THE SCHOOL DISTRICT OF PALM BEACH COUNTY

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Chad Phillips, Science
SCHOOL FAIR CALENDAR OF EVENTS

STUDENT PROJECTS ARE DUE

OUR SCHOOL FAIR IS

PARENTS CAN VIEW PROJECTS

DISTRICT FAIR CALENDAR OF EVENTS

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>Schools Set Up School Projects</td>
<td>12:00 p.m. - 4:00 p.m.</td>
</tr>
<tr>
<td>May 6, 2013</td>
<td>Judges’ Reception Dinner &amp; Project Judging</td>
<td>5:00 p.m. - 8:00 p.m.</td>
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<tr>
<td></td>
<td>DISTRICT FAIR CLOSED</td>
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</tr>
<tr>
<td>Tuesday</td>
<td>School Field Trips</td>
<td>9:00 a.m. - 1:00 p.m.</td>
</tr>
<tr>
<td>May 7, 2013</td>
<td>DISTRICT FAIR OPEN</td>
<td>9:00 a.m. - 7:00 p.m.</td>
</tr>
<tr>
<td>Wednesday</td>
<td>School Field Trips</td>
<td>9:00 a.m. - 12:00 noon</td>
</tr>
<tr>
<td>May 8, 2013</td>
<td>DISTRICT FAIR OPEN</td>
<td>9:00 a.m. - 12:00 noon</td>
</tr>
</tbody>
</table>

Coordinators Pick-up Projects and Return Them to School 1:00 - 5:00 p.m.
Dear Parent/Guardian:

Your child will soon have the opportunity to compete in our school’s Mathematics and Science Fair. I will assist them by providing suggestions of project ideas and modeling the project procedures. I encourage you to provide your support to this process also.

Completing a project can be a memorable experience for your child. The Mathematics and Science Fair is an adventure in learning, and the development of a project is an excellent activity for applying your child’s understanding of math and science.

Your child should select a project appropriate for their age and grade level. You should assist them by providing encouragement, praise, necessary materials, and a quiet place and time to complete their work. Your child may ask you to take them to the public library to research their project ideas. Please limit your involvement in their investigation process to encouraging your child to predict, experiment, and draw conclusions on their own. Emphasize the mathematical or scientific thinking and process skills they should use.

All District Fair project display board should measure 36" (high) x 48" (wide), must be self-supporting and should be made of standard cardboard. Science fair display boards are available in the school book store. District displays should not exceed these dimensions. Please remind students that certain items are not permitted on the display boards such as food, candy, medicine, vitamins, soil, plants, money, chemicals, mold or bacteria cultures, and animal pieces or parts. A complete list of the competition, safety and security rules are included in this guide for you to review.

I look forward to seeing what questions your child will be investigating!

Sincerely,
TYPES OF PROJECTS

Math
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, 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
A science projects consists of all the activities used to investigate a problem, explore an idea, and apply science skills and concept. It must include a purpose, hypothesis, experimental procedure, data tables, graphs, and a conclusion. It should show a record of all the data (evidence) collected in the experiments in tables or charts, and compare or contrast any trends in graphs. A written conclusion with claims supported by evidence 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.

Both math and science fair project boards should include all the following steps:

1. **Purpose** - a (problem) statement describing what you are trying to discover. It should be written in the form of a question. You can also use the problem statement as the title of your project. Collect as much information as you can about your project. Spend some time in the library or on the internet learning more. Your research should help you understand your question a little better and help you predict your experiment’s results.

2. **Hypothesis** - a prediction that can be tested by conducting an experiment. A hypothesis is an informed guess. Use the information you’ve collected about your question to predict the outcome of your investigation before doing your experiments.

3. **Materials** - a list of all the equipment and supplies you plan to use in your experiment. It is best to list the items by quantity, in column form. Use metric tools and measures if possible.

4. **Procedure** - a list of all the steps for your experiment in the exact order you will perform them. Be clear, but keep it simple. Other people should be able to repeat your experiment by following your procedure steps.

