

Pittsburgh Regional Science & Engineering Fair GUIDE

April 1-2, 2011 - Heinz Field

Changes/Modifications for 2011

- **Human Subjects/Non-Human Vertebrate Animals/Potentially Hazardous Biological Agents and Hazardous Chemicals, Activities and Devices** - Paperwork is due November 30, 2010.
- All other paperwork is due **January 14, 2011**.
- **School Fairs** - Special arrangements can be made for schools that have school science fairs. Please call the PRSEF office prior to January 1, 2011 to make these special arrangements.

Pittsburgh Regional Science and Engineering Fair (PRSEF)
c/o Carnegie Science Center
One Allegheny Avenue, Pittsburgh, PA 15212-5850
Phone: 412.237.1534
Website: www.pittsburghsciencefair.org
Email: prsef@carnegiesciencecenter.org

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CALENDAR

2011

SCIENCE

FAIR

November 15, 2010	PRSEF School Registration Deadline
November 30, 2010	Deadline for PRSEF projects using Human Subjects/Non-Human Vertebrate Animals/Potentially Hazardous Biological Agents and Hazardous Chemicals, Activities and Devices
January 15, 2011	Deadline for PRSEF paperwork for all other projects
February 2011	Deadline for School Science Fair paperwork
April 1, 2011	PRSEF Competition Day, 7:00 a.m. - 4:00 p.m. - Heinz Field
April 2, 2011	PRSEF Awards Celebration, 9:00 a.m - 11:30 a.m. - Heinz Field

Register Now! SciTech School Days

Middle School Days: Nov. 9-10, 2010 & March 8-9, 2011

High School Days: Nov. 11-12, 2010 & March 10-11, 2011

SciTech Days feature interactive experiences with our region's top companies; hands-on workshops; online teacher resources; and clear links to Pennsylvania education standards and anchors. SciTech Days features an exhibit area on green technology and regional careers.

- **Explore** emerging high-tech industries in the western PA region.
- **Meet** real scientists working in the field today.
- **Facilitate** hands-on, personal experiences that link classroom learning to real-world applications.
- **Find out** how you can be a part of the next generation of technology development.
- **Inspire** your students to pursue high-level studies in science and math.

For more information, visit www.SciTechSpec.org or contact Geri Baker at 412.237.1552 or bakerg@carnegiesciencecenter.org.

OVERVIEW



The Pittsburgh Regional Science & Engineering Fair (PRSEF) is affiliated with the Intel International Science & Engineering Fair (ISEF). Therefore, the International Rules for PreCollege Science Research are applied to all projects submitted to the PRSEF. The complete rules are available from the Society for Science & the Public website at <http://www.societyforscience.org/isef/document/>. The student handbook is available at <http://www.societyforscience.org/isef/document/>, click 2011 Student Handbook.

This Guidebook along with the documents mentioned above will answer most questions and cover the details and requirements for students to compete at PRSEF. However, should you still have questions, please contact us at 412.237.1534 or at prsef@carnegiesciencecenter.org.

On competition day, students will display their presentation boards and discuss their research with scientists and engineers. Nearly \$1 million in scholarships, cash prizes and trips are awarded. Sponsor awards are presented on competition day. Category, Scholarships, Perseverance, and ISEF award winners will be announced at the Awards Program. First place category award winning projects will be displayed at Carnegie Science Center following PRSEF.

Thanks to all of the teachers, parents, and volunteers for your long hours of dedication in helping our young scientists and engineers to explore their world through hands-on science research. Without you, PRSEF would not exist. These young scientists and engineers are our future. Thanks for your commitment to our future.

CHANGES/MODIFICATIONS FOR 2011



Rules and guidelines for conducting research were developed with the intent to do the following:

- protect the rights and welfare of the student researcher and human subjects
- protect the health and well-being of vertebrate animal subjects
- follow federal regulations governing research
- use safe laboratory practices
- address environmental concerns

The following changes/modifications have been made for 2011:

- Projects involving **Human Subjects/Non-Human Vertebrate Animals/Potentially Hazardous Biological Agents and Hazardous Chemicals, Activities and Devices** - Paperwork is due November 30, 2010.
- All other paperwork is due **January 14, 2011**.
- **School Fairs** - Special arrangements can be made for schools that have school science fairs. Please call the PRSEF office prior to January 1, 2011 to make these special arrangements.

Please call the PRSEF office at 412.237.1534 with any questions regarding these modifications.

Required Registration Forms



The following will summarize which forms are required for different types of projects.

All student registration forms must be submitted by **January 14, 2011**. However, projects involving **Human Subjects/Non-Human Vertebrate Animals/Potentially Hazardous Biological Agents and Hazardous Chemicals, Activities and Devices** are due **November 30, 2010**.

Forms required for ALL STUDENTS

- Form 1 – Checklist for Adult Sponsor
- Form 1A – Student Checklist
- Research Plan
- Form 1B – Approval Form
- Student Registration Form (signature page if student was registered online)
- Abstract (abstracts must be submitted by email to prsef@carnegiesciencecenter.org or during online registration)

All required forms can be accessed online at www.pittsburghsciencefair.org.

