends (patterns) you see in your graph.

☐ Record your conclusions. Do your results support your hypothesis? If not, why not? Don’t change you data, just explain your results. What claims can you make based on the data? It’s not about right or wrong, it’s about what your data supports or rejects. Report your results truthfully. Just list the facts.

☐ Match each claim (true statement) with evidence (data) you recorded. Explain the data that supports each claim. Describe why your results are important, what they mean, and why they are significant. You may also explain how the problem you investigated applies to real-life.
DISTRICT FAIR COMPETITION RULES
PBC DISTRICT ELEMENTARY MATHEMATICS AND SCIENCE FAIR

All project boards must have the following labels in order from left to right with explanations to be certified for judging at the District Fair. School Fairs should use the District Judging Criteria (p. 23) and Math and Science Project Score Sheets (pp. 29-30) for a successful transition from School to District Fair.

**Purpose** is a statement or question explaining what you are investigating.

**Hypothesis** is a prediction that can be tested by conducting an experiment.

**Materials** are a list of all the equipment and materials you plan to use in your experiment.

**Procedure** is a list of all the steps in your experiment in the exact order you performed them.

**Data** a written record of all the observations and measurements you make during your experimental trials. Take photographs showing the changes you observe, but not of the investigator or subjects faces. Run the experiment with fresh materials three (3) times and/or use three (3) test samples.

Graphs (or technical drawings) that visually comparing and contrasting the data you have collected, trends you identify, or improvements you’ve made. Record all measurements with units. Organize the data from all 3 experimental trials in Data Tables. Tables, graphs, and technical drawings can be taped at the top in layers to save space on the project board (no staples please).

**Relationship to Mathematics** is required on all math project boards explaining all the math skills, calculations, principles or processes used in your investigation

**Conclusion** explaining the results of your investigation using your recorded data, matching any statements (claims) you make, to the data (evidence) you recorded that which supports them.

**NO BACTERIA, VIRUSES, MOLD, OR PRESERVED SPECIMEN PROJECTS ARE ALLOWED.**

**NO BODY PARTS, DISSECTIONS OR AUTOPSY PHOTOS ARE ALLOWED.**

**PROJECTS INVOLVING LIVE ANIMALS MUST BE PRE APPROVED BEFORE EXPERIMENTS BEGIN.**
Experiments that involve living invertebrate and vertebrate animals must not injure, harm, or kill the animal. Approval by the parent, teacher, and school coordinator must be granted before experimenting (see the Animal Approval Form, pg. 20).

**PROJECTS INVOLVING HUMAN SUBJECTS MUST BE PREAPPROVED BEFORE EXPERIMENTS BEGIN.**
All human participants involved in an experiment must know what the experiment involves and agree to participate. Approval by the parent, teacher, and school coordinator must be granted before experimenting (see the Human Approval Form, pg. 21).

**NO LABORATORY GRADE CHEMICAL SUBSTANCES CAN BE USED WITHOUT ADULT SUPERVISION.**
This includes grocery store compounds (i.e., alcohol, oxides, strong acids, bases or flammables). Any questionable chemicals should be approved by the District Fair Reviewed Committee before any experimenting begins.

Each project registered by the School Coordinator in the District Fair will be examined and certified for judging and display by the District Fair Certification Committee (see the Certification Checklist on page 19).

Individual projects must win 1st or 2nd place in a School Fair before being entered into the District Fair competition. One ribbon will be awarded to any District Fair winner.

Class projects must win 1st place in the School Fair competition before being entered in the District Fair competition.

Team projects cannot exceed 4 students and must win 1st or 2nd place in a School Fair before being entered into the District Fair competition. One ribbon will be awarded to each winning team member at the District Fair.

Both School Coordinators and District Committee Leaders have the right to prohibit the display and judging of any projects that do not comply with the rules or that are determined unsafe or inappropriate for elementary audiences.
Students may only enter one project per division, math or science, in the District Fair. Projects must be entered in the student’s current grade-level. Any projects intentionally entered incorrectly will not be awarded ribbons.

Student, teacher and/or school name labels may only be placed on the back of the center panel, of the project board. Projects with student and or school name anywhere else will not be certified.

No photographs can show student faces at the District Fair competition. Projects that show student faces will not be certified.

Photographs of the experiment, data samples, measurements, and or improvements done in the investigation are permitted on the display board.

Project boards must be 36" H x 48" W and should be free-standing, cardboard which shutter fold to the center (Office Depot #434415 and department stores). Any other size board will not be certified.

Boards must close flat and cannot have anything sticking out of the top, bottom, or sides of the board or they will not be certified.

Only paper and pictures are allowed on the project boards.

Only glue and tape should be used to secure the paper or pictures.

No objects can be displayed in front of the project board at the District Fair.

Data logs, notebooks, or research papers not glued or taped to the project are not allowed.

Project boards entered in the District Fair must be self-supporting (able to stand vertically by themselves).