   In every experiment there is a control group. The control group has no changes added. You will use the control group data after the experiment to compare your results. List the part(s) of your experiment you will use for your controls.

   Anything in your experiment that changes in order to solve your problem statement is a variable. Pick one variable to test and control all the other variables keeping them the same in each trial.

   After writing your experiment on paper, show it to your teacher. If your teacher approves it, you are now ready to begin experimenting.

5. **Data** – a record of all the observations and measurements made in your experiments. It is important to record everything that takes place. Keep a record of all the observations and measurements you gather. The data should be kept in a notebook. Take photographs showing your data, not the investigator (student). When you have finished your experiment, run it again using fresh materials. The more you repeat it, the more accurate your results will be. Run three (3) trials and/or samples minimum.

6. **Tables & Graphs** – visuals comparing and contrasting the data and showing trends. The data you collect should be organized into tables so it is easy to understand. Record all measurement with their units. Be precise and accurate with any calculations. Then average the data trials and graph them using the most appropriate type of graph (bar, line, circle, or leaf-plot) to show any trends.
TYPES OF PROJECTS (continued)

7. Relationship-to-Mathematics – explain all math skills, calculations, or principals used in the investigation. This step is required on all math fair project boards, but can also be included on science project boards. It should explain, in writing, any math skills, calculations, or principals used to justify the findings of the investigation from a math perspective.

8. Conclusions – stating if your results agree or disagree with your hypothesis and explaining how. Begin your conclusion stating in writing if your results agreed or disagreed with your hypothesis. Write about any problems that happened during your experiment that may have affected the results. All findings should be explained. Any claims should be supported by the data (evidence). If possible, at the end of you conclusions explain how your project contributes to real-life situations. This is called your application.

All project boards should show the entire investigation process. The students are not present for judging, so only the information written and displayed on their project board communicates their understanding to the judges.

The layout of the information on the project board should follow the same order of the steps above and should read from left panel to right panel of the project board display.

CHOOSING A TOPIC

Original project ideas grow out of individual interests and should be chosen by the learner themselves. Proper topic selection should appropriately reflect the learner’s grade-level, skills and ability. Expectations should be rigorous yet enjoyable for the learner. Parents can quick-start the process by using the Math and Science Fair Project Ideas and suggestions in this handbook.

Choosing a topic can be difficult for the learner. Engage them by asking, “What questions are you wondering about?” Suggest possible question after science or math lessons. For example -

<table>
<thead>
<tr>
<th>Mathematics</th>
<th>Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are odd and prime numbers alike?</td>
<td>How does light affect _____?</td>
</tr>
<tr>
<td>What is divisibility and how can it help ___?</td>
<td>Does color affect _____?</td>
</tr>
<tr>
<td>Are all rectangles the same?</td>
<td>How does freezing affect _____?</td>
</tr>
<tr>
<td>What’s the probability of scissors, rock, &amp; paper?</td>
<td>Does pollution affect precipitation?</td>
</tr>
</tbody>
</table>

Recording their inquiry questions routinely can help learners select a project topic they can investigate independently. Asking guiding questions can help them develop their topic into a project. Below are some example guiding questions to use throughout the process.

- What predictions could you test? *(Hypothesis)*
- What materials and tools will you need to test it? *(Materials)*
- What steps should you follow in your experiment? *(Procedure)*
- What “changes” *(variables)* should you look for? *(Observations)*
- What should “stay the same” *(control)* in your experiment? *(Observations)*
- What metric tool(s) can you use to measure your results? *(Collecting Data)*
- What measurements and observations should you record? *(Recording Data)*
- Should you record your data in a table or log? *(Organizing Data)*
- How can you compare, contrast or graph your data? *(Analyzing Data)*
- What claims can you make from your data? *(Drawing Conclusions)*
- What data *(evidence)* supports your claims? *(Drawing Conclusions)*
- How should you display your work so the judges know what you discovered? *(Layout)*
Choosing a Topic (Continued)