Many student researchers require additional forms. The following chart indicates which additional forms are required:

Non-Human Vertebrate Animals* – Forms 1, 1A, Research Plan, 1B, and

- Form 2 – Qualified Scientist and
- Form 5A – Vertebrate Animal Form (if conducted in a Non-regulated site), **OR**
- Form 5B – Vertebrate Animal Form (if conducted in a Regulated Research Institution)

If applicable:

- Form 1C – Regulated Research Institution/Industrial Setting Form (if conducted in a Regulated Research Institution)

Human Subjects* – Forms 1, 1A, Research Plan, 1B, and

- Form 4 – Human Subjects Form

If applicable:

- Form 1C – Regulated Research Institution/Industrial Setting Form (if conducted in a Regulated Research Institution)
- Form 2 – Qualified Scientist (required if more than minimal risk is involved)

Potentially Hazardous Biological Agents* (formerly classified as pathogenic and potentially pathogenic agents, Recombinant DNA, human and vertebrate animal tissue) – Forms 1, 1A, Research Plan, 1B, and

- Form 2 – Qualified Scientist, and
- Form 6A – Potentially Hazardous Biological Agents

If applicable:

- Form 1C – Regulated Research Institution/Industrial Setting Form (if conducted in a Regulated Research Institution)
- Form 3 – Risk Assessment
- Form 6B – Human and Vertebrate Animal Tissue Form (for all studies involving tissues and body fluids.)

Hazardous Chemicals, Activities or Devices (includes DEA-controlled substances, prescription drugs, alcohol and tobacco, firearms and explosives, radiation, lasers, etc.)* – Forms 1, 1A, Research Plan, 1B, 2, 3, and

If applicable:

- Form 1C – Regulated Research Institution/Industrial Setting Form (if conducted in a Regulated Research Institution)

Still unsure on what forms are required? Visit the forms wizard at <http://www.societyforscience.org/isef/students/wizard/index.asp>. Please contact the PRSEF office at 412.237.1534 with any questions.

***Requires SRC/IRB approval prior to experimentation**



Rules of Participation

- You must be less than 21 years of age as of May 1, 2010.
- You must live in one of the following counties: **PENNSYLVANIA:** Allegheny, Armstrong, Beaver, Bedford, Blair, Butler, Cambria, Centre, Clarion, Clearfield, Crawford, Erie, Fayette, Greene, Indiana, Jefferson, Lawrence, Mercer, Somerset, Snyder, Venango, Washington, Westmoreland; **WEST VIRGINIA:** Marion, Monongalia, Preston; **MARYLAND:** Allegany, Garrett.
- The Pittsburgh Regional Science & Engineering Fair is the **ONLY** science fair in western PA which is affiliated with the ISEF. Please note that students may compete in only one ISEF affiliated science fair per school year.
- The **project must be solely the work of the exhibitor(s)** in research, construction and design of the exhibit. Parents or sponsors may only advise. (Adult supervision and assistance with the use of power tools are recommended.) **Students in Grades 6-8 are permitted to compete as a TEAM.** (A team consists of 2-3 students).
- All schools are permitted to send up to 20 projects per division: Junior Division (grade 6), Intermediate Division (grades 7-8) and Senior Division (grades 9-12). If a school submits more entries, all entry forms will be returned to the sponsoring teacher.
- Each student **MUST** have an adult sponsor (parent/teacher/mentor) who is ultimately responsible for the health and safety of the student conducting the research and of any human or animal subjects. An adult sponsor may be a teacher, parent, university professor or scientist who has a solid background in science and will closely supervise the student's research.
- All students (in all divisions) conducting **research involving vertebrate animals, human subjects, tissue, recombinant DNA, microbes, and potentially hazardous biological agents or hazardous chemicals, activities or devices, MUST** fill out special approval certification forms **BEFORE** starting the project. Paperwork for these projects must be submitted by November 30.
- **Potentially Hazardous Biological Agents** ALL studies involving the use of microorganisms (including bacteria, viruses, viroids, prions, rickettsia, fungi, and parasites), recombinant DNA (rDNA) technologies or human or animal fresh tissues, blood, or body fluids require pre-approval by the SRC or other appropriate review committee (IBC, RAC, IACUC). **Studies in these areas of research are prohibited in a home environment.** Research projects in these areas of research are now classified into biosafety levels that require appropriate biosafety containment. Studies utilizing **MRSA and VRE** are prohibited. Additional information on these projects and required review committees can be found at www.societyforscience.org/isef/document/.
- Bacteria/Mold - Many students collect bacteria in a home environment. This is acceptable as long as the collected bacteria are immediately transported to a laboratory with the appropriate level of biosafety containment. (See www.societyforscience.org/isef/document/, 2011 Rules and Guidelines page 13.)
- Students **MUST** set up their own exhibit at PRSEF for project inspection. If parents or teachers are present in the exhibit area during set up, the student will be disqualified.
- Students **MUST** be present at their project boards during the official judging time on Competition Day. The exhibit area is a restricted area during official judging. **ONLY students, judges, and official PRSEF volunteers/staff are permitted on the exhibit floor during judging times.**
- All students must remove their project boards from the exhibit area after the Award Ceremony on April 2. Remaining projects will be discarded due to space limitations.
- Any student leaving early **MUST** have completed the early dismissal form and have approval from the PRSEF staff. Visit www.pittsburghsciencefair.org for the early dismissal policy.