No headers or other extensions added to the board are allowed.

An English Translation Form (p. 28) must be attached to any project written in any language other than English, to be certified for display or judging at the District Fair. Foreign language projects without English translation sheets will not be certified.
DISTRICT FAIR COMPETITION RULES (continued)
PBC DISTRICT ELEMENTARY MATHEMATICS AND SCIENCE FAIR

The following are **NOT ALLOWED** at the Elementary District Fair and will result in a project **NOT** being certified for display or judging.

- mold, bacteria, or virus projects
- animal projects without an **Animal Approval Form** (see pg. 20)
- human subject projects without a **Human Approval Form** (see pg. 21)
- preserved specimens, body parts, taxidermy, dissections or autopsy photos
- dirt, soil, minerals, rocks, or compost samples
- any solid, liquid, or gas chemical or compound samples (including water)
- any food of any kind (human or animal - including candy, snacks or treats)
- any sharp objects of any kind
- any medicines, vitamins, poisons (including plants), or drugs of any kind
- dry ice or other inappropriate solid, liquid, or gas
- flammable substances, candles, lamps, burners or other heating devices
- batteries of any kind
- real money, coins, or currency of any nation
- plastic, wood, metal, fabric, foam or any material that keeps the project board from closing flat
- awards, ribbons, medals, or certificates from any other competitions
- photographs showing student faces (experimenters or subjects)
- student or school names on the front or side panels
- project board over or under 36 inched high by 48 inches wide
- headers or anything sticking out of the sides or bottom of the project board
- display board that does not lay flat when closed
- any materials deemed unsafe or inappropriate by the District Fair Committee
- papers, log books, pictures or objects NOT attached to the display board
- staples, clips, push pins, brads, nails or tacks
- chemical substances of any kind

The Elementary District Fair Committee reserves the right to disqualify any project considered unsafe or inappropriate from judging and remove it from public display.

Students, parents, and teachers are responsible for checking their display boards before registering them into the District Fair competition to make sure they comply with the rules and have all the appropriate forms needed for certification.
PROJECT CERTIFICATION CHECK LIST

The following check-list was developed from the competition Rules and Handbook of the Palm Beach County School District Elementary Mathematics and Science Fair. Please check each project board you have registered to make sure they will pass certification.

✓ Animal Approval Form for all live animal experiments. (p. 20)
✓ Human Approval Form for all projects involving human subjects. (p. 21)
✓ PURPOSE / Ask* - statement or question explaining what you are investigating.
✓ HYPOTHESIS / Imagine* - a prediction that can be tested by conducting an experiment.
✓ MATERIALS - a list of all the equipment and materials you plan to use in your experiment.
✓ PROCEDURE / Plan* - a list of the steps in your experiment in the exact order you performed them.
✓ DATA / Create* - a written record of all the observations and measurements you make during your experimental trials. Graphs (or technical drawings) that visually comparing and contrasting the data you have collected, trends you identify, or improvements you’ve made.
✓ RELATIONSHIP to MATHEMATICS - explaining all the math skills, calculations, principles or processes used in your investigation - must be on all math project boards.
✓ CONCLUSION / Improve* - an explanation of the results of your investigation using your recorded data, matching all the statement (claims) you make, to the data (evidence) you recorded that which supports them.

✓ Project Board Size Must Be 36” High, 48” Wide.
✓ Project Boards Must Lay Flat when closed, and cannot have anything sticking out of the top, bottom or sides.
✓ Pictures and paper should be attached with tape or glue, NO STAPLES.
✓ No Unsafe or NOT ALLOWED items on the project board. (Check the NOT ALLOWED items list for items that could disqualify your project on page 18.)
✓ No Inappropriate Content of a sensitive nature or unsuitable for public display.
✓ Any student and/or school names (or labels) can only be on the back of the center panel of the display board.
✓ No photographs of student faces, investigator or subjects are allowed on the project board.
✓ English Translation Form glued or taped on any projects not written in English. (p. 28)

*Ask, Imagine, Plan, Create, and Improve labels may be added to any engineering projects in addition to the standard project board labels.
ANIMAL APPROVAL FORM
REQUIRED FOR ALL INVESTIGATIONS INVOLVING ANIMALS

School: ________________________________________ Today’s date: _____ / ____ / _______
Coordinator: ___________________________ Work email: _______________________________
Teacher: _______________________________ Work Email: _______________________________
Parent: ________________________________ Email: ____________________________________
Student(s): _____________________________________________________ Grade level: _______
Project Title: _____________________________________________________________________

<table>
<thead>
<tr>
<th>Type:</th>
<th>Math</th>
<th>Science</th>
<th>Individual</th>
<th>Team</th>
<th>Category:</th>
<th>E.S.E.,</th>
<th>E.L.L.,</th>
<th>Regular,</th>
<th>Gifted</th>
</tr>
</thead>
</table>