To promote questions and provide ideas for areas of interest, try the following techniques:

✦ Take a new look around you. Involve the learner in a brainstorming session. List suggestions of familiar places, people, and things that might inspire a project like
  • hobbies or free-time activities
  • look in the refrigerator, under the sink, in the garage, etc.
  • look in the backyard, schoolyard, neighborhood, park, or vacant lot
  • look at pets, wildlife, insects, plants, etc.
  • look around while going places on your bike, in the bus or car
  • look through magazines, advertisements, newspapers, books

✦ Check the idea bank. Allow learners to contribute to an “idea bank/resource center.”
  • bulletin board - combine words and picture collages of subjects to spark ideas
  • collect and post ”I wonder ...” questions
  • share vetted elementary science and math project website resources
  • show student investigation videos or DVDs

✦ Help! I still can't decide. Some learners will still need additional suggestions. Utilize the following:
  • books of experiments from the school media center
  • lists of specific projects for alternative curriculum resources
  • parent-student discussions, brainstorming sessions or conferences
  • Internet website searches

As soon as a learner chooses an idea, it should be thought through carefully. The procedural steps should be enumerated and a timeline for completion should be developed. The timeline should be feasible and one that establishes a comfortable working pace for project and exhibit completion. By identifying possible problems or pitfalls during the planning stage, the timeline can be adjusted to accommodate extra time if needed.

During this time, the learner may wish to discuss plans with other people. Discussing an idea with someone else often gives a new or clearer perspective. The expertise of family members, community and business representatives, teachers, professionals, and other students can enhance the learner’s understanding and help to fine-tune the project. The comments, constructive criticism, and suggestions of others, enhance the learner’s depth of understanding and can help assess their progress during all stages of their project’s development.
SUPPORT AND GUIDANCE

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 project’s expectations with your child
- Review the timeline and assignments with them
- 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
- Tell 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 only with suggestions, DO NOT DO THE BOARD FOR THEM
- Help them get 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 cannot 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 will be removed from display. No models, parts, equipment, or samples are allowed.

HELPFUL HINTS FOR STUDENTS

The school Math and Science Fair is a competition. Your project should show what you learned in your investigation. It will be judged along with other projects submitted by other students in your grade level at your school.

You will learn how to conduct an investigation, make a hypothesis and test it by doing an experiment you design. Then you will present your findings on a project board that explains the results of your experiment.

Track your progress by checking off each step you complete. (See checklist on next page)
STUDENT CHECK LIST

☐ Follow all the District Fair Rules.

☐ Pick an interesting topic you want to learn more about.

☐ Write your purpose. State what you are trying to discover in the form of a question.

☐ Research your topic. Use books and the internet to read more about your topic idea. Think of an experiment you could do to learn more about your question.

☐ Write your hypothesis. Predict what you think will happen when you do your experiment.

☐ List your materials. Make a list of the things you will need to do your experiment. Use metric tools if possible to measure some of your observations.

☐ Plan your experiment. Write a list of the steps you will follow to do it. Think about one variable you want to observe changing in your experiment. Place controls on all the other variables so they DO NOT change as you experiment. This will help you explain your results later.

☐ Submit your plan for approval to your teacher. Read and follow their comments or suggestions.

☐ Begin your experiment. Follow any safety instructions carefully. Record your observation data in your notebook until you are done experimenting.

☐ Now repeat your experiment using fresh materials at least two (2) more times. Record a second and third set of observation data for each additional experiment. Don't change anything.

☐ Organize your data into tables. Average your trial measurements. Graph the averaged data to see if any trends appear.

☐ Write your conclusions. Do your results agree or disagree with your hypothesis? What claims can you make? Explain how your data supports each claim. If possible, end by explaining how your results might contribute to a real life situation.

☐ Assemble your project. Use the Sample Board Labels and Project Boards as a guide.