These rules are intended to protect the student researcher by ensuring that the proper supervision is provided and that all potential risks are considered so that the appropriate safety precautions are taken.

- **Required registration forms for all students:**

Forms 1, 1A, Research Plan (see research plan instructions on page 2 of 1A), 1B, PRSEF Student Registration Form and PRSEF Abstract.

- ! • **Deadline** for all registration forms: **January 14, 2011**. However, projects involving **Human Subjects/Non-Human Vertebrate Animals/Potentially Hazardous Biological Agents and Hazardous Chemicals, Activities and Devices** are due **November 30, 2010**. PRSEF Student Registration Form (or Signature Page if submitted electronically), Abstract (electronically submitted) and all Forms 1, 1A, Research Plan, 1B. Additional forms may be required. See page 2 for more information or visit the ISEF forms wizard at www.societyforscience.org/isef/students/wizard/index.asp.
- Students' research plans **MUST** include a detailed description of the methods or procedures involved in their projects (**list all materials, chemical concentrations, drug dosages**). The procedure should be clear to the SRC reviewer. **Research plans** must list at least **5** major references (e.g. science journals, books, articles, internet sites will be checked and must be well documented.)
- **A Scientific Review Committee (SRC) within the school is recommended** to support the teacher in reviewing students' research plans. Proper review of students' research plans will eliminate the risk of a student being disqualified from participation in PRSEF. **Please call the PRSEF office in the fall for information on setting up your school district SRC.**
- Check all forms for completion. Signatures on ALL forms (except 1C, if applicable) **must** be obtained **prior** to the **start** of the **student's experimentation**.
- **Form (3) Risk Assessment Form is required for projects using hazardous chemicals, activities or devices or regulated substances and some potentially hazardous biological agents.** The rules include substances and devices that are regulated by local, state, country or international law, most often with restrictions of their use by minors such as DEA-controlled substances, prescription drugs, alcohol and tobacco and firearms and explosives. Hazardous activities are those that involve a level of risk above and beyond that encountered in the student's everyday life.
- Conducting experiments which pose a threat to the safety and welfare of animals (such as feeding them human food or placing the animal in an unsafe or unethical environment) are prohibited. Please visit www.societyforscience.org/isef/document/, 2011 Rules and Guidelines, page 10, for additional rules regarding animal research.
- **Photographs and/or visual depictions** are permitted on the display board IF: a) they are not deemed offensive or inappropriate by PRSEF; b) credit lines of their origins ("Photographs take by..." or "Image taken from ..." are attached; c) they are from the internet, magazines etc., and credit lines are attached; d) they are photographs of the student researcher; e) they are photographs of the human subjects for which consent forms were obtained. NOTE: Photographs or visual presentations depicting vertebrate animals in surgical techniques, dissections or other lab procedures are **not allowed**.
- **International Science & Engineering Fair (ISEF)**. Any 9th - 12th grade student who wishes to be considered for the ISEF must be a PRSEF entrant and submit a Preliminary ISEF Application Form and Research Paper by February 11, 2011. You must also email a copy of your research paper to prsef@carnegiesciencecenter.org. Visit www.pittsburghsciencefair.org for details.

Visit the PRSEF website, www.pittsburghsciencefair.org, for the latest information.



Scientific Research

By following the seven stages listed below, you should be able to produce a superior scientific experiment.

1. Be curious, choose a limited subject, ask questions, identify or define a problem.
2. Review published materials related to your question.
3. Evaluate possible solutions and make your educated guess (hypothesis).
4. Design the experiment where only one variable is changed at a time. This makes the experiment a "controlled" experiment.
5. Challenge and test your hypothesis through experimentation (data collections) and analysis.
6. Evaluate the results of your experiment and reach conclusions based on your data.
7. Prepare report and exhibit.

Good scientists, both young and old, follow a similar approach to study what they see in the world. Research is the process by which people create new knowledge about themselves or the world in which they live in order to answer a question or solve a problem. When choosing your topic, give careful thought to how your research might enhance the world and its inhabitants.

Questioning is probably the most important part of scientific creativity and is often followed by an "if... then" statement. Questioning usually leads to experiments or observations.

Students should learn to be skeptical of all research results, especially their own. A good experiment may or may not answer the questions asked, but almost always leads to fresh questions requiring new experiments or observations. The hypothesis often changes during the course of the experiment. Supporting or not supporting your hypothesis is secondary to what is learned and discovered during the research.

Goals of Engineering

What is the difference between a scientist and engineer? Scientists try to understand how nature works, engineers create things that never were or improve on a previous design. An engineering project should state the engineering goals, the development process and the evaluation of improvements. Engineering projects may include the following stages:

1. Define a need.
2. Develop design criteria.
3. Search literature to see what has already been done.
4. Prepare preliminary designs.
5. Build and test a prototype.
6. Re-test and redesign as necessary.
7. Present results.