Type of animal(s) being tested __________________________________________ How many? ______

Where will this experiment be done? _______________________________________

Start date: ___ / ___ / _____ End date: ___ / ___ / _____ Adult supervisor ______________

Describe the normal diet of the animal(s) __________________________________________

Describe the housing and care of the animal(s) ______________________________________

What will happen to the animal(s) after the experiment? _____________________________

(add more pages if needed)

Purpose ____________________________________________________________

Hypothesis (expected result) __________________________________________

Materials (equipment used) __________________________________________

Procedure (Describe the activities with the animal, how the equipment is used, any safety precautions, and identify who is providing oversight) __________________________

Parent __________________________________ Teacher __________________________
I have reviewed and give my consent and supervision I have reviewed and discussed safety precautions with student

Coordinator __________________________ Date ___ / ___ / _______
I have reviewed and approved with these conditions

APPROVED with the following conditions
☐ No harm comes to the test animal(s)
☐ Student investigator follows all suggested safety precautions
☐ All test animal(s) continue their normal diet and rest

NOT APPROVED because
☐ to much risk to the animal(s)
☐ procedure needs a veterinarian’s approval
☐ procedure needs a qualified scientist’s approval
**Human Approval Form**

**Required for all investigations involving human subjects**

School: ___________________________ Today’s date: __/__/____

Coordinator: ___________________________ Work email: _______________________________

Teacher: ___________________________ Work email: _______________________________

Parent: ___________________________ Email: _______________________________

Student(s): ___________________________ Grade level: _______

Project Title: ___________________________________________________________________

Type: [ ] Math [ ] Science [ ] Individual [ ] Team

Category: [ ] E.S.E., [ ] E.L.L., [ ] Regular, or [ ] Gifted

How many test subjects are needed? ___________________________ What ages? ___________________________

Where will this experiment be done? ___________________________________________________________________

Start date: ___/___/____ End date: ___/___/____ Adult supervisor ___________________________

Describe everything ingested or inhaled.

Describe any physical activity involving the subjects.

☐ I have attached all surveys or questionnaires I will be using. (add extra pages if needed)

**Purpose**

___________________________________________________________________________________________

**Hypothesis (expected result)**

___________________________________________________________________________________________

**Materials (include any food or drink or items to smell, touch, taste or eat)**

___________________________________________________________________________________________

**Procedure (describe all activities with the subjects, how materials and equipment are used with them, include any safety precautions, surveys or questions, and identify who is providing oversight)**

___________________________________________________________________________________________

___________________________________________________________________________________________

___________________________________________________________________________________________

(Add extra page if needed)

Parent ___________________________ Teacher ___________________________

I have reviewed and give my consent and supervision

I have reviewed and discussed safety precautions with student

Coordinator ___________________________ Date ___/___/____

I have reviewed and approved with these conditions

**Approved with the following conditions**

☐ Student explains test procedure to all test subjects

☐ Test subjects agree to be tested

☐ Student subjects need a parental permission slip

**Not approved because**

☐ unsafe for test subjects

☐ procedure needs to be revised

☐ materials pose potential risks to test subjects
### ENGLISH TRANSLATION FORM

School coordinators must translate any foreign language project information into English. Tape this Translation form over the Purpose on the project display board. You may add additional pages if needed.

**Purpose**

________________________________________________________________________________
________________________________________________________________________________

**Hypothesis**

________________________________________________________________________________
________________________________________________________________________________

**Materials**

________________________________________________________________________________

**Procedure** *(add additional pages if needed)*

________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________

**Observation Data**

________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________

**Relation to Mathematics** *(math projects only)*

________________________________________________________________________________
________________________________________________________________________________

**Conclusion**

________________________________________________________________________________
A **Purpose** is a statement explaining what you are trying to investigate. It can also be written as a question. You can also use all or part of your purpose statement/question as the title of your project.

**The Hypothesis** is a prediction that can be tested by conducting an experiment. It uses the information you collect about your purpose to explain the observations made before, during, and after doing your experimental test trials.

**Materials** are a list of all the equipment and materials you use in your investigation. List each item by quantity. Use metric tools, measures with units when possible (customary English measuring tools, and measures with units will also be accepted).

**The Procedure** is a list of all the steps in your experimental trials, in the exact order you perform them. Be clear, but keep it simple. Other scientists should be able to replicate your experimental results by following the same procedures.

**Data** is a written record of all the observations and measurements made in your experimental trials organized in tables or charts. It is important to record everything that takes place. Record qualitative and quantitative descriptions and measurements with units. Run a minimum of 3 trials that follow the same procedure. If testing samples, test each sample a minimum of 3 times as well.

**Relationship to Math** is required on all math projects. Explain any math skills, computations, or processes that were used in your investigation.

**Conclusion** are true statements explaining the results/outcome of your investigation. What evidence did you discover in your experimental trials that supports each statement? Do they support or reject your hypothesis?