☐ Hand in your project by the due date. First and second place School Fair winners can advance to the District Fair competition.
DISTRICT FAIR COMPETITION RULES
PBC SCHOOL DISTRICT ELEMENTARY MATHEMATICS AND SCIENCE FAIR

All project display boards must have the following labels and their explanations to be certified for judging at the District Fair.

**Purpose** - a *(problem)* statement describing what you are trying to discover.

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

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

**Procedure** - a list of all the steps for your experiment in the exact order you will perform them.

**Data** - a record of all the observations and measurements made in your experiment. Only take photographs showing your data, not the investigator *(student)*. Run the experiment using fresh materials a minimum of three (3) times or use a minimum of three (3) samples.

**Tables & Graphs** - visuals comparing and contrasting the data and showing trends. Record all measurements with their units. Average the data trials and graph them to show any trends.

**Relationship to Mathematics** - MUST BE ON ALL MATH PROJECTS explaining all math skills, calculations, or principles used in the investigation.

**Conclusions**

Explain the results of the project using the recorded data - *write any claims you can make and support each claim with evidence based on the observational data you recorded.*

School and District coordinators reserve the right to prohibit the display of any project that does not comply with the rules or that is determined unsafe or inappropriate for elementary audiences.

Each project registered by a school coordinator, parent, or group in the District Fair will be examined and “certified for judging and display” by a District Fair certification committee member.

Any student in grades K-5 enrolled in a public, private, home, or virtual school in Palm Beach County may enter an individual project completed during the current school year. Individual projects must win or place in a School Fair before being entered into the District Fair competition if possible.

Classroom teachers, grades K-3, enrolled in a public, private, or home school organization may enter a class project completed during the current school year. Class projects must win in a School Fair competition before being entered the District Fair competition if possible.

Students may only enter one project per subject area, math and/or science, in the District Fair. Students in grades K-5 can submit individual projects completed during the current school year.

In grades 3-5, projects must be the student’s own work. Adults, including teachers, tutors, and parents may only advise, provide constructive criticism, encourage, or supervise them.
DISTRICT FAIR COMPETITION RULES (continued)
PBC SCHOOL DISTRICT ELEMENTARY MATHEMATICS AND SCIENCE FAIR

No student or school name may be on the front of the project board at the District Fair. Teacher and school name labels may only be placed on the back of the project board.

No photographs that show student’s faces are permitted and should be removed before entering the District Fair competition. Photographs of the experiment, data samples, or measurements used in the investigation are permitted on the display board.

Project displays cannot be larger 36" H x 48" W and should be mounted on a free-standing, cardboard project board (available at most office supply stores).

Only paper and pictures are allowed on the project boards. No 3 dimensional objects, money, food, parts, pieces or samples can be mounted on the project board. Please only use glue, not staples that can cut the hands.

No objects can be displayed in front of the display board at the District Fair including models, sample data, log books, notebooks or research papers. Only the required items on the board will be judged.

Project boards entered in the District Fair must be self-supporting (able to stand vertically themselves). Use of the floor or walls for projects, signs, posters, charts, etc. is prohibited at the District Fair and will result in disqualification.

An English Translation Form must be attached to any project written in any language other than English entered in the District Fair.

Project boards should not include any items which might be easily removed or become dangerous to the public.

NO BACTERIA, VIRUSES OR MOLD GROWTH PROJECTS ARE ALLOWED AT THE ELEMENTARY LEVEL OF SCIENCE FAIR COMPETITION. Due to allergy, contagion, toxicity and health and safety concerns established by the Florida Department of Education, student projects involving potential pathogens must be conducted at state registered clinics under the supervision of certified technicians that provide full liability insurance.

NO PRESERVED VERTEBRATE ANIMALS, BODY PARTS, DISSECTIONS OR AUTOPSIES. Procedures involving live vertebrate animals (amphibians, reptiles, fish, birds, or mammals) must first be approved by the school fair coordinator or committee before any student experimentation begins. Only evidence of humane treatment can be displayed in writing, drawings, pictures, charts, or graphs on a project board.