Other Non Inquiry Based Research

Computer Science Projects - These often involve creating and writing new algorithms to solve a problem or improve on an existing algorithm. Simulations, models or "virtual reality" are other areas on which to conduct research.

Mathematics Projects - These projects involve proofs, solving equations, etc. Math is the language of science and is used to explain existing phenomena or prove new concepts and ideas.

Theoretical Projects - These projects involve a thought experiment, development of new theories and explanations, concept formation or designing a mathematical model.

CATEGORIES



Select your category on the required Student Registration Form.

JUNIOR DIVISION (Grade 6)

Physical Science: *physics:* state of matter, heat, temperature, electricity and magnetism, optics, acoustics, etc.

chemistry: organic, inorganic, chemical compounds, household chemicals, etc.

engineering: technology, inventions and projects that directly apply scientific principles to manufacturing and practical uses - civil, mechanical, aeronautical, chemical, electrical, photographic, sound, automotive, marine, heating and refrigerating, transportation, environmental engineering, etc.

Life Science: *biology, zoology, botany,* enzymes, photosynthesis, blood chemistry, protein chemistry, food chemistry, biochemistry, human and animal behavior, psychology, learning perception, educational testing, nutrition, allergies, studies of animal/human health, etc.

Consumer Science: consumer product testing and design.

TEAM: Any research project consisting of 2 or 3 student researchers.

INTERMEDIATE DIVISION (Grades 7 & 8)

Behavioral and Social Science: human and animal behavior, social and community relationships - psychology, sociology, anthropology, archaeology, ethology, ethnology, linguistics, learning, perception, urban problems, reading problems, public opinion surveys, educational testing, etc.

Biology: botany, zoology, genetics, biochemistry, including hormones, molecular biology, molecular genetics, enzymes, photosynthesis, blood chemistry, protein chemistry, food chemistry, etc.

Chemistry: inorganic, organic, physical materials, plastics, fuels, pesticides, metallurgy, etc.

Computer Science/Math: development of computer hardware, software engineering, internet, simulations, statistics, calculus, geometry, abstract algebra, number theory, probability, etc.

Consumer Science: consumer product testing and design.

Earth/Space/Environment: pollution and sources of control, ecology, geology, mineralogy, oceanography, meteorology, climatology, astronomy, geology, seismology, etc.

Engineering/Robotics: technology; projects that apply scientific principles to manufacturing and practical uses - civil, mechanical, aeronautical, chemical, heating and refrigerating, transportation, electrical, photographic, sound, automotive, marine, etc.

Medicine & Health/Microbiology: bacteriology, virology, fungi, bacterial genetics, etc.; study of diseases and health of humans and animals - dentistry, pharmacology, pathology, ophthalmology, nutrition, sanitation, pediatrics, dermatology, allergies, speech and hearing, etc.

Physics: solid state, optics, acoustics, particle, nuclear, plasma, superconductivity, fluid and gas dynamics, magnetism, quantum mechanics, biophysics, etc.

TEAM: Any research project consisting of 2 or 3 student researchers.

SENIOR DIVISION (Grades 9-12)

Behavioral and Social Science: human and animal behavior, social and community relationships - psychology, sociology, anthropology, archaeology, ethology, ethnology, linguistics, learning, perception, urban problems, reading problems, public opinion surveys, educational testing, etc.

Biology: botany, zoology, genetics, biochemistry, including hormones, molecular biology, molecular genetics, enzymes, photosynthesis, blood chemistry, protein chemistry, food chemistry, etc.

Chemistry: inorganic, organic, physical materials, plastics, fuels, pesticides, metallurgy, etc.

Computer Science/Math: development of computer hardware, software engineering, internet, simulations, statistics, calculus, geometry, abstract algebra, number theory, probability, etc.

Earth/Space/Environment: pollution and sources of control, ecology, geology, mineralogy, oceanography, meteorology, climatology, astronomy, geology, seismology, etc.

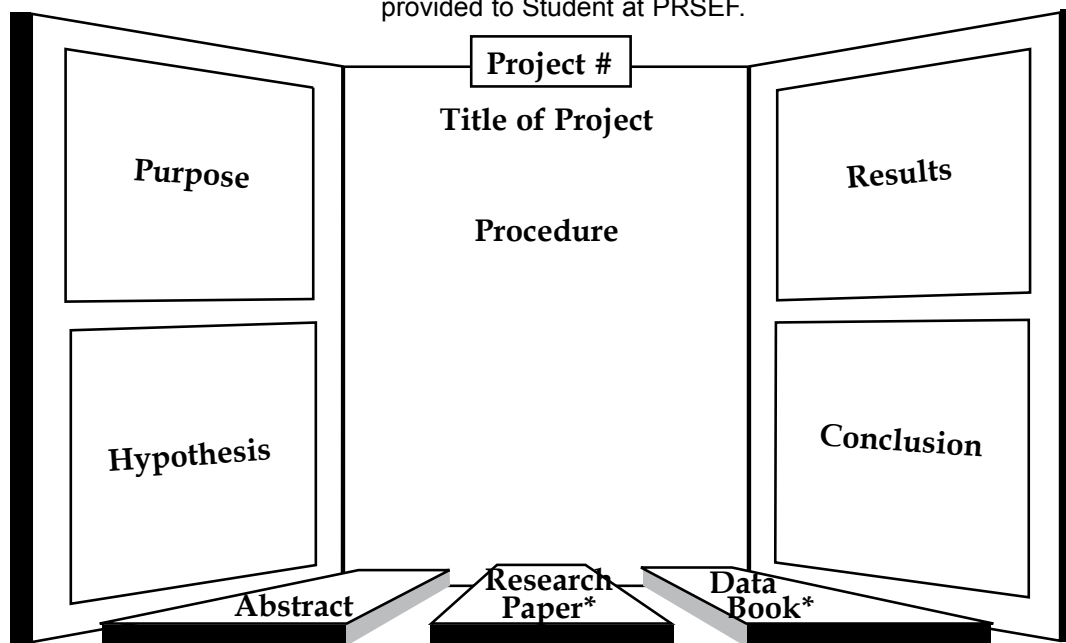
Engineering/Robotics: technology; projects that apply scientific principles to manufacturing and practical uses - civil, mechanical, aeronautical, chemical, heating and refrigerating, transportation, electrical, photographic, sound, automotive, marine, etc.