NO LABORATORY GRADE CHEMICAL SUBSTANCES CAN BE USED WITHOUT ADULT SUPERVISION. Grocery compounds (i.e., baking soda, vinegar, salt, lemon juice, etc.) are appropriate. See the Elementary Science Safety Guide for an appropriate chemicals list for elementary investigations.

NO PHOTOGRAPHS THAT SHOW STUDENT FACES. Projects involving human test subjects should be approved for safety before experimentation begins.
The following objects or items are **NOT ALLOWED**.

- living or dead organisms (*plant or animal*)
- preserved specimens, body parts, or taxidermy
- dirt, soil, mineral or compost samples
- any solid, liquid or gas chemical samples (*including water*)
- any food (*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 sublimated solid, liquid or gas
- flammable substances, candles, lamps, burners or other heating devices
- batteries of any kind
- real money, coins or currency
- awards, ribbons, medals or certificates from other competitions
- photographs of student faces
- any unsafe or inappropriate materials

The District Elementary Fair Committee reserves the right to remove any project(s) considered unsafe or inappropriate for public display prior to judging.

**SPECIAL AWARD CATEGORIES**

Ribbons are awarded in each grade level however; student’s that do projects with the following themes could also win additional awards at the District Fair competition.

**PALM BEACH FLIGHT SAFETY INTERNATIONAL**

**Aviation Award** – individual math or science projects from grades 3-5 with a "flight or flight safety concept theme." Three awards available, first, second and third place.

**PALM BEACH SCIENCE EDUCATORS ASSOCIATION**

**Green Project Award** – individual math or science projects from grades 3-5 with a "reduce, reuse, or recycle concept theme." Three awards available, first, second and third place.

**UP-N-RUNNING MACHINERY INC.**

**Physical Science Award** – individual math or science projects from grades K-5 with a "physical science, machine or engineering concept theme." Three awards available, first, second and third place.

**FLORIDA POWER & LIGHT**

**Energy Award**  individual math or science project form grades K-5 with an “energy conservation theme.” Three awards available, first, second and third place.
TOPICS FOR MATHEMATICS FAIR PROJECTS

A math project should focus on the mathematical process and computation skills in the investigation. The mathematical process includes comparing quantitative data, measurement, and other possible math solutions used to solve an investigation. When selecting a mathematics project, foremost consideration should be given to how math skills helped in your investigation.

A FEW IDEAS to trigger the imagination...

Symbols Past and Present
Magic Squares
Comparison Shopping
Napier Rods
Number Cubes (probability)
Probability and Predictions
Triangular and Square Numbers
Temperature
Printing Shapes
Scale Drawings
Famous Mathematicians
Roman Numerals
Peasant Multiplication
Combinations of Sets
Collecting Data
Computer Languages
Mathematical Analogies & Patterns
Music Notation & Fractions
Tangrams
Stock Market
Time Zones
Investigate "Big" Numbers
Catalan Numbers
Triangular Numbers
Fibonacci Numbers

Fractions in Advertising
Bank Services
Unit Pricing
Scientific Numbers
Measuring the Planets
Providing the Area of a Circle
Angles of a Triangle
Perfect Squares & Square Root
Graphs
Calculator Activities
Least Number of Coins
Money around the World
Binary Numbers
Divisibility
Weather Reports & the Almanac
Ordered Pairs in Art
Venn Diagrams
Symmetry in Nature
History of the Calendar
Optical Illusions
Abacus
How Computer Barcodes Work
Infinity
The Golden Mean

What am I interested in...something different and creative?
TOPICS FOR SCIENCE FAIR PROJECTS

PLANTS
How does the duration of light affect plant growth?
How does the color of light affect the growth of plants?
What are the effects of temperature on the germination of bean seeds?
What is the effect of spacing on the growth of radish seeds?
How does magnetism affect the height of bean seeds?
To what extent does pH affect the germination of rye grass?
What is the effect of different soil mixtures on plant growth?
What is the effect of planting depth on the germination of seeds?
To what extent do various concentrations of salt water affect plant growth?
How does acid rain affect leaf development?
What is the effect of detergents on the germination of bean seeds?
What is the effect of gravity on the roots of a plant?
What is the effect of temperature on the ripening of a banana?