Medicine & Health/Microbiology: bacteriology, virology, fungi, bacterial genetics, etc.; study of diseases and health of humans and animals - dentistry, pharmacology, pathology, ophthalmology, nutrition, sanitation, pediatrics, dermatology, allergies, speech and hearing, etc.

Physics: solid state, optics, acoustics, particle, nuclear, plasma, superconductivity, fluid and gas dynamics, magnetism, quantum mechanics, biophysics, etc.



A Project Number Card will be provided to Student at PRSEF.



* not required, but recommended

Presentation Board Size Requirements

The standard presentation board is a three-panel, free-standing structure that folds for ease in transporting to and from PRSEF. You can make your own or ask your teacher about ordering a stock board from an educational supply catalog or visit your local office supply store.

Board size **MUST** not exceed:

Tabletop Display: 36" wide (122 cm) x 30" deep (76 cm) x 78" high (198 cm)

Floor Display: 36" wide (122 cm) x 30" deep (76 cm) x 108" high (274 cm)

Note: Please inform PRSEF one month prior to Fair Day to make special arrangements for floor displays.

Oversized exhibits may be disqualified.

IMPORTANT NOTE: Students must set up their project displays. Heavy wooden, double-stacked, plastic, or metal display boards are **not** recommended.

Helpful Hints

Photographs. Many projects involve elements that may not be safely exhibited at PRSEF, but are an important part of the projects. Take photographs of important parts/phases of your experiment to use in your display. Photographs of human test subjects must have signed consent forms. Credit must be given for all photographs.

A Good Title. Your title should be simple, accurate and descriptive. Make the observer want to know more.

Organization. Make sure your display is logically presented and easy to read. A glance should permit anyone (particularly the judges) to locate quickly the title, experiments, results, and conclusions. When you arrange your display, imagine that you are seeing it for the first time.

Eye-catching. Make your display stand out. Include photographs. Use neat, colorful headings, charts, and graphs. Pay special attention to the labeling of graphs, charts, diagrams, and tables. Each item must have a descriptive title. Anyone should be able to understand the visuals without further explanation.



Written Presentation

A research paper should be prepared and available along with a project data book, and any necessary forms or relevant written materials for display during PRSEF.

Project Data Book

A project data book is your most treasured piece of work. Record accurate and detailed notes to make a logical and winning project. Good notes show consistency and thoroughness to the judges and will help you when writing your research paper. Data tables are also helpful.

Research Paper

A research paper helps organize data as well as thoughts. A good paper includes the following sections:

Title Page and Table of Contents. The title page and table of contents allows the reader to follow the organization of the paper quickly.

Introduction. The introduction sets the scene for your report. The introduction includes your purpose, hypothesis, an explanation of what prompted your research, and what you hoped to achieve.

Experiment. Describe in detail the methodology used to collect your data or make your observations, design apparatus, etc. Your report should be detailed enough so that someone could repeat the experiment from the information in your paper. Include detailed photographs or drawings of self-designed equipment. Only include this year's work.

Results. The results include data and analysis. This should include statistics, graphs, etc.

Discussion. Be thorough, the discussion is the essence of your paper. Tell your readers exactly what you did and thought. Compare your results with theories, published data, commonly held beliefs, and expected results. Discuss possible errors. How did the data vary between repeated observations of similar events? How were results affected by uncontrolled events? What would you do differently if you repeated this project? What other experiments should be conducted?

Conclusion. Briefly summarize your results. Be specific. Do not generalize. Never introduce anything in the conclusion that has not already been discussed. Also mention practical applications.

Acknowledgments. Credit those who assisted you, including individuals, businesses, and educational or research institutions. Note any financial or material donations. (Remember, however, DO NOT LIST teachers/ parents/school by name.)

References. List any documentation not your own (i.e., books, journal articles). See an appropriate reference for format. (See <http://www.societyforscience.org/isef/document/hbk2009.pdf>, page 3).

Abstract

After finishing your research and experimentation, you are required to write a maximum 100-word, one-page abstract. An abstract should include: (a) purpose of the experiment, (b) procedures used, (c) data, (d) conclusions. It also may include any possible research applications. Only minimal reference to previous work may be included. For continuation projects, the abstract should focus on work done since the last PRSEF and should not include: a) acknowledgments, or b) work or procedures done by the mentor. Abstracts must be submitted electronically by email or during online registration. See page 11 for an example of an appropriately written abstract.

Patent and Copyright Information

You may want to consider applying for a patent or copyright if you want to protect your work. Contact the U.S. Patent and Trademark Office, at 1-800-786-9199 or their website, www.uspto.gov, for patent information, or the Library of Congress at 202-707-3000 for copyright information.

ABSTRACT CRITERIA

Upon completion of research and experimentation, you are required to write a maximum 100-word, one-page abstract. A completed abstract **MUST** be emailed to prsef@carnegiesciencecenter.org or submitted during online registration to PRSEF.

An abstract is a very short description (100 word maximum) of what you did, why you did it, how you did it, what the results were, what the conclusion was and perhaps what work is planned as a follow-up. An abstract must **NOT** include any acknowledgements or work or procedures done by the mentor. Projects do not need to be completed to submit an abstract. You can simply state experimentation is continuing.

Sponsor and other special award judges have requested student abstracts prior to competition day to determine which projects address their special areas. Please send by email and include a written abstract in the body of the e-mail. **Do not send as an attachment.** Include the student name, teacher name and school in the body of the e-mail. Only electronically submitted abstracts will be included in the Abstract Book which is distributed to the judges. Please call the PRSEF office at 412.237.1534 if you have any questions.

An abstract example follows. Note that it has six sentences and only 91 words, yet it says all that needs to be said!

NOTE: Abstracts from past participants can be found at http://www.scitechfestival.com/mainsf_gs.asp.

ABSTRACT EXAMPLE

PROJECT TITLE: Hummingbird Color Preferences

CATEGORY: Behavioral & Social Science

GRADE: 8th Grade

SPONSORING TEACHER Mrs. Adams

SCHOOL Pittsburgh Elementary

Hummingbirds are welcome visitors to a backyard or patio. This work intended to learn if these birds favor one color of nectar over other colors. Five different colored nectars were set out in clear feeding stations and the number of "hits" on each color was recorded. It was determined that the birds prefer red; no statistically significant difference was observed with the other colors. Literature suggests that food coloring is inappropriate for hummingbird nectar. Future work is planned to determine if red, prominent on the feeding station, is equally attractive.



What You **MUST** Bring to the Science Fair:

YOUR DISPLAY which includes:

- Project Data Book (recommended, but not required)
- Research Paper (recommended, but not required)
- Presentation Board
- Copies of your Abstract

V.I.S.!! Very Important Stuff to remember....

Names **must not** be displayed on your project board or paperwork. Please remember this when you are putting together your project board. **Also, do not list parents or teachers by name on the acknowledgments.** However, names can be placed on the back of the board for identification purposes.

Your **Project Number** will be assigned by PRSEF and will be available online in mid-March at www.pittsburghsciencefair.org. **Project Number Cards will be provided on Fair Day for use on your project board.**

YOU - be ready to present your work!

Be prepared! Practice your presentation! Remember that the judges will be interviewing you and asking about your work. You must know your research **and** be able to communicate your research to others effectively. The judges are interested in hearing why you chose your research topic, what interested you most in your findings, how your research can enhance the world and its inhabitants.

THE FORMS

Bring your copy of the forms submitted to PRSEF - for reference only - NOT FOR DISPLAY.

A LIGHT SNACK

We suggest that you bring a piece of fruit, granola bar and/or water with you, especially if you are leaving early from home or school on fair day! Concession stands at Heinz Field will be open for lunch.

JUDGING

Students will be required to stand by their projects during the entire judging session. Please dress appropriately.

Competition Day - Friday, April 1, 2011, 7:00 a.m. - 4:00 p.m.

Awards Ceremony - Saturday, April 2, 2011, 9:00 a.m. -11:30 a.m.

PROJECT INSPECTION CHECKLIST



Students' displays are inspected after set up and prior to judging. All projects must satisfy certain inspection requirements before they are cleared for judging. The following is a checklist used by PRSEF inspectors and is provided here, FOR REFERENCE PURPOSES ONLY, to assist students/teachers in double-checking their project displays before PRSEF day. DO NOT COMPLETE THIS FORM, DO NOT MAIL OR BRING THIS FORM TO PRSEF – FOR REFERENCE ONLY.