ANIMALS
How does temperature affect the activity of meal worms?
To what extent does the amount of food affect the population size of mealworms?
How does different colored light affect the behavior of earthworms?
How does the intensity of light affect crickets?
What is the effect of background color on the color of a chameleon?
What is the effect of temperature on the behavior of goldfish?
How do different levels of salinity affect brine shrimp?
What is the effect of different pH on snails?
How do vibrations affect the behavior of ants?
What is the effect of height above ground on the attraction of birds to a feeder?

HUMAN BODY
Who generally have bigger hands (feet), boys or girls?
Who are generally taller, boys or girls?
Who generally have larger lung capacity, boys or girls?
How does vision effect the sensation of taste?
What is the effect of age on reaction time?
To what extent does age effect the sensation of hearing?
To what extent does age effect the sensation of smell?
What is the effect of exercise on pulse rate (or blood pressure)?
What is the effect of walking/skipping/running on respiration rate?
What is the effect of left/right handedness on reaction time?
To what extent does the amount of light affect the acuity of vision?
How does color affect the perceived taste sensations of noncarbonated beverages?
Does listening to different types of music affect how well you can perform mental tasks?
Does watching T.V. affect how well you can perform mental tasks?

EARTH & SPACE SCIENCE
Does the sun rise at the same time and in the same location in the sky?
Are the amount of hours of daylight and night the same year round?
Does the moon rise at the same time and in the same location in the sky?
What is the effect of freezing temperatures on rocks?
To what extent do different types of soils retain water?
What is the effect of rain on soil covered with different types of foliage?
What is the effect of wind on different mixtures of soil?
What is the effect of temperature on crystal growth?
What is the effect of temperature on the evaporation of water?
What is the effect of air pollution on precipitation?
What is the effect of the length of a wing on the length of flight of a paper airplane?
To what extent does sunlight affect the temperature of soil?
TOPICS FOR SCIENCE FAIR PROJECTS  

EARTH & SPACE SCIENCE (Continued)
To what extent does sunlight affect the temperature of water?  
To what extent does humidity affect evaporation?  
How does the pH of rain affect limestone?  
What is the effect of time of day on shadows?  
To what extent does the season affect shadow length?  
To what extent does season affect shadow direction?  
How does the angle of the sunlight affect the temperature of soil or water?  
How do different surfaces absorb the sun’s energy?

PHYSICAL SCIENCE
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?  
To what extent 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?  
To what extent do different insulating materials affect heat loss/gain of water?  
How does the color of an object affect its reflection and absorption of solar energy?  
What is the effect of household liquids and powders on red cabbage juice?  
How is the strength of a magnet affected by different materials (glass, cardboard, paper)?  
What is the best shape for a kite to lift off quicker?  
How is the distance a skateboard rolls affected by the amount of mass on the skateboard?  
How does wattage affect the radiation of heat from a light bulb?  
How do different fabrics affect heat loss from an object?  
To what extent does temperature affect the height that a ball will bounce?  
How do the number of batteries and the way they are connected affect the brightness of a bulb?  
How do the number of batteries and the way they are connected affect the strength of an electromagnet?  
How does the number of wraps of wire around an electromagnet affect its strength?  
What is the effect of the size of the iron core on the strength of an electromagnet?  
How does the density of an object affect its buoyancy?

ENVIRONMENTAL (GREEN) SCIENCE
What is the effect of recycling on 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 and shells?  
Which plant and food wastes breakdown and can be composted easily into new garden soil?  
Which native plants will attract hummingbirds, butterflies, or more birds into an environment?  
Which native plants require less irrigation water and provide year round 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 do to reduce the trash sent to the landfill?  
What steps can be taken to reduce energy consumption in your home or school over time?  
What steps can be taken to reduce potable water use at home or school?
JUDGING CRITERIA

All projects are scored based on the same 5 judging criteria. The target questions under each criterion will help you make your final decisions. Most questions are objective however some are subjective by the nature of the competition.

1. MATHEMATICS OR SCIENCE INVESTIGATION - 40 total points
   - Are the purpose and hypothesis stated differently on the display board? (6 points)
   - Is the procedure thoroughly explained? (8 points)
   - Is the method of data collection and analysis explained? (8 points)
   - Does the data support the conclusion? (8 points)
   - Does the project include all these parts: purpose, hypotheses, procedure, materials, observations/data, graphs?
     Math projects must have a relation to math and a conclusion? (10 points)

2. Creative Ability - 20 total points
   - Did the student design and/or construct the equipment or was it purchased? (4 points)
   - Does the project display originality? (4 points)
   - Does the project rely on the research of others? (4 points)
   - Is the data logically presented? (4 points)
   - Is the information creatively displayed? (4 points)

3. Thoroughness - 15 total points
   - Were the experimental results replicated at least three (3) times? (3 points)
   - Does the display physically demonstrate the operation or results of the project? (3 points)
   - Have variables affecting the outcome been identified and controlled? (3 points)
   - Are the materials listed by amounts? (3 points)
   - How complete are any samples? (3 points)

4. Skill - 15 total points
   - Is the student’s skill commensurate with their grade level? (6 points)
   - How complete is the exhibit compared to others in the same division? (6 points)
   - Does the display catch/keep your attention? (3 points)

5. Clarity/Neatness - 10 total points
   - Is the data properly presented, (i.e., numbers and units) and understandable? (2 points)
   - Are the findings well organized? (2 points)
   - Is the display logically arranged? (2 points)
   - Is the spelling and grammar correct? (4 points)
# Math Project Board Labels

<table>
<thead>
<tr>
<th>PURPOSE</th>
<th>TITLE OF PROJECT</th>
<th>PROCEDURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain why you are doing the investigation in one, two or three sentences.</td>
<td><strong>Hint:</strong> Think of something creative and catchy.</td>
<td>Give step-by-step &quot;recipe&quot; directions of everything you did to perform your experiment.</td>
</tr>
</tbody>
</table>
| **Example**
"The purpose of this project is ..." | | **Hint:** Repeat the experiment at least three times and average your data. |

<table>
<thead>
<tr>
<th>HYPOTHESIS</th>
<th>TABLES AND/OR GRAPHS</th>
<th>RELATIONSHIP TO MATH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prediction of what you think will happen when you perform your investigation.</td>
<td>Tables and graphs are a visual way to display the data you have collected.</td>
<td>Explain the relation of the investigation to mathematics.</td>
</tr>
</tbody>
</table>
| **Example**
“I think …” | | |

<table>
<thead>
<tr>
<th>MATERIALS</th>
<th>PHOTOGRAPHS</th>
<th>CONCLUSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide a list of all the materials you used in your experiment.</td>
<td>A sample or photographs of your experiment may be attached to your project board. NO PICTURES OF STUDENT FACES ARE ALLOWED</td>
<td>Review and briefly describe the results of your investigation.</td>
</tr>
</tbody>
</table>

**NOTE:** See page 17 of this handbook for list of items not permitted on display boards.

**Answer this question:**
Did the results agree with the original hypothesis?
<table>
<thead>
<tr>
<th>PURPOSE</th>
<th>Signs on the Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>The purpose of this project is to identify the most common shape used for street signs.</td>
<td>What is the most common shape of street signs?</td>
</tr>
<tr>
<td></td>
<td>Average Number of Sign Shapes</td>
</tr>
<tr>
<td></td>
<td>In 3 Different Ways to School</td>
</tr>
</tbody>
</table>
HYPOTHESIS
I think the diamond square will be the most popular shape used for street signs.