1. Is the project # displayed on the top center of the student's board presentation?
 yes, go to #2 no, move it to the center
2. Is the project # on the back of this form the same as the project number on the student's presentation?
 yes, go to #3 no, send student to Information Hub
3. Is the name of the student, school, teacher, or advisor/mentor anywhere on the project or in the report?
 yes, remind the student that it's preferred not to have these placed on the board/report, go to #4
 no, go to #4
4. Size should not exceed:
Table top display - 48" w (122 cm) x 30" d (76 cm) x 78" h (198 cm)
Floor display - 48" w (122 cm) x 30" d (76 cm) x 108" h (274 cm)
5. Project should not contain the following:
 living organisms (plants, animals, microbes, bacteria)
 dried plants (living/ dead/preserved) which are in their raw or unprocessed or unmanufactured state
 taxidermy specimens or parts (stuffed or mounted skins of dead animals)
 preserved vertebrate (having a backbone or spinal column) or invertebrate animals
 human or animal food
 human/ animal parts or body fluids; exceptions: teeth, hair, nails, dried animal bones, histological dry mount sections and wet mounts properly acquired.
 soil or waste samples unless permanently encased in a slab of acrylic
 liquids of any kind (laboratory chemicals and WATER)
 poisons, drugs, controlled substances, hazardous substances or devices (firearms, weapons, ammunition, reloading devices)
 dry ice or other sublimating solids (i.e., solids which vaporize to a gas without passing through a liquid phase)
 "loose" sharp objects (pins, tacks, knives, scalpels, needles, syringes, etc.) unless firmly intact on the project
 empty tanks that have previously contained combustible liquids or gases, unless purged with carbon dioxide
 open top cell batteries (i.e., batteries with a removable cap/can see acid inside if removed)
 breakable objects (beakers, test tubes, slides, etc.) unless they are firmly attached to the project
 electrical or hot apparatus that is not properly insulated (must be UL approved electrical materials, i.e., extension cords/surge suppressors)
 photographs or other visual presentations depicting vertebrate animals in other than normal conditions (i.e., surgical techniques, dissections, necropsies or other lab techniques)
 photographs ARE PERMITTED if credit lines of their origins are attached (such as "Photograph taken by..."). These labels can be found at the Information Hub. Photographs from the internet, magazines should also have credit lines. Photographs of the Finalist are permitted. Photographs of human subjects are permitted if photo release form is completed.
 active internet or email connections as part of displaying/operating project.
 prior year's written or visual depictions on display board (Exception: the project title may mention year or years in the title ie. "Year Two of an Ongoing Study".)

ABOUT THE JUDGES



One of the most valuable experiences for young scientists and engineers is the opportunity to discuss their findings with established members of the scientific, engineering and technology communities. PRSEF competitors take great pride in their work and judging interviews greatly contribute to the overall educational experience of the competition. Each year, professionals, representing university faculty, industrial scientists and engineers, representatives of private and federal research centers and agencies, and medical researchers volunteer their time to interview and award our region's most promising young scientists and engineers.

There are five different categories of judges at PRSEF: **Category Award** judges will select winners in each of the 21 categories, **Sponsor Award** judges represent their professional organizations or institutions and judge students' projects for their specific award criteria, **Affiliated Award** judges represent the sponsors from the Intel International Science and Engineering Fair, **Scholarship Award** judges choose students who qualify for scholarship awards from participating colleges and universities in our region and **International Science and Engineering Fair (ISEF)** judges will select the winner(s) to attend ISEF.

Individuals should not serve as both **Category Award** judges and Sponsor, Affiliated, or Scholarship Award judges. All judges have expertise in scientific disciplines and engineering. Science fair directors, elementary or secondary school teachers are NOT eligible to serve as PRSEF judges.

Pittsburgh Regional Science & Engineering Fair judges all adhere to the following ethics standard:

To preserve the integrity of the Pittsburgh Regional Science & Engineering Fair, even the appearance of prejudice must be avoided. If a judge has any relationship to or knowledge of an entrant or project, that judge must decline participation where it may influence an entrant's award.

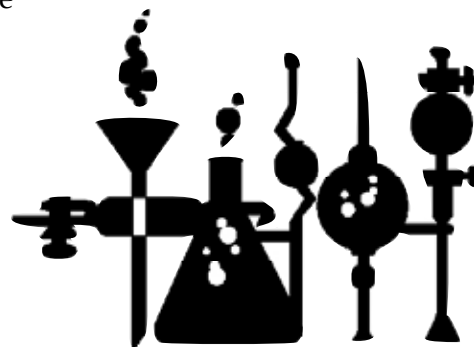
Message From the Judges:

Be ready to talk in depth about your research. You should be able to have a conversation about your work and results. Practice explaining your research to your parents, teachers, and friends, especially people who don't understand your research. Tell everyone to ask you at least three questions.

Judges look for well thought out research. They consider how significant your project is in its field, as well as how thorough you were in conducting your research. Did you leave something out? Did you start with four experiments and finish only three?

Judges recognize students who can speak freely and confidently about their work. They are not interested in memorized speeches but prefer simply to TALK with you about your project to see if you have a good grasp of your research from start to finish. Besides asking the obvious questions, judges often ask questions to test your insight into your project, such as, "What was your role?" or "What didn't you do?" and "What would be your next step?"

JUDGES EXPECT YOU TO DEMONSTRATE THAT YOU DID THE WORK.





Category Judges

Category Judges choose the winners in each category. Last year, a new rubric was developed in order to provide constructive feedback to the students. In 2011, this rubric will be used again as the judging criteria. Some rubrics are tailored for specific applications. Point scores are used as a judging tool. Rubrics less the point values will be provided to the students' teachers after PRSEF. Visit www.pittsburghsciencefair.org for these judging rubrics.