MATERIALS
Paper, pencil, markers, ruler, film, camera, glue

PROCEDURE
After identifying what shapes are used to create signs by taking pictures of the shapes, I will have mom drive me to school in three different directions. I will tally how many signs of each shape I see along the way.

RELATIONSHIP TO MATH
I learned how to make a pictograph and understand the importance of starting each column at the same baseline. You can clearly see which shape is the most popular by finding the tallest column and which shape is the least popular by finding the shortest column.

CONCLUSION
From observing the graph, the octagon was the most common shape and the oval the least common shape used for making street signs. My hypothesis that diamond square would be most common shape used for street signs was incorrect. The most common shape was the octagon. The shape used for stop signs.

### SCIENCE PROJECT BOARD LABELS

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>diamond square</td>
<td>oval</td>
<td>octagon</td>
<td>triangle</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**PURPOSE**

Explain why you are doing the investigation in one, two or three sentences.

**Example**
"The purpose of this project is ..."

---

**PROJECT TITLE**

Hint: Think of something creative and catchy.

---

**PROCEDURE**

Give step-by-step "recipe" directions of everything you did to perform your experimental investigation.

**Hint:** REPEAT THE EXPERIMENT AT LEAST 3 TIMES. AVERAGE ANY NUMERIC DATA.

---

**HYPOTHESIS**

Prediction of what you think will happen when you test your hypothesis through an investigation.

**Example**
"I think …" or "If this …, than that"

---

**TABLES AND/OR GRAPHS**

Tables and graphs are a visual way to analyze and display the data you have collected.

---

**MATERIALS**

Provide a list of all the materials you used in your experiment. List the quantity (how many) of each material.

---

**PHOTOGRAPHS**

Clip art or photographs of your experiment may be attached to your project board. NO PICTURES OF STUDENT FACES ARE ALLOWED.

**Note:** See page 17 of this handbook for list of items not permitted on display boards.

---

**CONCLUSION**

Review and briefly describe the results of your investigation.

**Hint:** Answer these questions:
What claims can you make? What evidence supports your claims? Did your results confirm or reject your hypothesis?

---

**Sample K-3 Science Project Board**
**PURPOSE**
The purpose of this project is to identify which brand of paper towel will hold the most weight.

**HYPOTHESIS**
I think the Mounty brand towel will hold the most weight.

**MATERIALS**
Paper towel (3 different brands), rolls of pennies (2-3), rubber bands (3), Styrofoam/plastic cups (3)

---

### TUFF TOWEL
Which Brand of Paper Towel Holds the Most Weight?

**PROCEDURE**
Collect three different brands of paper towels. Separate each into single-ply sheets. Wrap the sheet around the opening of each cup and fully secure it with the rubber band. Begin resting pennies on the sheet until the pennies fall through the paper towel. Repeat for the other brands. Record the number of pennies from each trial.

**CONCLUSION**
From observing the graph, the Sharmin brand paper towel was able to hold the most pennies. This means that it was able to hold the greatest amount of weight. My hypothesis that the Mounty brand towel would hold the most weight was rejected when compared to the Sharmin brand towel.

---

<table>
<thead>
<tr>
<th>NUMB ER of PEN NIES</th>
<th>8</th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper Towel BRAND</td>
<td>Lefty</td>
<td>Sharmin</td>
<td>Mounty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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<th>X</th>
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<th>X</th>
<th>X</th>
<th>X</th>
<th>X</th>
</tr>
</thead>
</table>
ENGLISH TRANSLATION FORM

Fair coordinators are required to translate the project information into English. Once this form is completed, clip it to the back of the project display board.

Purpose


Hypothesis


Materials


Procedure


Observation Data


Relation to Mathematics (Math Projects only)


Conclusion