Sponsor Judges

Sponsors of PRSEF send a representative to select the winning science fair project(s) in its fields of interest. These judges have specific criteria based on their company's mission. For example, Allegheny-Singer Research Institute at AGH awards senior division students the conduct research in medicine/health/microbiology that involves circulatory (cardiac disease and stroke), genetics, genomics or medical devices. Awards are presented on the exhibit floor between 2p - 4p on April 1. For a list of project ideas from our sponsors, visit http://www.scitechfestival.com/mainsf_idea.asp. Visit http://www.scitechfestival.com/mainsf_judges_spons.asp for the complete list of PRSEF sponsor awards.

Affiliated Sponsor Judges

As a science fair affiliated with the Intel ISEF, awards are presented based on criteria received from the Intel ISEF. For example, the National Oceanic and Atmospheric Administration provides certificates and medallions to the projects that emphasize NOAA's mission to understand and predict changes in Earth's environment and conserve and manage coastal and marine resources to meet our Nation's economic, social and environmental needs. For a complete list of affiliated awards, visit http://www.scitechfestival.com/mainsf_judges_affil.asp.

Scholarship Judges

In 2010, nearly \$1 million in scholarships was awarded to PRSEF student researchers from local colleges and universities. Scholarships include full/half/partial tuition scholarships, pre-college program scholarships. For example, Carnegie Mellon University awards two pre-college program scholarships to be utilized for the Advanced Placement/Early Action Program. Allegheny College awards up to four scholarships in the amount of \$12,500 per recipient. Preference for scholarship consideration will be given to students who embody the philosophy of the College and wish to explore their diverse interests after high school. For a complete list of scholarships, visit http://www.scitechfestival.com/mainsf_judges_schol.asp.

TIP: Judges applaud those students who can speak freely and confidently about their work. They simply want to talk with you about your research. Greet the judges with a firm handshake. Appearance, good manners, appropriate attire and enthusiasm for what you are doing will impress the judges.

AWARDS AND SCHOLARSHIPS



More than \$1M in cash prizes and scholarships are awarded!

Over 30% of all PRSEF participants in 2010 won an award!

INTERNATIONAL SCIENCE & ENGINEERING FAIR (ISEF) AWARDS

Senior Division (9th - 12th grades): Each student researcher entering an exhibit in this division may apply for participation in the Intel ISEF, www.societyforscience.org/isef. Student must apply by February 11, 2011 to be considered. The procedure can be accessed at www.pittsburghsciencefair.org. Up to four student researchers will be chosen and will receive an all-expense paid trip to compete at ISEF, held May 8-13, 2011 in Los Angeles, CA. Visit <http://www.societyforscience.org/intelisef2011>.

PRSEF is the ONLY Science Fair in Western Pennsylvania which is affiliated with Society for Science & The Public and can advance students to the Intel ISEF.

CATEGORY AWARDS

Senior Division:

\$300 - First Place \$75 - Third Place
\$150 - Second Place \$25 - Honorable Mention

Intermediate Division:

\$150 - First Place \$35 - Third Place
\$75 - Second Place \$20 - Honorable Mention

Junior Division:

\$75 - First Place \$30 - Third Place
\$50 - Second Place \$15 - Honorable Mention

Certificates of Science Excellence will be sent to the students' schools. All category award winners receive medals. Teams will split the cash prizes.

SPONSOR AWARDS

Sponsor awardees receive \$50 and a medal. Sponsor awards are defined and selected by the sponsoring organization. Many sponsors also recognize the sponsoring teacher with a cash award of \$50. **Affiliated Sponsor** awards (certificates, medallions, items as determined by sponsors) are awarded at PRSEF, because of its affiliation with ISEF. These sponsors include Intel, U.S. Army, Navy and Marines.

SCHOLARSHIPS

Full/half/partial tuition and pre-college program scholarships are determined and selected by the awarding colleges and universities.

PERSEVERANCE AWARDS

Inscribed trophies are awarded to students for their continued dedication to the exploration of science and engineering. Qualifying students must submit the perseverance form by Feb. 28, 2011.

Honorary Scientist

Eleventh and twelfth graders with five or more years of active participation.

Associate Scientist

Tenth, eleventh and twelfth graders with three or four years of active participation.

Junior Scientist

Eighth and ninth grade students with three or more years of active participation.

MERIT AWARDS

Category Judges select students who exhibit excellence in Creativity, Presentation, or Scientific Method. Students will receive a certificate of excellence that signifies their outstanding performance in one of these areas.

SPECIAL AWARDS

Schools and Teachers with the **most winning entries** in each division are honored. One student in each Division is honored at the Carnegie Science Awards. Some sponsors invite students to club meetings, recognition dinners or site tours.

Sponsors

Bayer Corporation, FedEx Ground, The Buhl Foundation, The Heinz Endowments, United States Steel Corporation with additional support from regional academic institutions, corporations, foundations & professional societies.

The Pittsburgh Regional Science and Engineering Fair is presented by Carnegie Science Center. Please contact us at 412.237.1534 or prsef@carnegiesciencecenter.org or visit www.pittsburghsciencefair.org.